Ballinger Open Space Restoration
Project Design Document – Year 4

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INSTRUCTIONS

Project Operators must complete and submit this Project Design Document (PDD) to request credits after the third anniversary of the Credit Commencement Date. City Forest Credits then reviews this PDD as part of the validation process along with all other required project documents. An approved third-party verifier then does an independent check of all documents and compliance with the Protocol, known as verification. An updated PDD will need to be submitted for future verification at Year 6 and After Year 25.

Project Operators should enter data and supporting attachments starting on page 3 under Project Overview where you find "[Enter text here]" as thoroughly as possible and provide numbered attachments for maps and other documentation (ex: 1 – Regional Map). Keep all instructions in the document.

Below is a list of documents that are needed to complete a successful Year 4 Project Design Document:

<u>For the Single Tree Planting Design:</u>

- Carbon Quantification Year 4 Credit tool
- Tree Sampling Data
- Geocoded photos
- Project geospatial data, if there have been changes (KML file or shapefile)

<u>For the Cluster Planting Design</u>

- Project Area imaging from any telemetry, imaging, or remote sensing service
- i-Tree Canopy report
- i-Tree Canopy source data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool

<u>For the Area Reforestation Planting Design (previously Canopy Design)</u>:

- Either:
    - Project Area imaging from any telemetry, imaging, or remote sensing service
    - i-Tree Canopy report
    - i-Tree Canopy source data
- Or:
    - Tree plot sampling data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool
- Summary of approach to quantifying the local CO_2 index

PROJECT OVERVIEW

Project Name: Ballinger Open Space Restoration
Project Number: 003
Project Type: Planting Project (under the Planting Protocol – Version 9, February 7, 2021)
Project Start Date: March 9, 2021 (date of last tree planted)
Project Location: Shoreline, WA

Project Operator Name: Mountains to Sound Greenway Trust
Project Operator Contact Information: Kate Fancher, Restoration Projects Manager
206-688-6560
Kate.Fancher@mtsgreenway.org

PROJECT AND PLANTING DESIGN UPDATES

Include information on changes to the project including tree survival, ownership, or other relevant updates.

The Mountains to Sound Greenway Trust (Greenway Trust) has partnered with the City of Shoreline and City Forest Credits to undertake ecological restoration at the 2.7-acre Ballinger Open Space in Shoreline, WA. Tree planting occurred between December of 2018 and March of 2021. To date, 1,917 trees have been planted at Ballinger Open Space using the single tree planting design.

There have been no changes in ownership to the Project Site since implementation. The Greenway Trust has maintained and monitored the site since the trees were planted.

The Greenway Trust continues to plant additional trees on the project site outside of the initial carbon project where additional weed removal had occurred. Overall, tree sampling mortality was estimated at 15% with tree mortality noted in all four plots. Plot 4's location had to be adjusted slightly due to a fallen tree and erosion of the creek bed.

CARBON QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)

Describe and summarize the planting design, sampling, and appropriate quantification/measurement method for the project – Single Tree, Clustered, or Area Reforestation. Include the project's climate zone and method of data collection. Outline the estimated total number of credits to be issued to the project over 25 years as well as the amount to be issued upon successful validation and verification in Year 4. Attach the quantification tool and appropriate sampling tool.

List of quantification Tools by planting method (CFC to provide guidance and resources):

1) *Single Tree - single tree quantification tool*
2) *Clustered - cluster quantification tool*
3) *Area Reforestation - quantification with CO_2 calculated per acre*

To ensure performance of the credits, Project Operators must commit to the following at Year 4, with additional requirements at Year 6 and after Year 25 based on the appropriate quantification method.

1) *Single Tree*
    a. *<u>Year 4:</u> Project Operators must generate a random sample of project tree sites using the Single Tree Quantification Tool. Project Operators must visit those sampled tree sites and collect data on whether the sample contains a live tree, standing dead tree, or no tree. Provide geocoded photos or imaging of a minimum sample of 20% of the trees. The tracking file includes a column where each tree is assigned a unique serial number to help with tracking each coordinate and tree picture or image.*
        i. *Based on this data, the number and species of project trees is adjusted and a new CO_2 projected amount by after Year 25 is generated.*

2) *Clustered*
    a. *<u>Year 4</u>: Project Operators provide images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project Operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.*
        i. *If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Clustered Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

3) *Area Reforestation (formerly Canopy planting design)*
    a. *<u>Year 4</u>: Project Operators must either conduct a physical tree count using plots or use imaging to determine canopy coverage at Year 4.*
        i. *If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

Overview

Tree planting occurred at Ballinger Open Space between December of 2018 and March of 2021. To date, 1,917 trees have been planted across the 2.7-acre site. Tree species planted primarily included Douglas

fir, Sitka spruce, western redcedar, grand fir, cascara, red alder, big-leaf maple, vine maple, black cottonwood, Pacific willow, and Sitka willow. The Project Operator used the single tree planting design and single tree quantification tool.

Data Collection

The Single Tree method was used for planting at Ballinger Open Space. Spacing was not regular throughout the site, with larger trees planted on ten foot spacing, but some smaller trees (e.g., Sitka willow and Pacific willow) planted closer together than 10 feet. The number of each tree species planted is detailed in the Ballinger Single Tree Credit Tool – Year 4 (attached) on the "planting list" sheet.

In 2021 field sampling for Year 1 planting verification included establishing four, 1/10th of an acre circular plots throughout the open space as directed by CFC forest scientists (refer to attachment 1, tab "Stem Counts – Yr 1" for the original plot stem counts). This added up to 4/10 of an acre, or 14.8% of the open space. To set up the plots, tape measurers were laid out in cardinal directions at a 75' diameter. The center of each plot was marked with a t-post. Pin flags were then installed along the perimeter of the plot to form a circle. In 2024 the location of Plot 4 had to be adjusted slightly due to a fallen tree and erosion of the creek bed (plot locations in attachments 2 and 3). With the plot shifting slightly to the east, 12 of the originally mapped trees were not included in the updated plot and 6 new trees were included (refer to attachment 3, "Plot 4 2024"). Photo points were taken from the edge of the circle (in each cardinal direction) for all four sample plots (shown in attachment 5).

Stems were counted throughout each plot (refer to attachment 4) and resulted in a count of 240 trees, which when extrapolated equates to 1,620 trees across the entire 2.7-acre open space (refer to attachment 1, tab "Stem Counts – Yr 4" for the updated plot stem counts). Overall, tree sampling mortality was estimated at 15% with tree mortality noted in all four plots (refer to attachment 1, tab "Plot Mortality"). Because of the decrease in total trees planted in plot 4, there is a slight inflation in mortality for plot 4. There were also a few updates made to miscounted trees in the original stem counts (refer to attachment 1, tab "Stem Counts – Yr 1" and "Stem Counts – Yr 4") and trees that weren't originally included in plot maps (refer to attachment 3). Overall, mortality isn't significant as at the outset of the project, we accounted for a 20% mortality deduction, which the 15% observed mortality falls within. However, additional infill planting will likely occur as the project progresses.

Attachments:

1 - Ballinger Single Tree Credit Tool – Year 4
2 - Ballinger Plot Drawings Year 1 (2021)
3 - Ballinger Plot Drawings Year 4 (2024)
4 - Ballinger Plot Coordinates Map
5 - Ballinger Year 4 Photos (2024)

Carbon Quantification

Total number of trees planted	1,917
Project area (acres), if applicable	2.7
Total number of trees per acre, if applicable	710

Credits attributed to the project (tCO2e)	2,847
Credits after mortality deduction (20% or insert observed mortality, if greater)	2,164
Contribution to Registry Reversal Pool Account (5%) (tCO2e)	114
Total credits to be issued to the Project Operator (tCO2e)	**2,164**
Total credits requested to be issued at Year 4	**865**

GHG Assertion:
Project Operator asserts that the Project results in GHG emissions mitigation of 2,164 tons CO_2e over the 25-year Project Duration. Project Operator asserts that, per Protocol guidelines, 40% of the Project GHG emissions mitigation is issued at Year 4, or 865 tons CO_2e.

The updated Projected CO_2 stored and credit issuance over 26 years is outlined below:

Single Tree Plantings	Projection at Initial Crediting	Updated Projection at Year 4
Total credits issued at Initial Crediting (10% CO2 (t))	216	216
Total credits to be issued at Year 4 (40% CO2 (t))	865	865
Total credits to be issued at Year 6 (30% CO2 (t))	649	649
Total credits to be issued at Year 26 (20% CO2 (t))	434	434
Total credits to be issued (tCO2e)	**2,164**	**2,164**

Attachment:
1 - Ballinger Single Tree Credit Tool – Year 4

CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 12 and Appendix A)

Summarize co-benefit quantification and provide supporting documentation. If necessary, update the CFC-provided Co-Benefits Quantification spreadsheet to calculate updated rainfall interception, reduction of certain air compounds, and energy savings.

Ecosystem Services	***Resource Units***	***Value***
Rainfall Interception (m3/yr)	9,701.52	$71,222.22
Air Quality (t/yr)	-0.6626	$478.82
Cooling – Electricity (kWh/yr)	100,421.12	$5,141.56
Heating – Natural Gas (kBtu/yr)	298,479.20	$3,397.79
Grand Total ($/yr)		**$82,079.52**

Attachment:
1 - Ballinger Single Tree Credit Tool – Year 4

ADDITIONALITY (Section 4)

Additionality is demonstrated by Project Operators per the Protocol in the following ways and in the Attestation of Additionality. The Attestation of Additionality was not required to be signed in the Tree Planting Protocol Version 9, however Project Operator met the requirements and is submitting the Attestation with this Project Design Document update.

- Project trees are not required by law or ordinance to be planted (Protocol Section 2.2). See Attestation of Planting.
- The Project did not plant trees on sites that were forested and then cleared of trees within the prior ten years
- Project trees are additional based on a project specific baseline or the Performance Standard Baseline attached to this PDD.
- Project Operator has signed a Project Implementation Agreement with City Forest Credits for 25 years.
- The 25-year Project Duration commitment is additional to and longer than any commitment the Project Operator makes to non-carbon project tree plantings.
- Project Operator has signed the Attestation of Additionality.

Attachment:
6 – Ballinger Attestation of Additionality

ADDITIONAL INFORMATION

Include additional information on changes to monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.

No additional changes to the monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.

SIGNATURE

Signed on December 23rd in 2024, by Kate Fancher, Restoration Projects Manager, for the Mountains to Sound Greenway Trust.

Kate Fancher
Signature

Kate Fancher
Printed Name

206-688-6560

Phone

Kate.Fancher@mtsgreenway.org_____
Email

ATTACHMENTS

For the Single Tree Planting Design:

1 - Ballinger Single Tree Credit Tool – Year 4
2 - Ballinger Plot Drawings Year 1 (2021)
3 - Ballinger Plot Drawings Year 4 (2024)
4 - Ballinger Plot Coordinates Map
5 - Ballinger Year 4 Photos (2024)
6 - Ballinger Attestation of Additionality

For the Cluster Planting Design

1 - Project Area imaging from any telemetry, imaging, or remote sensing service
2 - i-Tree Canopy report
3 - i-Tree Canopy source data
4 - Project geospatial data (KML file or shapefile)
5 - Carbon Quantification Year 4 Credit tool

For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
    1 - Project Area imaging from any telemetry, imaging, or remote sensing service
    2 - i-Tree Canopy report
    3 - i-Tree Canopy source data
- Or:
    1 - Tree plot sampling data

2 - Project geospatial data (KML file or shapefile)
3 - Carbon Quantification Year 4 Credit tool
4 - Summary of approach to quantifying the local CO_2 index

ATTACHMENTS

1 - Ballinger Single Tree Credit Tool – Year 4

Planting List

Table 2. Summary of Planting Sites

Tree-Type	Tree-Type Abbreviation	No. Sites Planted
Brdlf Decid Large (>50 ft)	BDL	410
Brdlf Decid Med (30-50 ft)	BDM	527
Brdlf Decid Small (<30 ft)	BDS	177
Brdlf Evgrn Large (>50 ft)	BEL	0
Brdlf Evgrn Med (30-50 ft)	BEM	0
Brdlf Evgrn Small (<30 ft)	BES	0
Conif Evgrn Large (>50 ft)	CEL	803
Conif Evgrn Med (30-50 ft)	CEM	0
Conif Evgrn Small (<30 ft)	CES	0
	Total Sites Planted	1917

Row Labels	Sum of No. Sites Planted
bigleaf maple	12
black cottonwood	398
Cascara	70
Douglas fir	178
grand fir	70
Pacific willow	477
red alder	50
Sitka spruce	255
Sitka willow	95
vine maple	12
western red cedar	300
Grand Total	**1917**

Stem Counts – Yr 1

PLOT 1		PLOT 2		PLOT 3		PLOT 4	
SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT
Western Red-cedar	12	Western Red-cedar	3	Western Red-cedar	4	Western Red-cedar	15
Sitka Spruce	11	Sitka Spruce	9	Sitka Spruce	2	Sitka Spruce	8
Douglas-fir	8	Pacific Willow	25	Douglas-fir	9	Douglas-fir	9
Pacific Willow	23	Sitka Willow	12	Grand Fir	16	Gary Oak	2
Sitka Willow	6	Red Alder	1	Big Leaf Maple	8	Pacific Willow	9
Black Cottonwood	3	Black Cottonwood	55	Vine Maple	4	Sitka Willow	1
Red Alder	9			Gary Oak	5	Black Cottonwood	11
				Cascara	1	Red Alder	3
TOTAL	72	TOTAL	105	TOTAL	49	TOTAL	58

plots	284
number of plots	4
trees per acre	710
total acres	2.7
TOTAL TREES	**1917**

Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	BC
Red Alder	RA

Stem Counts – Yr 4

PLOT 1		PLOT 2		PLOT 3		PLOT 4	
SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT
Western Red-cedar	12	Western Red-cedar	2	Western Red-cedar	4	Western Red-cedar	9
Sitka Spruce	10	Sitka Spruce	10	Sitka Spruce	1	Sitka Spruce	5
Douglas-fir	8	Pacific Willow	20	Douglas-fir	10	Douglas-fir	10
Pacific Willow	23	Sitka Willow	7	Grand Fir	12	Gary Oak	1
Sitka Willow	6	Red Alder	1	Big Leaf Maple	8	Pacific Willow	9
Black Cottonwood	3	Black Cottonwood	42	Vine Maple	4	Sitka Willow	1
Red Alder	9			Gary Oak	3	Black Cottonwood	8
				Cascara	1	Red Alder	1
TOTAL	71	TOTAL	82	TOTAL	43	TOTAL	44

number of trees on all plots	240
number of plots	4
trees per acre	600
total acres	2.7
TOTAL TREES	**1620**
Total Trees Planted Initially	1917
Survival Rate	85%

Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	BC
Red Alder	RA

Plot Mortality

Plot Sample Results

Plot	Species	Number
1	Western Red-cedar	12
1	Sitka Spruce	10
1	Douglas-fir	8
1	Pacific Willow	23
1	Sitka Willow	6
1	Black Cottonwood	3
1	Red Alder	9
2	Western Red-cedar	2
2	Sitka Spruce	10
2	Pacific Willow	20
2	Sitka Willow	7
2	Red Alder	1
2	Black Cottonwood	42
3	Western Red-cedar	4
3	Sitka Spruce	1
3	Douglas-fir	10
3	Grand Fir	12
3	Big Leaf Maple	8
3	Vine Maple	4
3	Gary Oak	3
3	Cascara	1
4	Western Red-cedar	9
4	Sitka Spruce	5
4	Douglas-fir	10
4	Gary Oak	1
4	Pacific Willow	9
4	Sitka Willow	1
4	Black Cottonwood	8
4	Red Alder	1

Row Labels	Year 0 counts	Year 4 counts	Survival Rate
Big Leaf Maple	8	8	100%
Black Cottonwood	69	53	77%
Cascara	1	1	100%
Douglas-fir	26	28	108%
Gary Oak	7	4	57%
Grand Fir	16	12	75%
Pacific Willow	57	52	91%
Red Alder	13	11	85%
Sitka Spruce	30	26	87%
Sitka Willow	19	14	74%
Vine Maple	4	4	100%
Western Red-cedar	34	27	79%
Grand Total	**284**	**240**	**85%**

Row Labels	Sum of Numb	Sum of Number	
BDL	84	65	77%
BDM	70	63	90%
BDS	24	19	79%
CEL	106	93	88%
Grand Total	**284**	**240**	**85%**

Credits

Directions

Using the information you provide and background data, the tool calculates the amount of Credits that could be issued at years 1 (10%), 3 (40%), and 5 (30%) after planting. A mortality deductions (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% buffer pool deduction is applied that will go into a program-wide pool to insure against catastrophic loss of trees. This tool is used to determine credits issued after planting (Intial Crediting). A different tool is used for credit issuance in Years 4 and 6. The tool in those years requires calculation of a sample and collection of data on tree status in the sample sites.

Anticipated Mortality Deduction (%)	20%
Observed Mortality (%)	17%

Table 3. Credits are based on 10%, 40%, and 30% at Years 1, 3, and 5 after planting, respectively, of the projected CO_2 stored by live trees 25-years after planting. These values account for anticipated tree losses and the 5% buffer pool deduction.

						10%	40%	30%	20%	
	No. Sites Planted	No. Live Trees	Mortality Deduction (%)	25-yr CO_2 stored (kg/tree)	Tot. 25-yr CO_2 stored w/ losses and 5% deduction (t)	10% CO_2 (t)	40% CO_2 (t)	30% CO_2 (t)	20% CO_2 (t)	
BDL	410	328	0.20	2,062.82	642.8	64.28	257.11	192.83	128.56	
BDM	527	422	0.20	1,277.75	511.8	51.18	204.71	153.53	102.35	
BDS	177	142	0.20	604.21	81.3	8.13	32.51	24.38	16.26	
BEL	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	
BEM	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	
BES	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	
CEL	803	642	0.20	1,520.44	927.9	92.79	371.16	278.37	185.58	
CEM	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	
CES	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	
	1917	1534		5,465.2	2163.7	216.37	865.48	649.11	432.74	
										sumcheck
				Credits issued	2164	216	865	649	434	2164

Total CO_2

In Table 4 the tool infers the amount of CO_2 stored after 25 years from the sample to the population of live trees. Values in column H account for anticipated tree losses and the 5% buffer pool deduction.

Table 4. Grand Total CO_2 Stored after 25 years (all live trees, includes tree losses and buffer pool deduction)

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality	25-yr CO_2 stored (kg/tree)	CO_2 Tot. - No Deductions (t)	Grand Total CO_2 w/ Deductions (t)
Brdlf Decid Large (>50 ft)	410	0.20	328	2,062.82	845.8	642.8
Brdlf Decid Med (30-50 ft)	527	0.20	422	1,277.75	673.4	511.8
Brdlf Decid Small (<30 ft)	177	0.20	142	604.21	106.9	81.3
Brdlf Evgrn Large (>50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Large (>50 ft)	803	0.20	642	1,520.44	1,220.9	927.9
Conif Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
	1917		1534	5,465.2	2,847.0	2,163.71

Co-Benefits

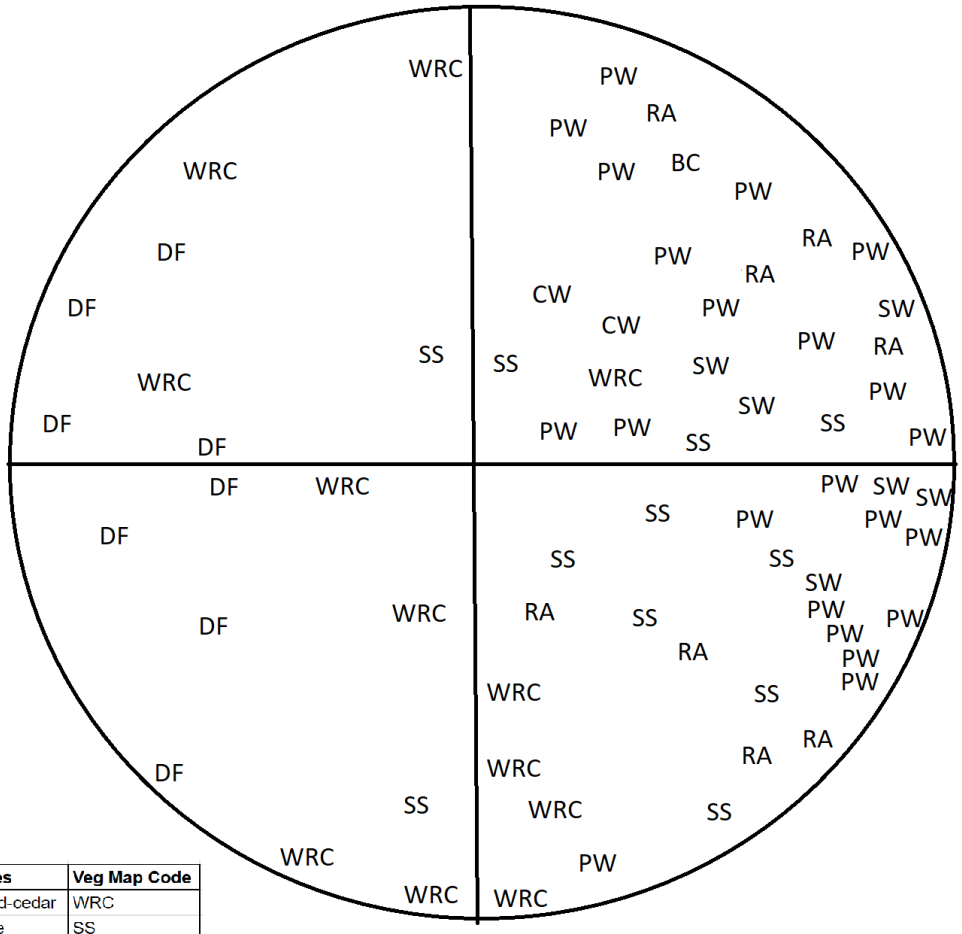
Using the information you provide and background data, the tool provides estimates of co-benefits after 25 years in Resource Units per year and $ per year.

Table 7. Co-Benefits PER YEAR after 25 years (all live trees, includes tree losses)

Ecosystem Services	Resource Units Totals	Resource Unit/site	Total $	$/site
Rainfall Interception (m3/yr)	9,701.52	5.06	$71,222.22	$37.153
CO_2 Avoided (t, $20/t/yr)	91.96	0.05	$1,839.13	$0.959
Air Quality (t/yr)				
O3	0.2939	0.0002	$608.97	$0.318
NOx	0.0948	0.0000	$196.40	$0.102
PM10	0.1665	0.0001	$613.13	$0.320
Net VOCs	-1.2178	-0.0006	-$939.68	-$0.490
Air Quality Total	-0.6626	-0.0003	$478.82	$0.25
Energy (kWh/yr & kBtu/yr)				
Cooling - Electricity	100,421.12	52.38	$5,141.56	$2.68
Heating - Natural Gas	298,479.20	155.70	$3,397.79	$1.77
Energy Total ($/yr)			$8,539.35	$4.45
Grand Total ($/yr)			$82,079.52	$42.82

2 - Ballinger Plot Drawings Year 1 (2021)
Plot 1 2021

PLOT 1

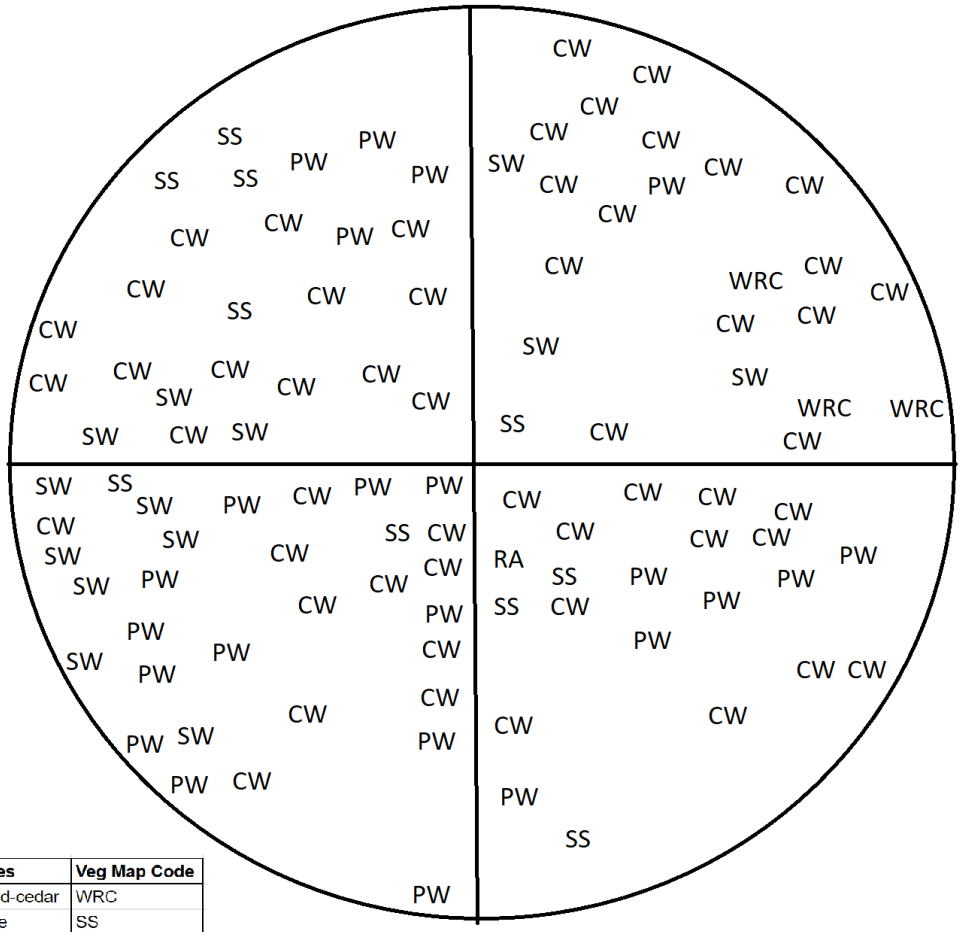


Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

Diameter = 75 ft

N

PLOT 2

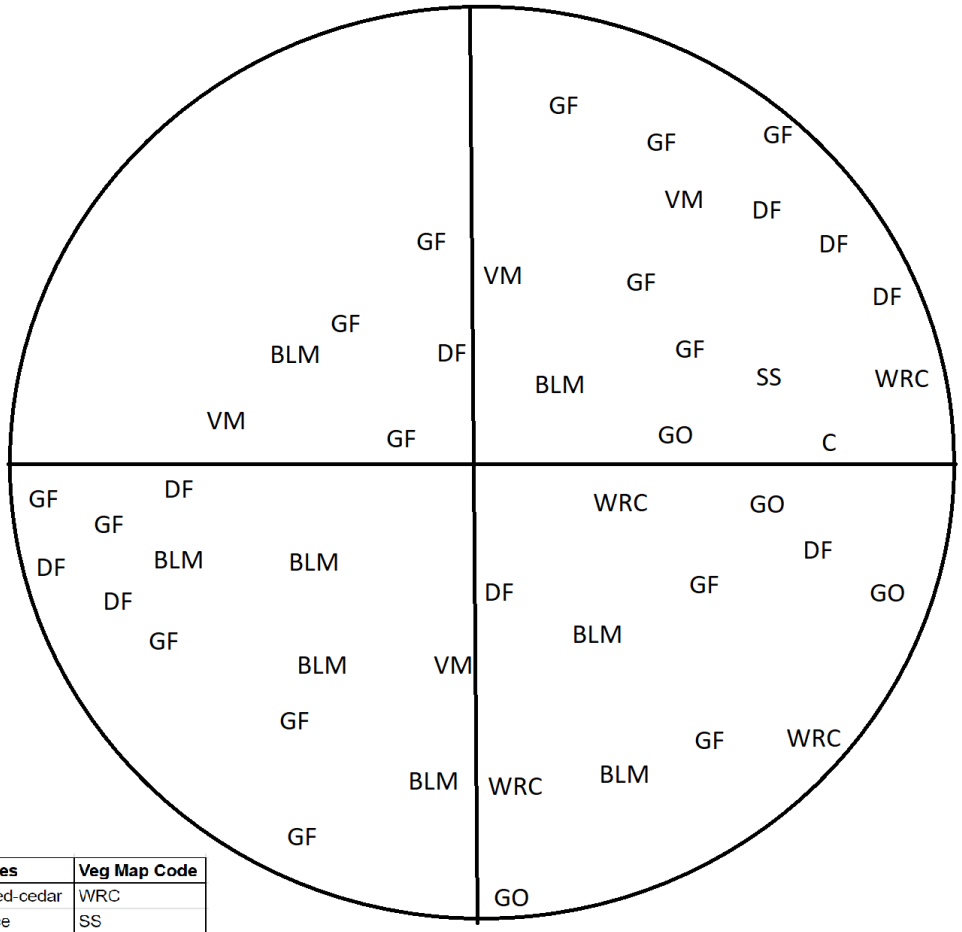


Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

Diameter = 75 ft

N

PLOT 3

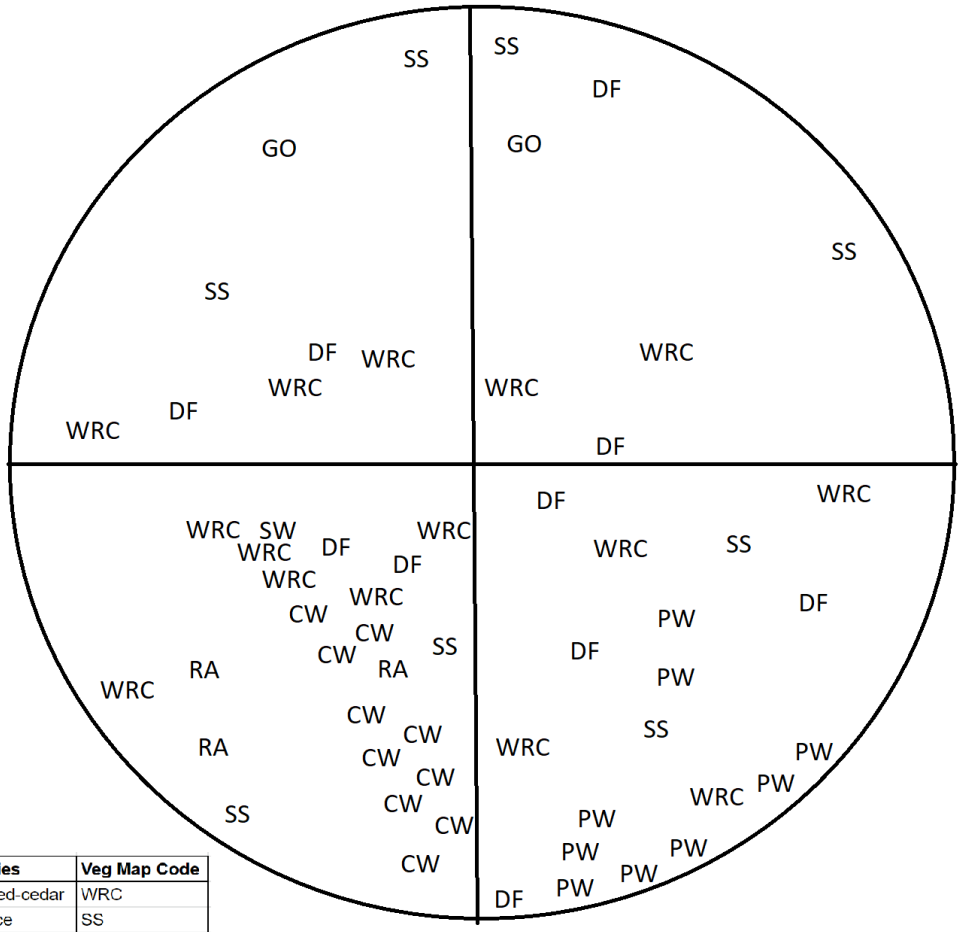


Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

Diameter = 75 ft

N

PLOT 4



Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

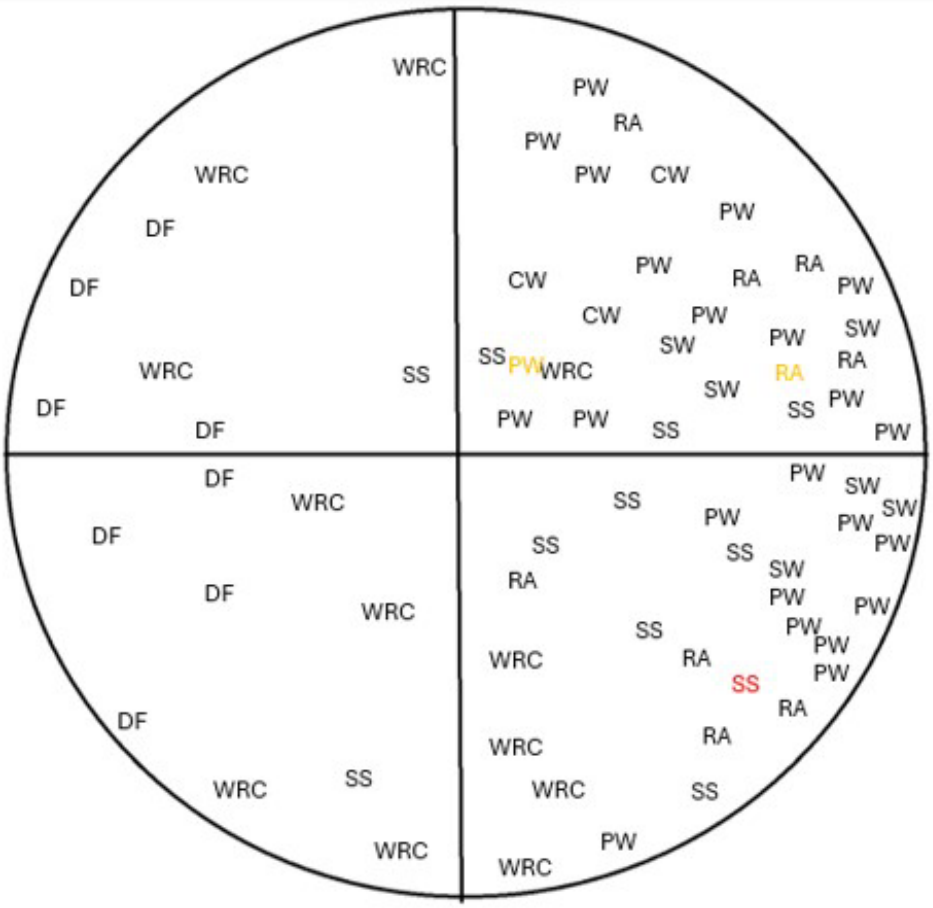
Diameter = 75 ft

N

3 - Ballinger Plot Drawings Year 4 (2024)

Plot 1 2024

PLOT 1



Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	CW
Red Alder	RA

Diameter = 75ft

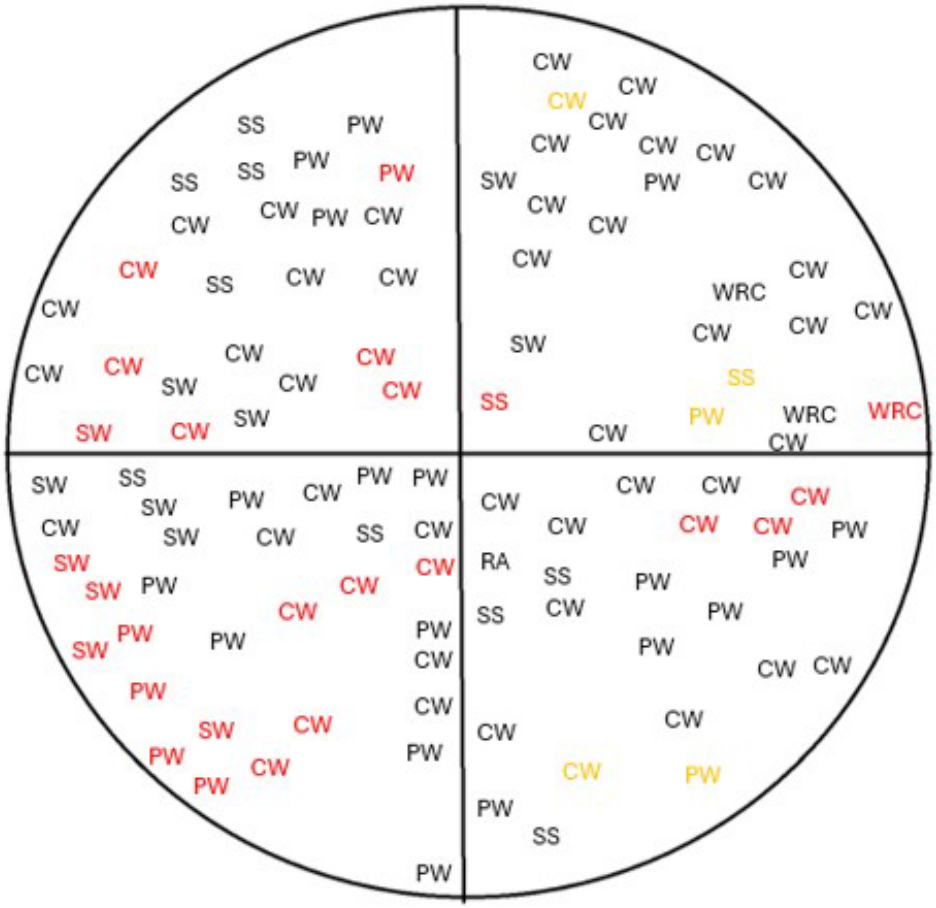
Red = dead/missing

Orange = Not originally mapped

N

Plot 2 2024

PLOT 2



Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	CW
Red Alder	RA

Diameter = 75ft

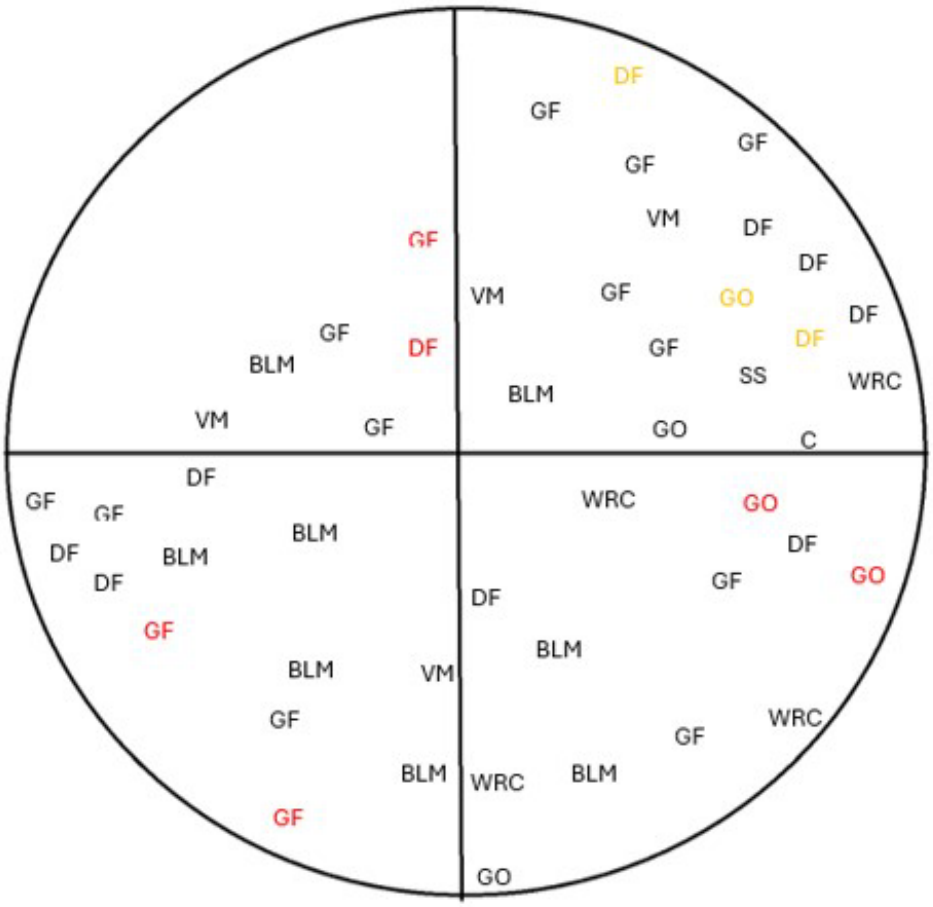
Red = dead/missing

Orange = Not originally mapped

N

Plot 3 2024

PLOT 3



Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	CW
Red Alder	RA

Diameter = 75ft

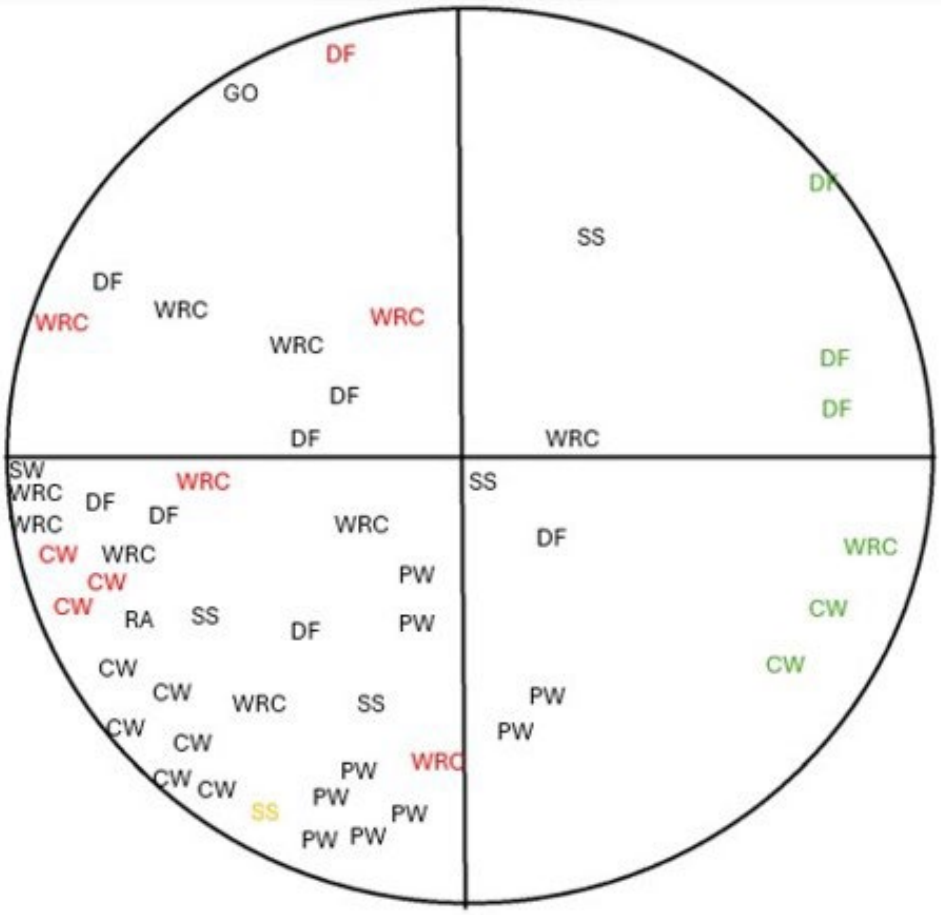
Red = dead/missing

Orange = Not originally mapped

N

Plot 4 2024

PLOT 4



Tree Species	Veg Map Code
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Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	CW
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Green = Included in shifted 2024 plot but not original 2021 plot

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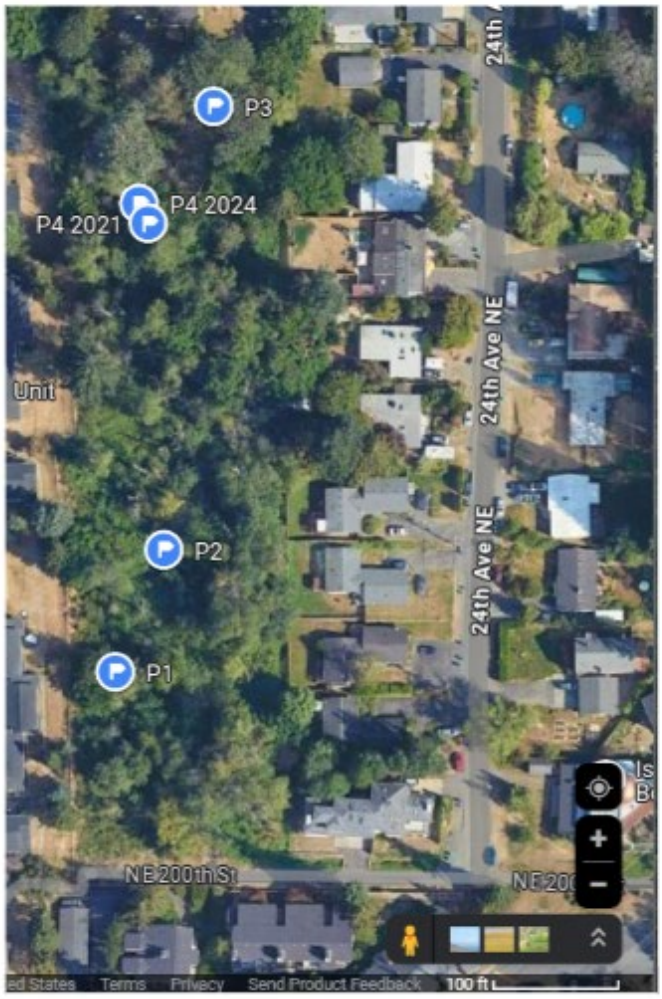
*Plot 4's location had to be adjusted slightly due to a fallen tree and erosion of the creek bed

N

4 - Ballinger Plot Coordinates Map

2024 Ballinger Open Space Monitoring Plot Locations

P1: (47.7742490, -122.3054380)
P2: (47.7745180, -122.3052790)
P3: (47.7754920, -122.3051160)
P4: (47.775278, -122.305361)
P4 2021: (47.7752340, -122.3053300)



5 - Ballinger Year 4 (2024) Photo Monitoring

Plot 1 looking north

Plot 1 looking west

Plot 1 looking south

Plot 1 looking east

Plot 2 looking south

Plot 2 looking west

Plot 2 looking east

Plot 2 looking north

Plot 3 looking west

Plot 3 looking south

Plot 3 looking north

Plot 3 looking east

Plot 4 looking west

Plot 4 looking south

Plot 4 looking north

Plot 4 looking east

Attachments

Carbon Quantification Year 4 Credit Tool – Single Tree

Plot Drawings Years 1 (2021) & 4 (2024)
Plot Coordinates Map
Year 4 Photos

Attestation of Additionality

Carbon Quantification Year 4 Credit Tool – Single Tree

In Table 4 the tool infers the amount of CO_2 stored after 25 years from the sample to the population of live trees. Values in column H account for anticipated tree losses and the 5% buffer pool deduction.

Table 4. Grand Total CO_2 Stored after 25 years (all live trees, includes tree losses and buffer pool deduction)

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality	25-yr CO_2 stored (kg/tree)	CO_2 Tot. - No Deductions (t)	Grand Total CO_2 w/ Deductions (t)
Brdlf Decid Large (>50 ft)	410	0.20	328	2,062.82	845.8	642.8
Brdlf Decid Med (30-50 ft)	527	0.20	422	1,277.75	673.4	511.8
Brdlf Decid Small (<30 ft)	177	0.20	142	604.21	106.9	81.3
Brdlf Evgrn Large (>50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Large (>50 ft)	803	0.20	642	1,520.44	1,220.9	927.9
Conif Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
	1917		1534	5,465.2	2,847.0	2,163.71

Table 2. Summary of Planting Sites

Tree-Type	Tree-Type Abbreviation	No. Sites Planted
Brdlf Decid Large (>50 ft)	**BDL**	410
Brdlf Decid Med (30-50 ft)	**BDM**	527
Brdlf Decid Small (<30 ft)	**BDS**	177
Brdlf Evgrn Large (>50 ft)	**BEL**	0
Brdlf Evgrn Med (30-50 ft)	**BEM**	0
Brdlf Evgrn Small (<30 ft)	**BES**	0
Conif Evgrn Large (>50 ft)	**CEL**	803
Conif Evgrn Med (30-50 ft)	**CEM**	0
Conif Evgrn Small (<30 ft)	**CES**	0
	Total Sites Planted	1917

Row Labels	Sum of No. Sites Planted
bigleaf maple	12
black cottonwood	398
Cascara	70
Douglas fir	178
grand fir	70
Pacific willow	477
red alder	50
Sitka spruce	255
Sitka willow	95
vine maple	12
western red cedar	300
Grand Total	**1917**

PLOT 1		PLOT 2		PLOT 3		PLOT 4	
SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT
Western Red-cedar	12	Western Red-cedar	3	Western Red-cedar	4	Western Red-cedar	15
Sitka Spruce	11	Sitka Spruce	9	Sitka Spruce	2	Sitka Spruce	8
Douglas-fir	8	Pacific Willow	25	Douglas-fir	9	Douglas-fir	9
Pacific Willow	23	Sitka Willow	12	Grand Fir	16	Gary Oak	2
Sitka Willow	6	Red Alder	1	Big Leaf Maple	8	Pacific Willow	9
Black Cottonwood	3	Black Cottonwood	55	Vine Maple	4	Sitka Willow	1
Red Alder	9			Gary Oak	5	Black Cottonwood	11
				Cascara	1	Red Alder	3
TOTAL	72	TOTAL	105	TOTAL	49	TOTAL	58

plots	284
number of plots	4
trees per acre	710
total acres	2.7
TOTAL TREES	**1917**

Tree Species	**Veg Map Code**
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	BC
Red Alder	RA

PLOT 1		PLOT 2		PLOT 3		PLOT 4	
SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT	SPECIES	COUNT
Western Red-cedar	12	Western Red-cedar	2	Western Red-cedar	4	Western Red-cedar	9
Sitka Spruce	10	Sitka Spruce	10	Sitka Spruce	1	Sitka Spruce	5
Douglas-fir	8	Pacific Willow	20	Douglas-fir	10	Douglas-fir	10
Pacific Willow	23	Sitka Willow	7	Grand Fir	12	Gary Oak	1
Sitka Willow	6	Red Alder	1	Big Leaf Maple	8	Pacific Willow	9
Black Cottonwood	3	Black Cottonwood	42	Vine Maple	4	Sitka Willow	1
Red Alder	9			Gary Oak	3	Black Cottonwood	8
				Cascara	1	Red Alder	1
TOTAL	71	TOTAL	82	TOTAL	43	TOTAL	44

number of trees on all plots	240
number of plots	4
trees per acre	600
total acres	2.7
TOTAL TREES	**1620**

Total Trees Planted Initially	1917
Survival Rate	85%

Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	BC
Red Alder	RA

Plot Sample Results

Plot	Species	Number
1	Western Red-cedar	12
1	Sitka Spruce	10
1	Douglas-fir	8
1	Pacific Willow	23
1	Sitka Willow	6
1	Black Cottonwood	3
1	Red Alder	9
2	Western Red-cedar	2
2	Sitka Spruce	10
2	Pacific Willow	20
2	Sitka Willow	7
2	Red Alder	1
2	Black Cottonwood	42
3	Western Red-cedar	4
3	Sitka Spruce	1
3	Douglas-fir	10
3	Grand Fir	12
3	Big Leaf Maple	8
3	Vine Maple	4
3	Gary Oak	3
3	Cascara	1
4	Western Red-cedar	9
4	Sitka Spruce	5
4	Douglas-fir	10
4	Gary Oak	1
4	Pacific Willow	9
4	Sitka Willow	1
4	Black Cottonwood	8
4	Red Alder	1

Row Labels	Year 0 counts	Year 4 counts	Survival Rate
Big Leaf Maple	8	8	100%
Black Cottonwood	69	53	77%
Cascara	1	1	100%
Douglas-fir	26	28	108%
Gary Oak	7	4	57%
Grand Fir	16	12	75%
Pacific Willow	57	52	91%
Red Alder	13	11	85%
Sitka Spruce	30	26	87%
Sitka Willow	19	14	74%
Vine Maple	4	4	100%
Western Red-cedar	34	27	79%
Grand Total	**284**	**240**	**85%**

Row Labels	Sum of Numbe	Sum of Number	
BDL	84	65	77%
BDM	70	63	90%
BDS	24	19	79%
CEL	106	93	88%
Grand Total	**284**	**240**	**85%**

Directions

Using the information you provide and background data, the tool calculates the amount of Credits that could be issued at years 1 (10%), 3 (40%), and 5 (30%) after planting. A mortality deductions (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% buffer pool deduction is applied that will go into a program-wide pool to insure against catastrophic loss of trees. This tool is used to determine credits issued after planting (Intial Crediting). A different tool is used for credit issuance in Years 4 and 6. The tool in those years requires calculation of a sample and collection of data on tree status in the sample sites.

Anticipated Mortality Deduction (%):	20%
Observed Mortality (%)	15%

Table 3. Credits are based on 10%, 40%, and 30% at Years 1, 3, and 5 after planting, respectively, of the projected CO_2 stored by live trees 25-years after planting. These values account for anticipated tree losses and the 5% buffer pool deduction.

						10%	40%	30%	20%
	No. Sites Planted	**No. Live Trees**	**Mortality Deduction (%)**	**25-yr CO_2 stored (kg/tree)**	**Tot. 25-yr CO_2 stored w/ losses and 5% deduction (t)**	**10% CO_2 (t)**	**40% CO_2 (t)**	**30% CO_2 (t)**	**20% CO_2 (t)**
BDL	410	328	0.20	2,062.82	642.8	64.28	257.11	192.83	128.56
BDM	527	422	0.20	1,277.75	511.8	51.18	204.71	153.53	102.35
BDS	177	142	0.20	604.21	81.3	8.13	32.51	24.38	16.26
BEL	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00
BEM	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00
BES	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00
CEL	803	642	0.20	1,520.44	927.9	92.79	371.16	278.37	185.58
CEM	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00
CES	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00
	1917	1534		5,465.2	2163.7	216.37	865.48	649.11	432.74

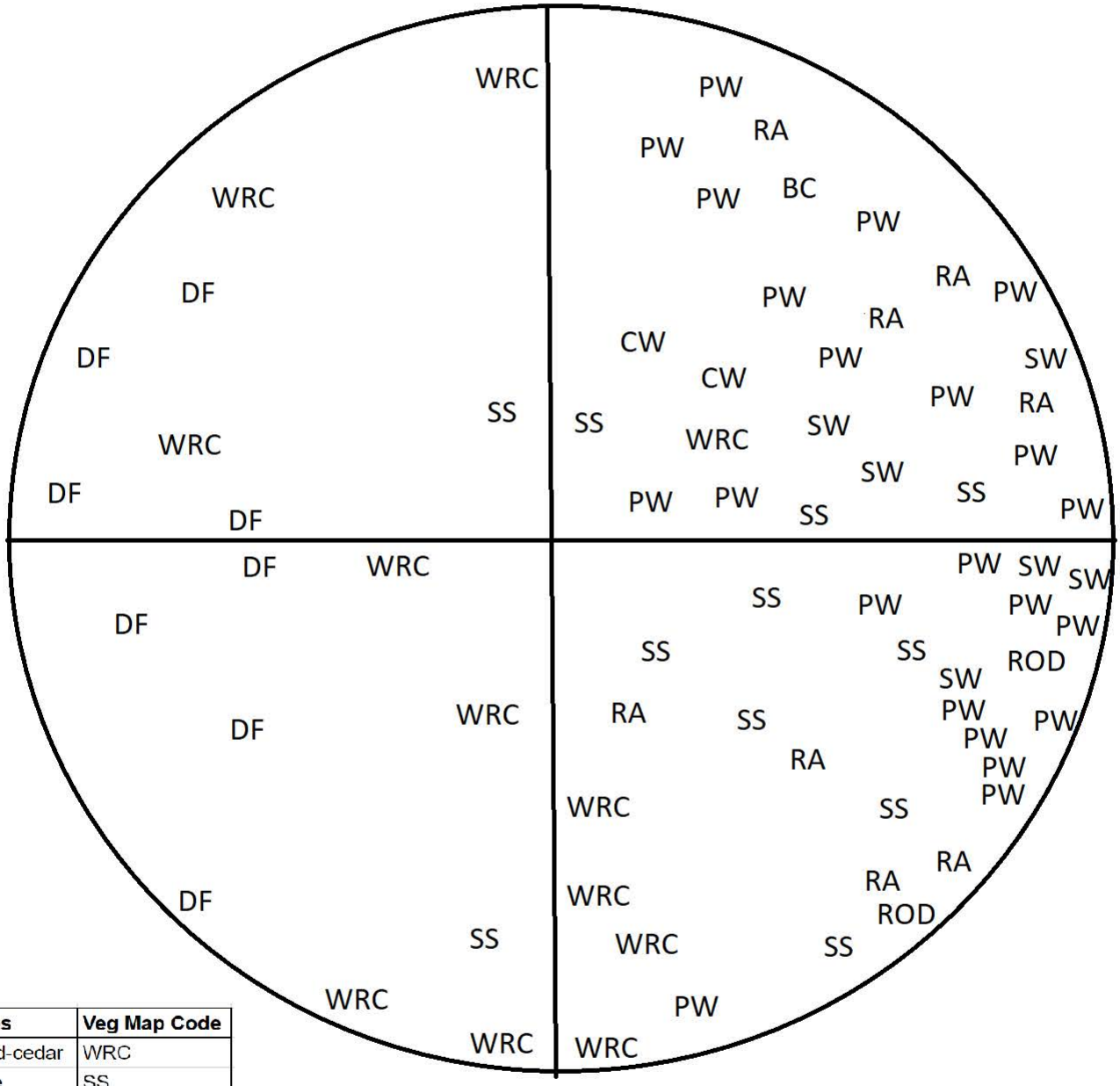
Using the information you provide and background data, the tool provides estimates of co-benefits after 25 years in Resource Units per year and $ per year.

Table 7. Co-Benefits PER YEAR after 25 years (all live trees, includes tree losses)

Ecosystem Services	Resource Units Totals	Resource Unit/site	Total $	$/site
Rainfall Interception (m3/yr)	9,701.52	5.06	$71,222.22	$37.153
CO_2 Avoided (t, $20/t/yr)	91.96	0.05	$1,839.13	$0.959
Air Quality (t/yr)				
O3	0.2939	0.0002	$608.97	$0.318
NOx	0.0948	0.0000	$196.40	$0.102
PM10	0.1665	0.0001	$613.13	$0.320
Net VOCs	-1.2178	-0.0006	-$939.68	-$0.490
Air Quality Total	-0.6626	-0.0003	$478.82	$0.25
Energy (kWh/yr & kBtu/yr)				
Cooling - Electricity	100,421.12	52.38	$5,141.56	$2.68
Heating - Natural Gas	298,479.20	155.70	$3,397.79	$1.77
Energy Total ($/yr)			$8,539.35	$4.45
Grand Total ($/yr)			$82,079.52	$42.82
			$2,051,987.94	

Plot Drawings Years 1 (2021) & 4 (2024)

PLOT 1

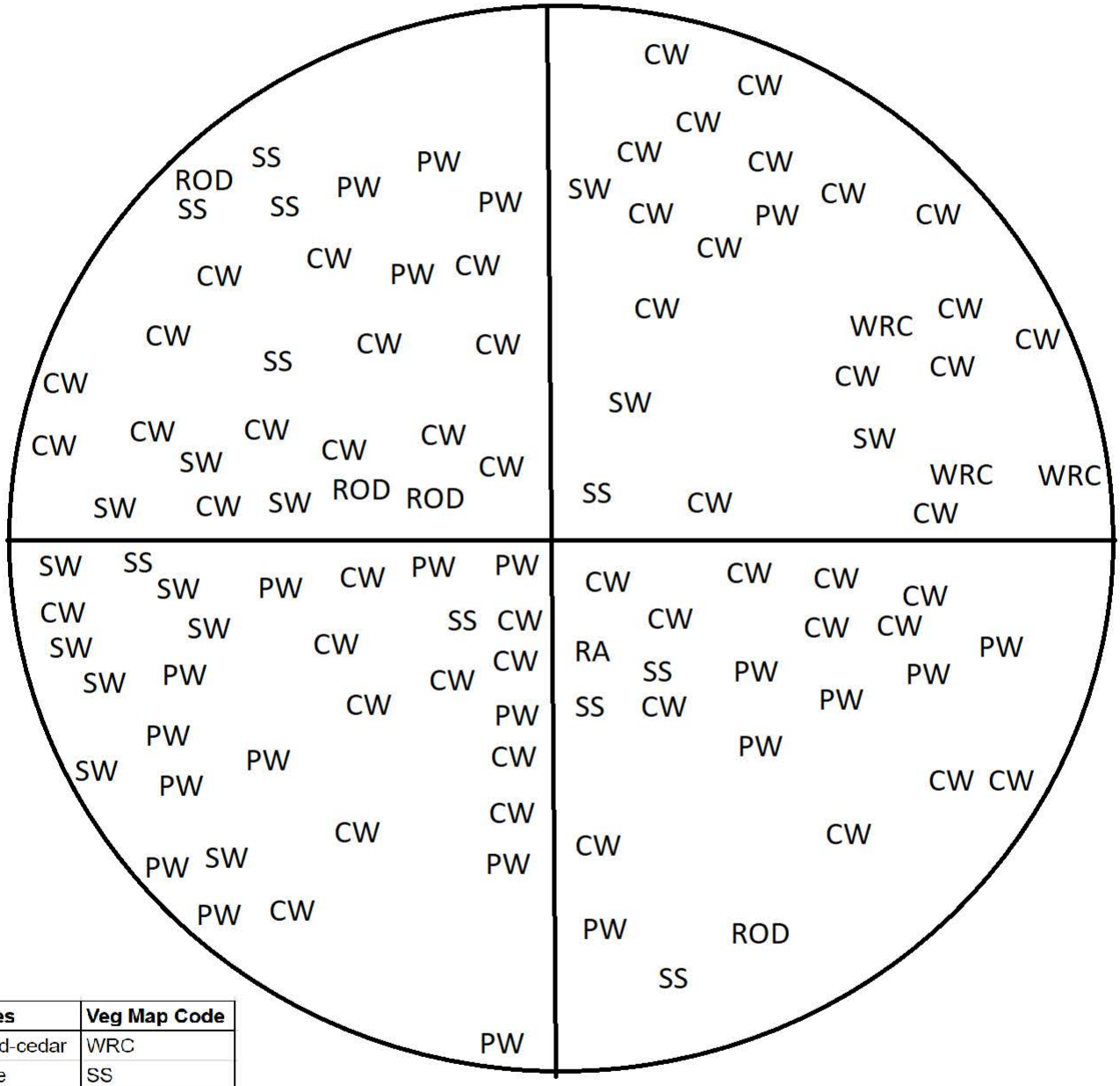


Tree Species	Veg Map Code
Western Red-cedar	WRC
Sitka Spruce	SS
Douglas-fir	DF
Grand Fir	GF
Big Leaf Maple	BLM
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

Diameter = 75 ft

N

PLOT 2



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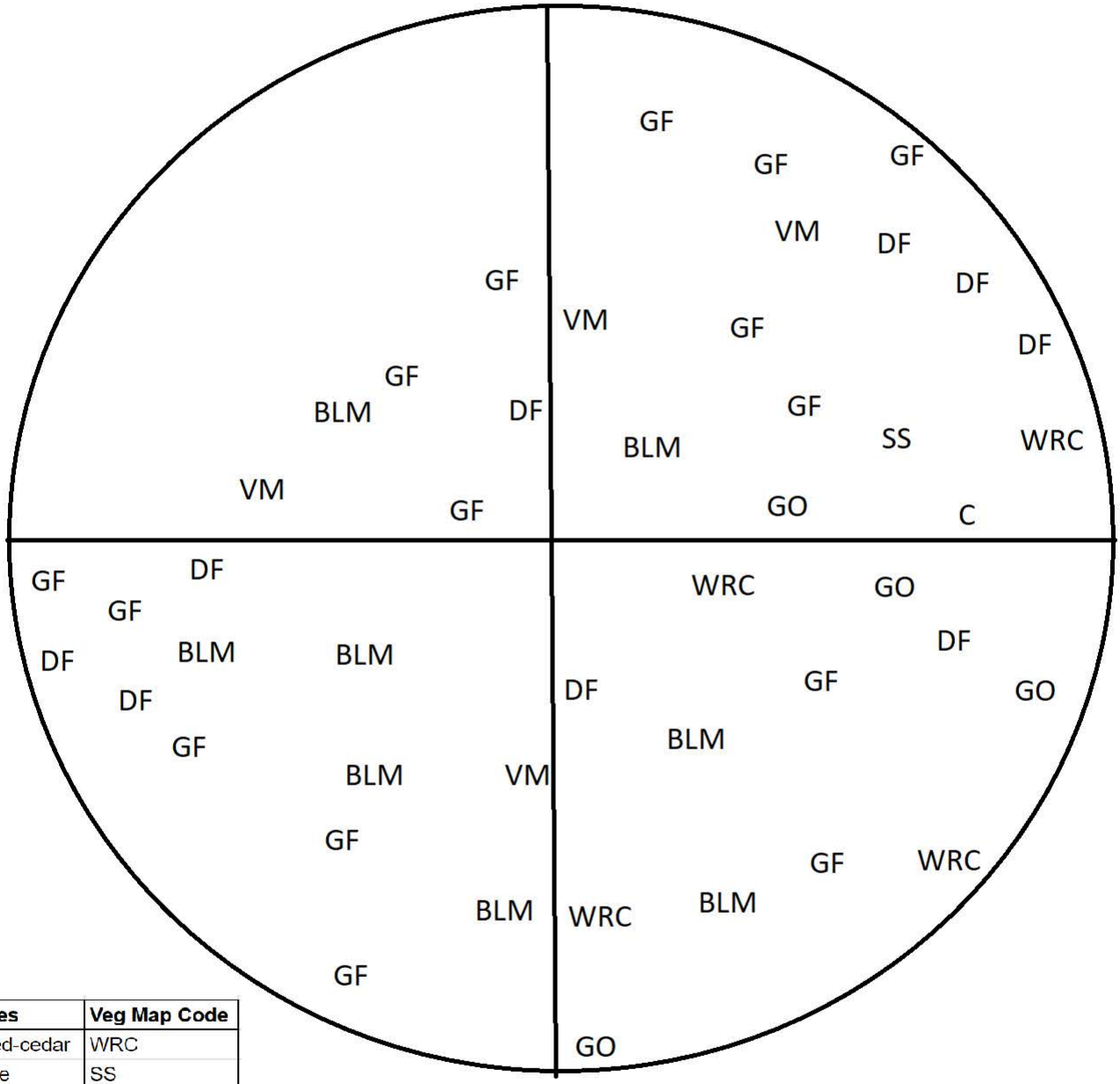
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

N

Diameter = 75 ft

PLOT 3



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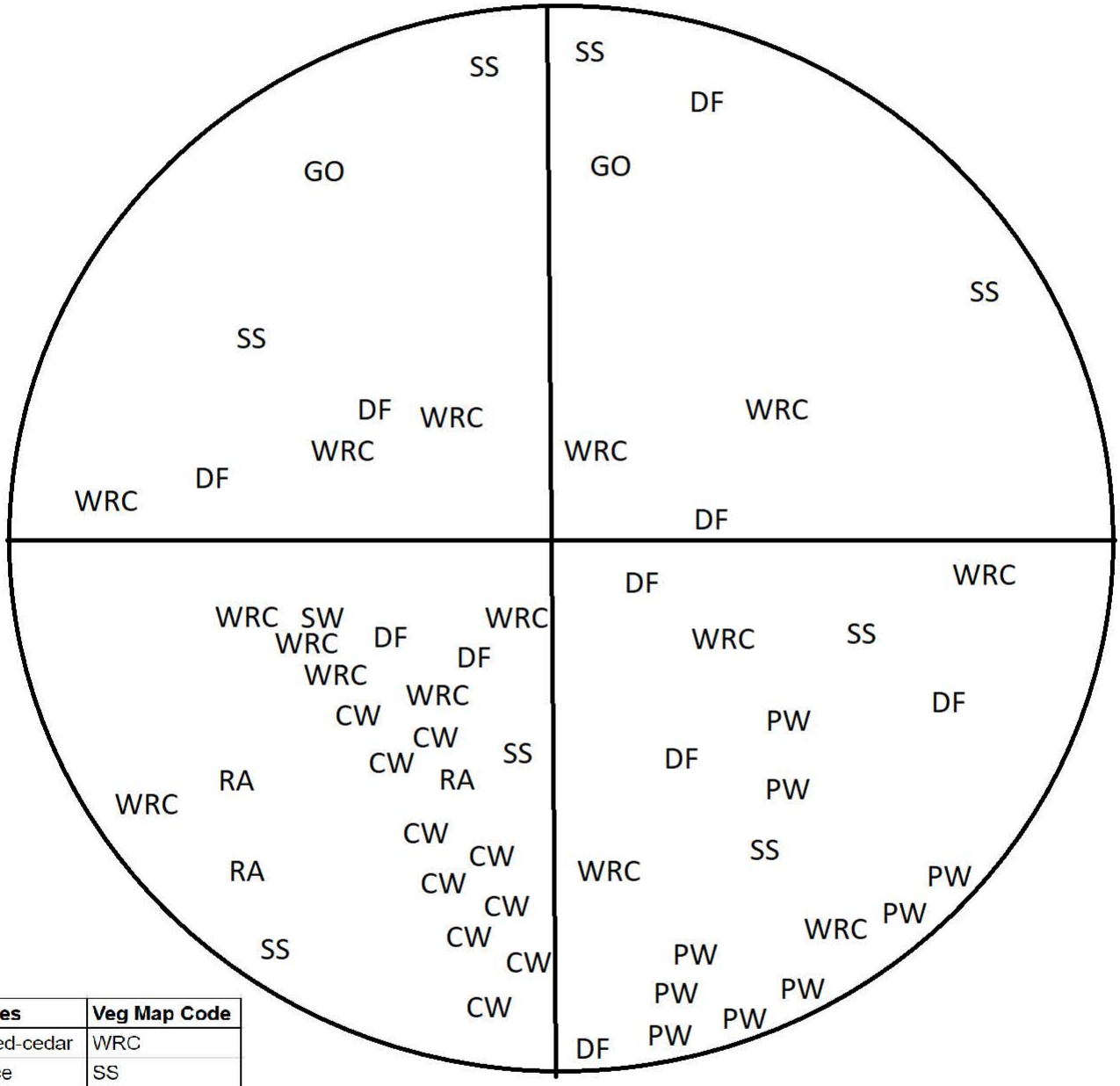
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

N

Diameter = 75 ft

PLOT 4



Tree Species	Veg Map Code
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Grand Fir	GF
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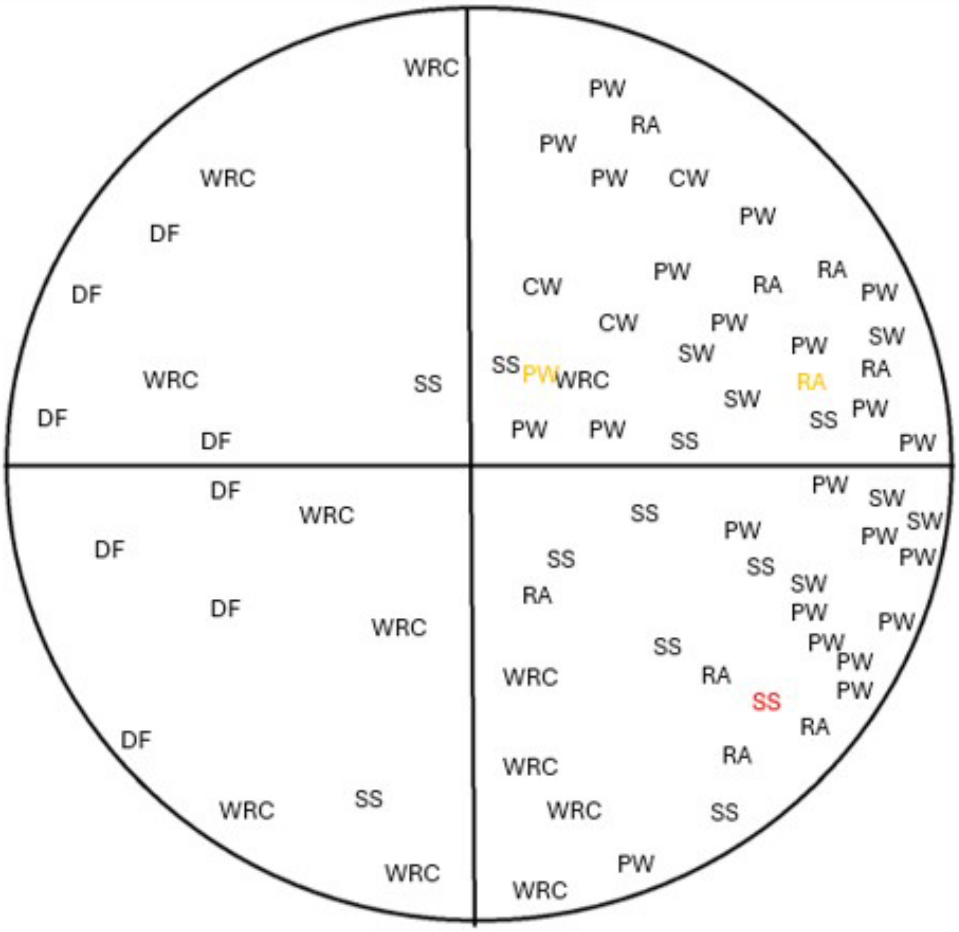
Vine Maple	VM
Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Red Osier Dogwood	ROD
Black Cottonwood	BC
Red Alder	RA

N

Diameter = 75 ft

PLOT 1



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Big Leaf Maple	BLM
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Gary Oak	GO
Cascara	C
Pacific Willow	PW
Sitka Willow	SW
Black Cottonwood	CW
Red Alder	RA

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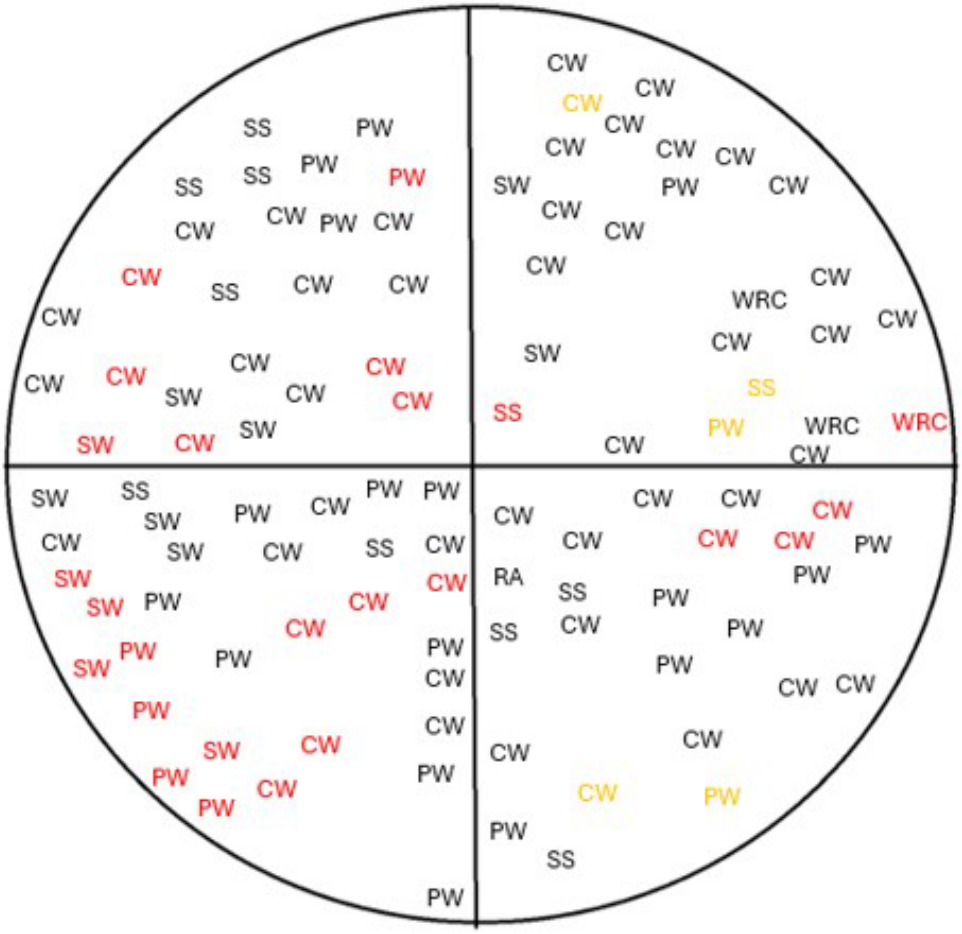

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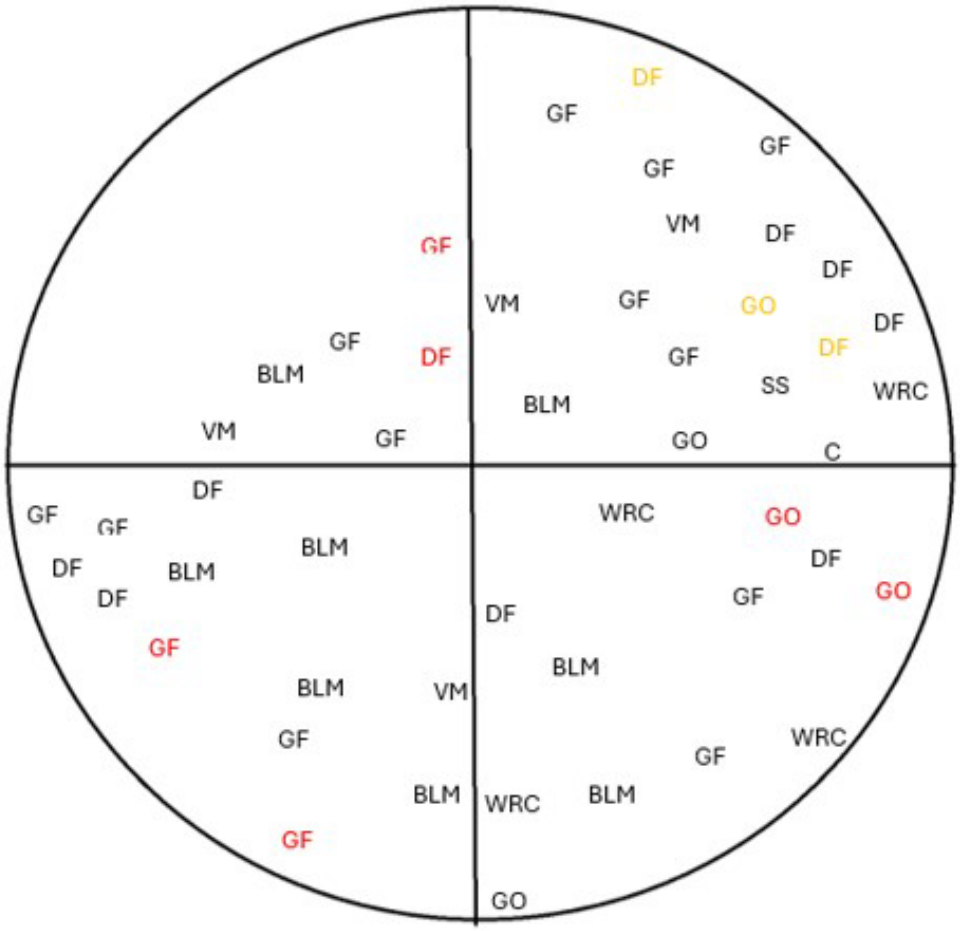

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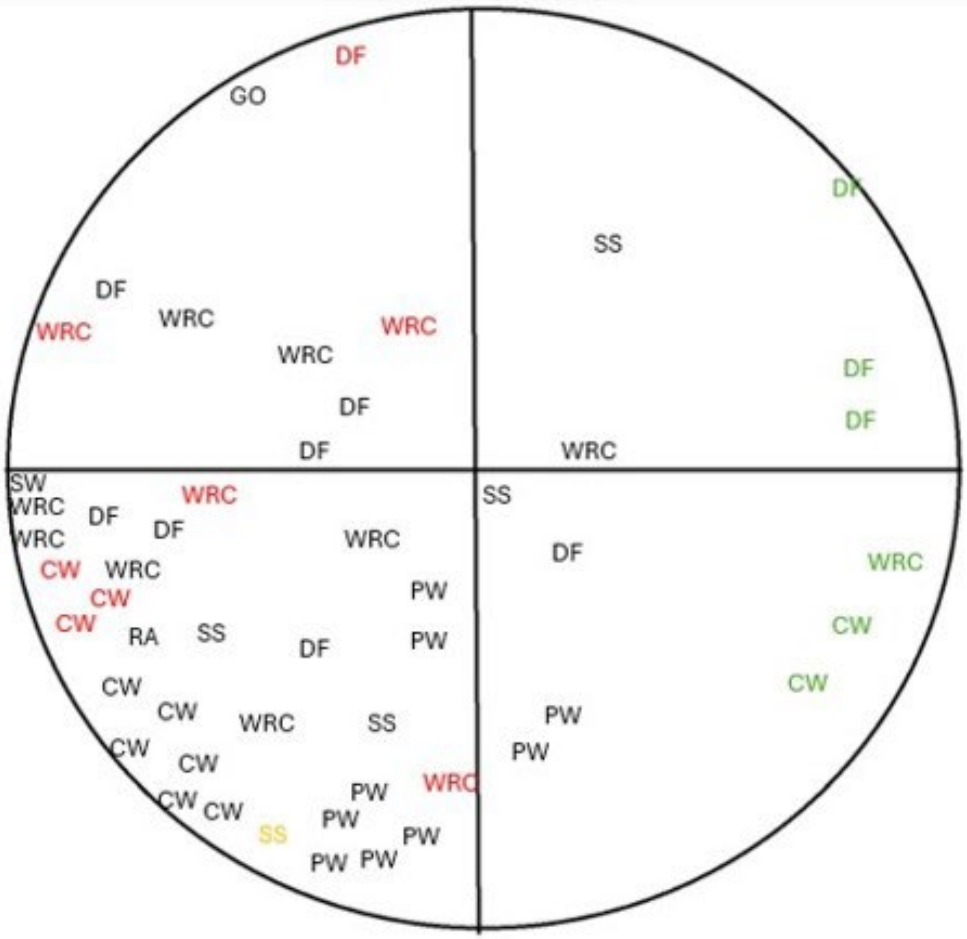
PLOT 4



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N

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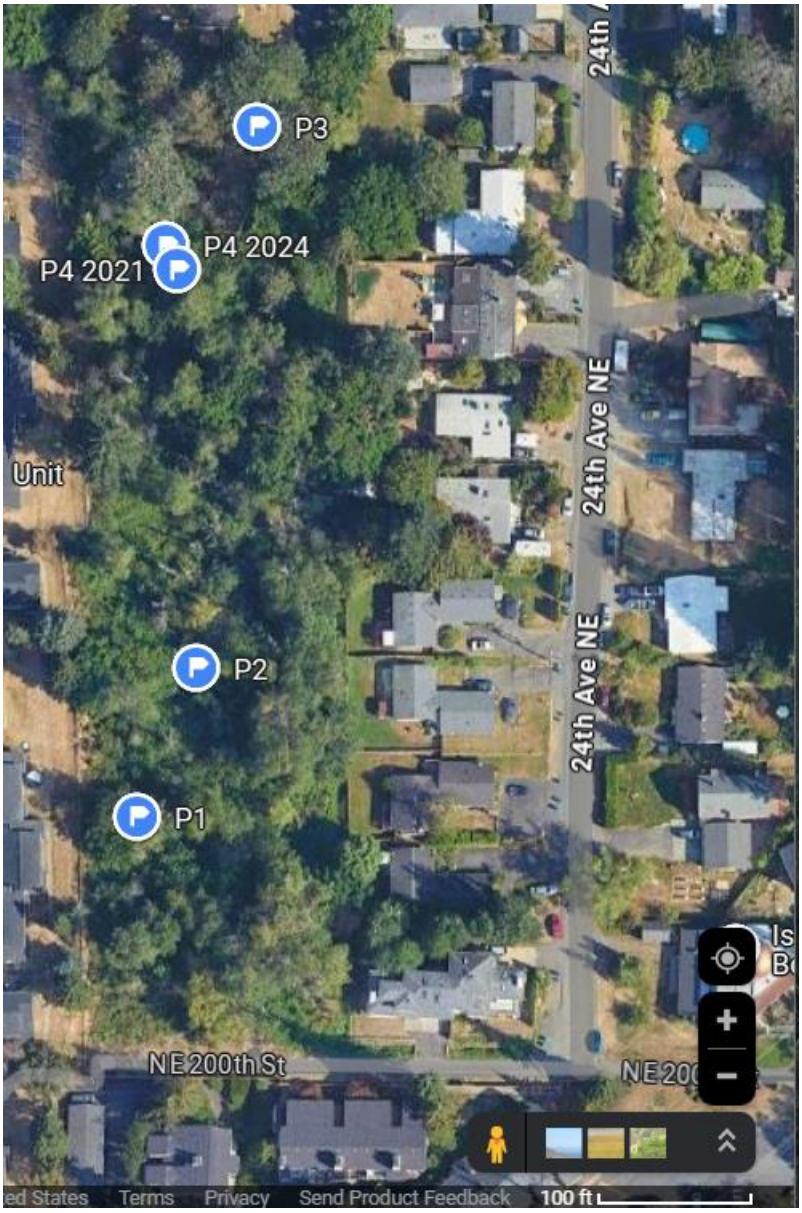
P3: (47.7754920, -122.3051160)
P4: (47.775278, -122.305361)
P4 2021: (47.7752340, -122.3053300)



Year 4 Photos

Ballinger Open Space: Year 4 (2024) Photo Points

Plot 1 looking north

Plot 1 looking west

Plot 1 looking south

Plot 1 looking east

Plot 2 looking south

Plot 2 looking west

Plot 2 looking east

Plot 2 looking north

Plot 3 looking west

Plot 3 looking south

Plot 3 looking north

Plot 3 looking east

Plot 4 looking west

Plot 4 looking south

Plot 4 looking north

Plot 4 looking east

Attestation of Additionality

Ballinger Open Space Restoration
Attestation of Additionality

I am the Restoration Projects Manager of the Mountains to Sound Greenway Trust and make this attestation regarding additionality from this tree planting project, Ballinger Open Space Restoration.

- Project Description
    - The Project that is the subject of this attestation is described more fully in both our Application and our Project Design Document (PDD), both of which are incorporated into this attestation.
- Legal Requirements Test (Protocol Section 1.8)
    - Project trees are not required by law or ordinance to be planted (except for replacement trees planted in place of removed trees for specific reasons).
- The Project did not plant trees on sites that were converted out of a forest use or that were cleared of healthy, non-invasive trees and then planted with project trees (Protocol Section 1.9)
- Project-Specific Baseline or Performance Standard Baseline
    - Project trees are additional based on a project specific baseline. See PDD; or
    - Project trees are additional based on the Performance Standard baseline; see attached baseline to the PDD. Project Operator has provided local canopy change data to support the use of the Performance Standard Baseline.
- Project Implementation Agreement for Project Duration
    - The Mountains to Sound Greenway Trust has signed a Project Implementation Agreement with City Forest Credits for 26 years.
- The 26-year Project Duration commitment is additional to and longer than any commitment the Mountains to Sound Greenway Trust makes to non-carbon project tree plantings.
- Financial Additionality
    - A successful afforestation carbon project goes beyond tree planting to ensure survival of the trees to a healthy maturity at 26 years after the Project start date. These Project Trees are at risk during all stages of this project. The Project Operator has no guaranteed source of long-term maintenance funding outside of the carbon revenues. Current funding sources do not typically extend beyond a three-year timeframe or include ongoing maintenance opportunities.
    - The revenue from the sale of carbon credits will play a material role in the successful and durable storage of Project Trees' carbon stock by providing funding that will help ensure the establishment and long-term health of Project Trees. Carbon credit revenues will be used to cover additional costs during the plant establishment phase and long-term maintenance. At Ballinger Open Space this will include continued introduced weed removal, replacement of dead trees, and other site maintenance such as mulching, erosion control, and trash removal.

- Prior Consideration: The Mountains to Sound Greenway Trust became aware of City Forest Credits after being connected through community partners and given the opportunity to be involved with the pilot program. The Greenway Trust then worked with the City of Shoreline to identify Ballinger Open Space as an ideal pilot project site and received grant funding from American Forests/Bank of America to initiate the project.
- In addition, many of the activities undertaken as part of the carbon project are beyond the Project Operator's common practice, including:
    - Long-term maintenance
    - Long-term monitoring and growth assessment
    - Acceptance of reversal obligations
    - Long-term legal commitment to the project

Signed on December 23rd in 2024, by Kate Fancher, Restoration Projects Manager, for the Mountains to Sound Greenway Trust.

_____
Signature

_Kate Fancher_____
Printed Name

206-688-6560_____
Phone

Kate.fancher@mtsgreenway.org_____
Email