

Pollinator Meadow Update: One Year Later

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Introduction

The Pollinator Meadow (PM) project was initiated in Summer 2020 by the Gorge Waterway Action Society (GWAS). The PM is located in Esquimalt Gorge Park (EGP), which borders the Gorge Waterway. The Gorge Waterway has been heavily impacted by urbanization and pollution over time, resulting in a significant decline in health and function of native ecosystems in the area. The PM project was initiated to contribute to the restoration of native ecosystems in the Gorge area and to increase native pollinator presence, such as insects and birds. Insects are key components of ecosystems, as they are the primary vector for transferring energy from plants to other animals in a food web (Tallamy, 2019). Therefore, increasing pollinator insect presence is predicted to enhance the overall ecological health of EGP.

During Winter 2021, GWAS developed a monitoring plan for the PM project; this plan includes a range of surveys to be repeated over time to assess the project's long-term success and a maintenance plan to aid in the meadow's overall health into the future. The first round of surveys and maintenance procedures took place during Summer 2021. The results of these surveys are summarized in this report, along with an analysis of how these results compare to site conditions from Summer 2020 and Winter 2021. Survey methods and timing may be adjusted in future years depending on staff resources and to better assess PM conditions.

Public Engagement

Flyers for the Pollinator Meadow were developed to facilitate community engagement and participation in the project. Flyer distribution took place on July 22, 23, and 26, 2021. Approximately 205 flyers were distributed to residences located within a 400 m radius of the meadow. Flyers were placed in the mailboxes of all houses included in this determined range, and extra flyers were given out to houses just outside of this range for educational purposes. Occasional houses in this outlined neighbourhood did not receive a flyer if there were issues accessing the property.

The flyer [1]* included information about the selected plant species and the importance of planting native species to provide resources for native pollinators (Appendix B). This content was based on research that determined the average foraging range of most insects to be 400 m (Wray & Elle, 2015). The flyer encouraged residents within this range to plant native species to provide supplemental resources for native insects and birds that GWAS's PM is trying to attract. Another purpose for distributing this flyer was to educate local residents about GWAS's work, promote the use of native species in residential gardens, and improve the health of pollinator populations in the area over the long term.

** [#] indicates a hyperlink GWAS removed from their internal report for the public access document you are reading now. These additional documents are available upon request for those interested in more information regarding the EGP Pollinator Enhancement Project.*

Methods

The PM Monitoring Plan was developed during the Youth Community Partnership (YCP) Program – a grant funded, youth internship program that GWAS ran during Winter 2021. This plan includes a variety of environmental surveys to monitor changes in the PM, seasonally and over time. These surveys include a biophysical inventory, photo point survey, maintenance procedures, and insect survey. Surveys were selected to measure changes in vegetation composition and growth patterns, changes in pollinator insect presence and abundance, and overall health of the meadow over time. Measuring these variables was predicted to reveal if the PM was successful in its goal of attracting native pollinator insects to the area. Detailed methods for these surveys are available upon request [2].

Results

Biophysical Inventory

Three biophysical inventories were conducted at the Pollinator Meadow site since the project's inception. The first was conducted in Summer 2020, before the meadow was built. Dominant species recorded in this survey [3] included grass and creeping buttercup (*Ranunculus repens*). The second biophysical inventory (Winter 2021) was conducted in January 2021, during the YCP program and the PM Biophysical Inventory Methodology [4] was developed for the site moving forward. A total of 25 plant species were recorded during the winter 2021 survey (Figure 1). The dominant plant species recorded was grass, and the dominant native species recorded was Self-heal (*Prunella vulgaris*) at 0.7% coverage (Figure 1). The relative species composition recorded was 52.4% non-native species cover compared to 47.6% native plant species cover (Figure 3). The third biophysical inventory (Summer 2021) was conducted in July 2021, and revealed a total of 41 plant species with yarrow (*Achillea millefolium*) being the dominant native species at 7.2% (Figure 2). The species composition for the Summer 2021 survey included 32.4% non-native species cover and 67.6% native species cover (Figure 4). **Comparable results from January to July 2021 indicate an increase of plant species diversity, an increase in native species dominance compared to non-native species, and a seasonal increase in plant ground cover compared to woodchip cover.** Data from both Winter and Summer 2021 surveys can be found in Appendix A.

Relative Ground Cover Abundance January 2021

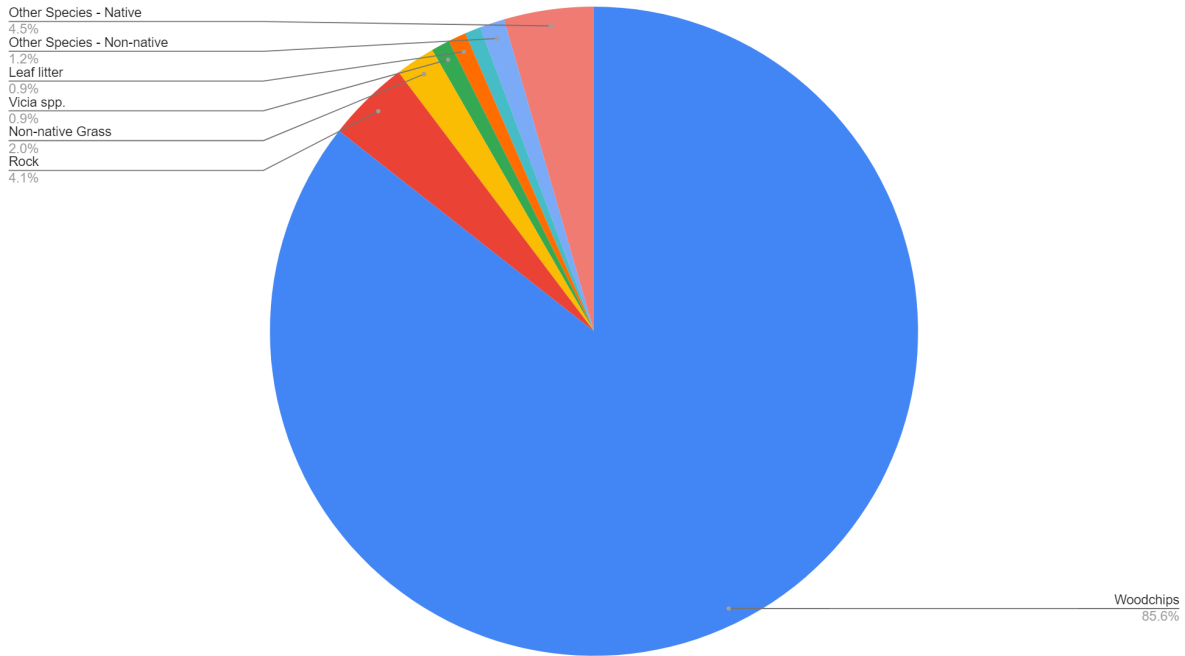


Figure 1: Relative ground cover abundance recorded during Winter 2021 biophysical inventory.

Relative Ground Cover Abundance July 2021

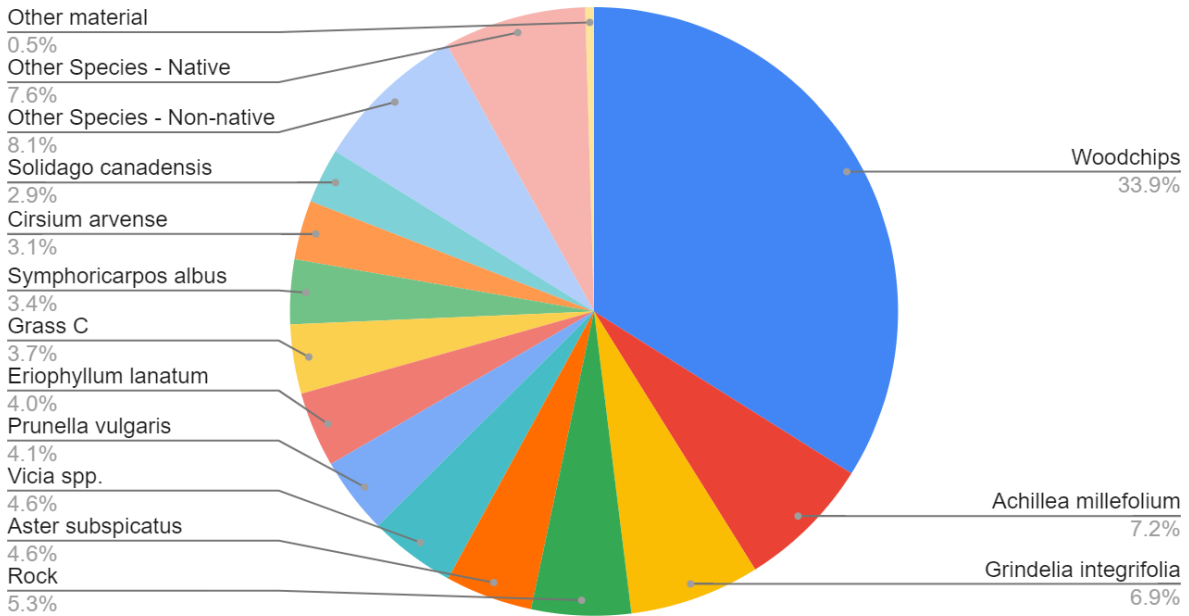


Figure 2: Relative ground cover abundance recorded during Summer 2021 biophysical inventory.

Relative Abundance (Native vs. Non-native) January 2021

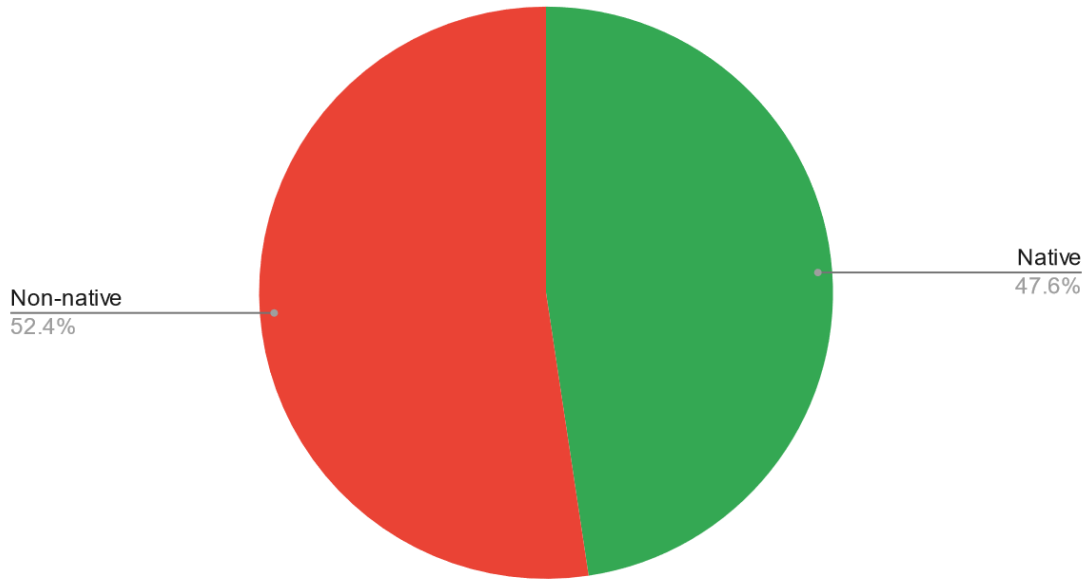


Figure 3: Relative % cover of native and non-native plant species recorded during Winter 2021 biophysical inventory.

Relative Abundance (Native vs. Non-native) July 2021

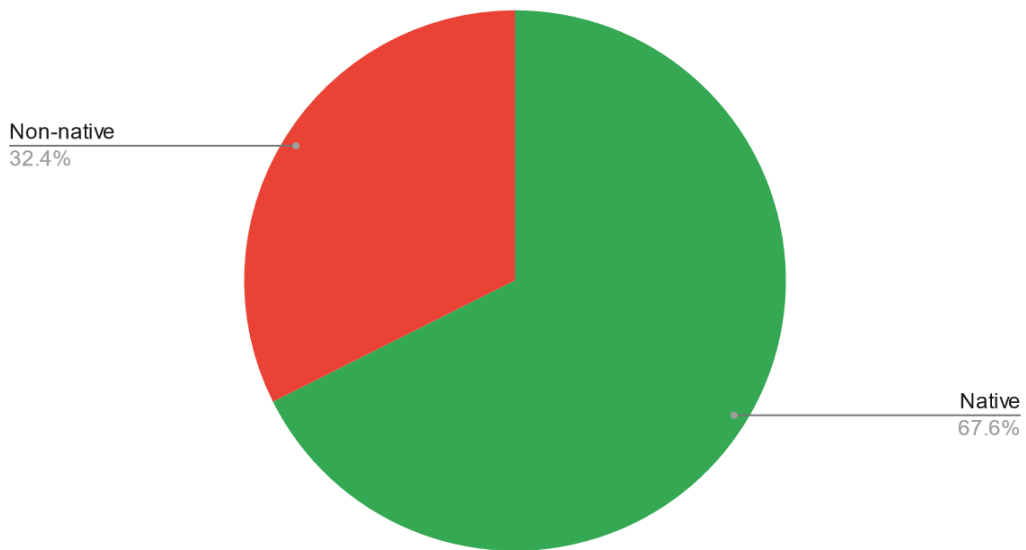


Figure 4: Relative % cover of native and non-native plant species recorded during Summer 2021 biophysical inventory.

Photo Point Survey

The photo point series documents the PM at several locations along the length of the site to highlight seasonal changes and changes through time (Figure 5). Photo point surveys were conducted in January, June, July, and August of 2021. **Photo data revealed an increase in plant species coverage in the meadow over time and showed visual seasonal changes in the meadow as different plant species bloomed.** Woolly sunflower (*Eriophyllum lanatum*) can be seen blooming in early June, while yarrow (*Achillea millefolium*) and some Canada goldenrod (*Solidago canadensis*) are shown blooming in early July. The survey carried out in early August showed the highest diversity and abundance of blooming native species, with Canada goldenrod (*Solidago canadensis*), Douglas' aster (*Symphotrichum subspicatum*), and entire-leaved gumweed (*Grindelia stricta*) flowering at this time. The late-August survey revealed a decline in flowering yarrow plants. Multiple photos from these surveys are available upon request to show the site progression throughout the year [5].

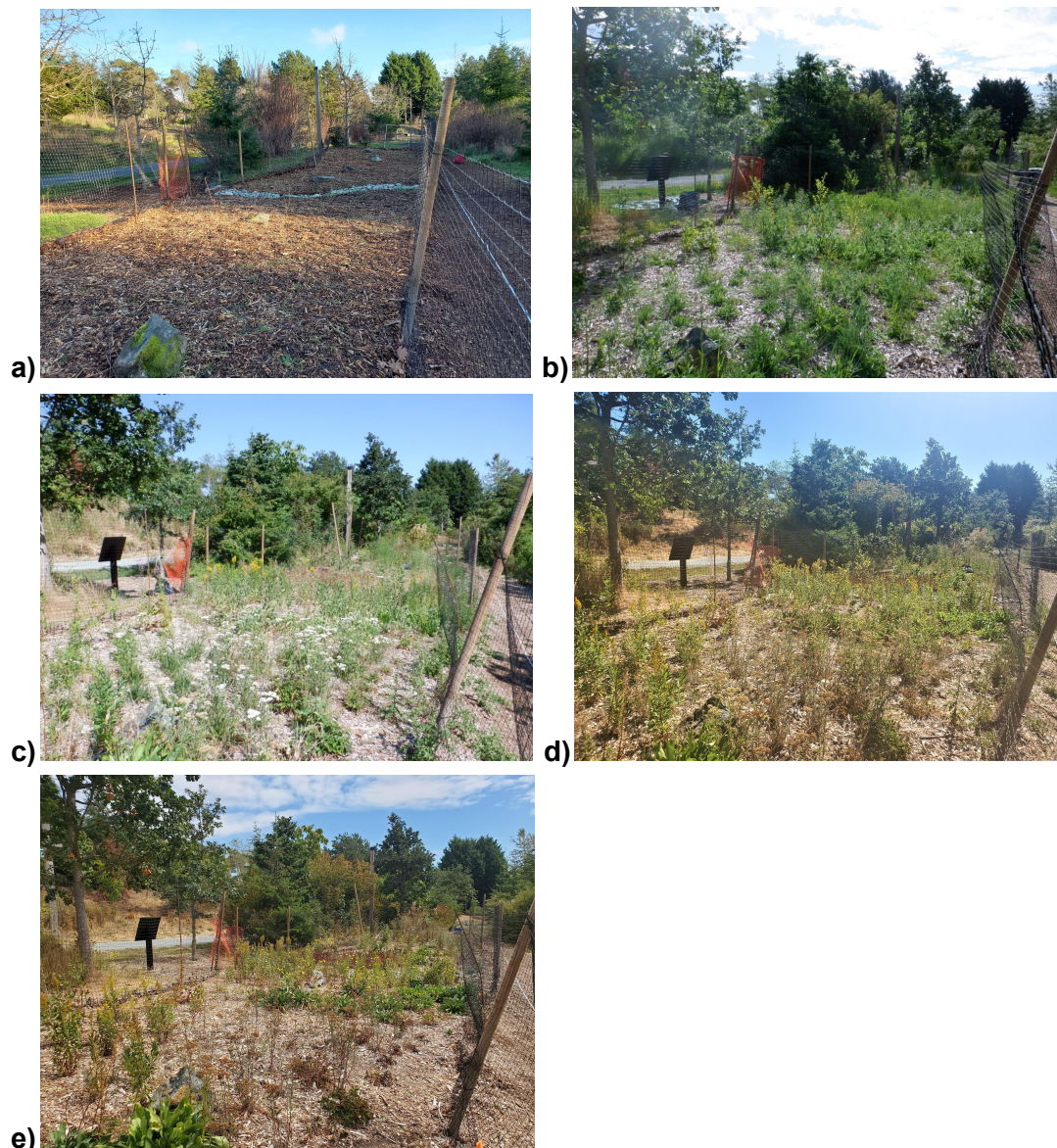


Figure 5: PM photo point series (Photo Point 3, taken at 18 m mark) **a)** January 19, 2021 **b)** June 4, 2021 **c)** July 6, 2021 **d)** August 4, 2021 **e)** August 27, 2021.

Meadow Maintenance

Invasive species removal in the PM during Summer 2021 took place over the course of 9 sessions, from July 20 to August 19. Sessions typically involved 1 participant and spanned approximately 2 hours. The duration and number of these sessions reflects limited staff availability and unusually high temperatures that limited the longevity of this fieldwork. Methods for this invasive species removal procedure were developed during the YCP Program and are available for review upon request [6]. Before official invasive species removal, grass heads were also severed during an incidental session in June 2021. The invasive species removal sessions primarily targeted various grass species, Canada thistle (*Cirsium arvense*), dandelion species, curled dock (*Rumex crispus*), and vetch (*Vicia* spp.). Several grass and vetch species likely spread seed in June-July before removal sessions began, making them focal species for removal sessions in Spring/Summer 2022. Some Canada thistle seed spread throughout the meadow, however, most was removed before this occurred. Additional meadow maintenance tasks included occasional watering during periods of drought throughout the summer, including one major watering event that took place through sprinkler watering on June 29, 2021.

Insect Surveys

Insect surveys of the PM were conducted both before and after the meadow restoration. During the initial PM insect survey in Summer 2020, before the removal of invasive species and planting of native flowering species, only four orders of insects were observed: Coleoptera, Diptera, Hymenoptera, and Lepidoptera. Abundance information is not available from this survey. In Summer 2021, two pollinator surveys – conducted in July and August – yielded an increase of diversity from four to eight orders of insects (Table 1). **The number of observed insect orders doubled from before to after the planting of native flowering species.** Results show that the dominant insect order present in the PM (Figure 6) was Hymenoptera (bees, ants, and wasps), followed by Diptera (flies).

Table 1: List of orders and families of insects with abundance information observed over two surveys in July and August in the pollinator meadow. Insects not identified to family level were included in the abundance count for order.

Order	# of individuals	Family	# of individuals
Coleoptera	13	Elateridae	1
		Curculionidae	2
		Meloidae	10
Diptera	102	Anthomyiidae	3
		Syrphidae	2
		Tephritidae	1
Hemiptera	12	Cicadellidae	8
		Miridae	2
Hymenoptera	240	Apidae	8
		Chalcididae	3
		Formicidae	172
		Halisidae	1
		Hesperiidae	1
		Sphecidae	4
		Torimidae	5
Vespidae	40		
Lepidoptera	49	Geometrid	3
		Hesperiidae	46
Orthoptera	2		
Thysanoptera	2	Aeolothripidae	2

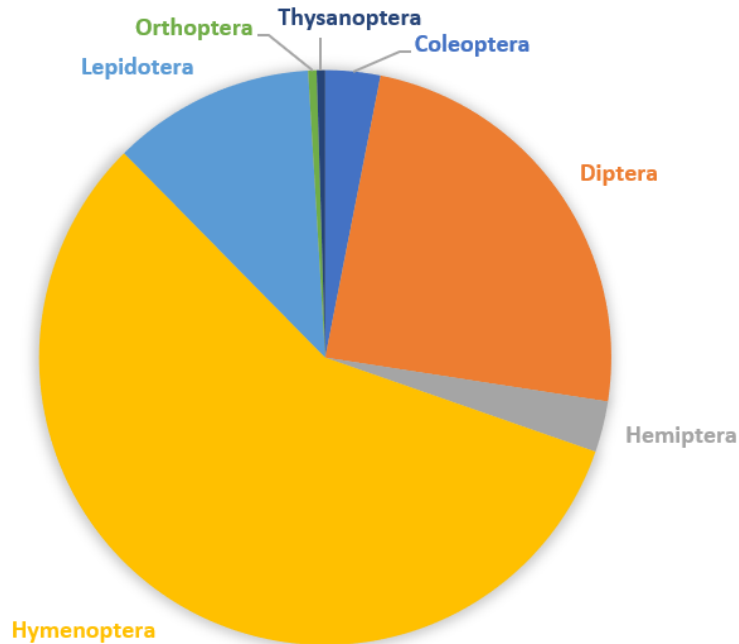


Figure 6: Relative abundance of each insect order observed in the two insect surveys in 2021.

Using the 2021 pollinator survey data, we further analyzed the relationship between insect order and dominant vegetation cover. We observed that insects in the order Hymenoptera were most often found on yellow flowers, such as goldenrod and gumweed (Table 2). This is a common trend observed in other literature attributed to the visual spectrum of bees in the UV range, which makes yellow more visible. Although a significant number of Hymenoptera insects were also observed on yarrow, these were mostly ants. Insects in the order Diptera were most often found on yarrow, and insects in the order Lepidoptera were most often found on the purple flowers of Douglas aster. A Pollinator Meadow Insect Field Guide [7] was developed to aid in on-site identification in future surveys, please reach out if you are interested in a copy.

Dominant plant species	Pollinator Order observed	# of Individuals
Douglas aster	Diptera	12
Douglas aster	Hemiptera	1
Douglas aster	Hymenoptera	10
Douglas aster	Lepidoptera	21
golden rod	Diptera	12
golden rod	Hemiptera	4
golden rod	Hymenoptera	46
golden rod	Lepidoptera	10
gumweed	Diptera	5
gumweed	Hemiptera	2
gumweed	Hymenoptera	28
gumweed	Lepidoptera	14
yarrow	Diptera	61
yarrow	Hemiptera	1
yarrow	Hymenoptera	35
yarrow	Lepidoptera	7

Table 2: Relative abundance of each insect order found on dominant flowering species in the pollinator meadow.

Additional Tasks

To further increase habitat, two shallow circular dishes were purchased and used to construct butterfly puddling stations for the PM. The dishes were filled with sand, soil, large stones, water, and sea salt, then left in locations containing flowering plants that had visible butterfly presence (Figure 7). These “puddlers” were added based on the recommendations [8] outlined in the YCP program in Winter 2021; the objective was to provide a water source and mineral source for butterfly species during the summer months.



Figure 7: Butterfly puddler in the PM on August 11, 2021.

On August 25, 2021, seeds were spread in locations throughout the PM where bare ground could be seen and plants were not present. Species seeded in the meadow during this event included:

- Nodding onion (*Allium cernuum*);
- Great camas (*Camassia leichtlinii*);
- Fireweed (*Epilobium angustifolium*);
- Red columbine (*Aquilegia formosa*);
- Entire-leaved gumweed (*Grindelia stricta*);
- Yarrow (*Achillea millefolium*);
- Self-heal (*Prunella vulgaris*);
- Douglas' aster (*Symphyotrichum subspicatum*).

Seeds were spread in meadow locations where the same species were already present, to increase the chances of further establishment. A photo point series was taken on August 27th [9] to visually document these seeded areas of the meadow at this time. On the same day, the following species were also seeded in the adjacent Garry oak spot-planting (GOSP) restoration site: Oniongrass, nodding onion, chocolate lily, fawn lily, shooting star, native wildflower blend.

Several bird point count surveys were conducted throughout the summer within the PM; methods were developed during the YCP program in Spring 2021 and executed during the summer. A total of 27 unique avian species were identified (Table 3) on site during the June/July 2021 surveys. Please note that abundance data has yet to be processed at this time; however, it is our goal to have comparative data from 2021 and 2022 in our next status update.

Table 3: List of avian species diversity observed within the PM between June and July 2021.

Species Observed	Scientific Name
Anna's Hummingbird	<i>Calypte anna</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Dark-eyed Junco	<i>Colaptes auratus</i>
Song Sparrow	<i>Melospiza melodia</i>
American Robin	<i>Turdus migratorius</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Hermit Thrush	<i>Catharus guttatus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Northern flicker	<i>Colaptes auratus</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Bushtit	<i>Psaltriparus minimus</i>
Mallard	<i>Anas platyrhynchos</i>

Northwestern Crow	<i>Corvus caurinus</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Varied Thrush	<i>Ixoreus naevius</i>
House Sparrow	<i>Passer domesticus</i>
House Finch	<i>Haemorhous mexicanus</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Great Blue Heron	<i>Ardea herodias</i>
Fox Sparrow	<i>Passerelia iliaca</i>
Glaucous-winged Gull	<i>Larus glaucescens</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Chipping Sparrow	<i>Spizella passerina</i>
Steller's Jay	<i>Cyanicitta stelleri</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>

Discussion

Collectively, the biophysical inventory, photo point survey, maintenance procedures, and insect survey provide an accurate depiction of the meadow's changing vegetation composition, pollinator insect presence, and health over time. Results between Winter and Summer 2021 show an increasing dominance of native plant species compared to non-native species over time and seasons, as well as an indication of increased native plant diversity, which could be attributed to the growth of plant leaves, flowers, and fruits that allow for more accurate plant identification during the growing season versus dormant time of year. Both of these trends will likely continue depending on the success of seeding and meadow maintenance procedures. The dominant native plant species recorded in the July 2021 biophysical inventory survey – yarrow (*Achillea millefolium*) – has a tendency to spread rapidly and out-compete other species. It is a beneficial species for pollinating insects and is therefore encouraged in the meadow; however, its presence should be monitored moving forward so that it does not out-compete other desired native species. Woodchip with no plant cover was the most abundant element recorded in both the January and July 2021 biophysical inventories. Bare ground can have ecological benefits, such as increased habitat for ground-nesting bees, however, an excess of bare ground can be prone to invasion by non-native species. Increasing the cover of native species in the PM should therefore be a priority over the next year while native shrubs and wildflowers establish.

Photo point surveys carried out in January and throughout the summer show a diversity of colours, configurations, and sizes of floral resources in the meadow from June to early August. Photo data indicated the highest diversity and abundance of flowering plants in the early August survey, which suggests that future species selections for the meadow should target early-season and late-season blooming plants.

Invasive species removal procedures in the PM took place in Winter 2021 and again in Summer 2021. The summer removal procedure targeted non-native grasses, vetch (*Vicia* spp.), and Canada thistle (*Cirsium arvense*) that had resurfaced throughout the spring. Due to the timing of the removal procedure, which took place in mid to late summer, non-native grass species and vetch had dispersed seeds before the removal session took place. In future years, invasive species removal sessions should begin in late spring or early summer so that these species are removed before they have the opportunity to disperse seeds. After the July 2021 invasive species removal session took place, Canada thistle could be seen sprouting new growth in areas of bare woodchip; this indicates a need to remove a larger section of Canada thistle taproot where possible, and to decrease the amount of bare ground in the PM over time.

The meadow contains native species, which are drought-tolerant and require little watering once established. Some exceptions observed this year included some transplanted salal (*Gaultheria shallon*) and dull Oregon grape (*Mahonia nervosa*) that were added to the meadow in March of 2021 that visibly suffered from low water levels. The meadow received one large watering event during the summer on June 29, during a period of unusual drought and high heat. It is likely that moving forward, summer drought conditions will continue to worsen and the PM may require more frequent watering during these times.

The insect surveys conducted in Summer 2021 yielded a higher number of orders than the survey conducted in 2020. Though data indicated an increased diversity, abundance information was not available from the first survey; as such, we acknowledge that a change in abundance cannot be determined. The increase in diversity could be a result of improved identification capabilities and more robust study methods. We believe that the increased diversity is likely the result of the meadow's construction, and therefore suggests an increase in insect abundance as well. Informal visual observations throughout Summer 2021 also suggest an increase in insect presence. Repeating this survey over time and refining the methods will provide a more comprehensive understanding of the overall trend in pollinator insect abundance and diversity throughout the Pollinator Meadow.

Conclusion

The results from monitoring surveys carried out in Summer 2021 showed an increase in diversity and abundance of native plant coverage, since the project commenced in 2020 and since January 2021; an increase in diversity of pollinating insects compared to earlier surveys; and created baseline bird point data for the site. Key conclusions from these results include the following:

- Total plant species documented in the PM increased in July 2021 (**41**) compared to January 2021 (**25**).
- Percent cover of native plant species increased in July 2021 (**67.6%** of total plant coverage) compared to January 2021 (**47.6%** of total plant coverage).
- Percent cover of non-native plant species decreased in July 2021 (**32.4%** of total plant coverage) compared to January 2021 (**52.4%** of total plant coverage).

- The dominant plant species recorded in July 2021 was **Yarrow** (*Achillea millefolium*) (7.2% of area surveyed). The dominant plant species recorded in January 2021 was **grass** (2% of area surveyed), and the dominant native species at this time was **self-heal** (*Prunella vulgaris*) (0.7% of area surveyed).
- Woodchip with no plant cover was the dominant element recorded in all surveys and can provide opportunities for invasive species to colonize. Increased ground cover of native species over time in the meadow should be prioritized.
- Photo point surveys suggest that the addition of plant species with early and late-season blooming times would benefit the PM.
- Earlier biophysical inventory survey times in future years could allow for earlier invasive species removal in the meadow, which would target invasive species before they are able to disperse seeds.
- PM plants should receive higher levels of watering after transplanting, and during especially dry periods during the summer months.
- July 2021 insect surveys revealed **8** orders of insects, compared to **4** orders recorded in the 2020 survey. This could be attributed to improved methods and ID capabilities, however, based on visual observations and the predicted ability of PM plants to attract pollinating insects, we believe that this increase in insect diversity is likely attributed to the construction of the PM.

References

- Tallamy, D. W. (2019). *Nature's best hope: a new approach to conservation that starts in your backyard*. Portland, Oregon: Timber Press.
- Wray, J. C., & Elle, E. (2015). Flowering phenology and nesting resources influence pollinator community composition in a fragmented ecosystem. *Landscape Ecology*, 30, 261-272. <https://link.springer.com/content/pdf/10.1007/s10980-014-0121-0.pdf>

Appendix A: Biophysical inventory results from January 2021 and July 2021.

Total Relative Abundance - January 2021				
[Element]		[total coverage]	% cover [proportional]	% of area sampled
Woodchips		2396.5	0.8558928571	85.589
Rock		115	0.0410714286	4.107
Grass		55.5	0.0198214286	1.982
Vetch	<i>Vicia</i> spp.	26	0.0092857143	0.929
Leaf litter		25	0.0089285714	0.893
Dovefoot geranium	<i>Geranium molle</i>	22	0.0078571429	0.786
Self Heal	<i>Prunella vulgaris</i>	19.5	0.0069642857	0.696
Coastal Strawberry	<i>Fragaria chiloensis</i>	17.5	0.00625	0.625
Yarrow	<i>Achillea millefolium</i>	15	0.0053571429	0.536
Unknown shrub #1 (Black twinberry or Snowberry)	<i>Lonicera involucrata</i> OR <i>Symphoricarpos albus</i>	14	0.005	0.5
Entire-leaved gumweed	<i>Grindelia stricta</i>	14	0.005	0.5
Unknown dead plant (Canada Goldenrod, or Douglas' Aster)	<i>Solidago canadensis</i> OR <i>Symphyotrichum subspicatum</i>	12.5	0.0044642857	0.446
Deadnettle	<i>Lamium purpureum</i>	10	0.035714286	0.357
Creeping buttercup	<i>Ranunculus repens</i>	9	0.003214285714	0.321
Clover	<i>Trifolium</i> spp.	8	0.002857142857	0.286
Fireweed	<i>Chamaenerion angustifolium</i>	5	0.001785714286	0.179
Red flowering currant	<i>Ribes sanguineum</i>	5	0.001785714286	0.179
Dewey's sedge	<i>Carex deweyana</i>	5	0.001785714286	0.179
Hairy honeysuckle	<i>Lonicera hispidula</i>	4.5	0.001607142857	0.161

Woolly sunflower	<i>Eriophyllum lanatum</i>	4.5	0.001607142857	0.161
Dandelion	<i>Taraxacum</i> spp.	3	0.001071428571	0.107
Snowberry	<i>Symphoricarpos albus</i>	3	0.001071428571	0.107
Unknown shrub #2 (Oceanspray?)	<i>Holodiscus discolor</i>	3	0.001071428571	0.107
Ribwort plantain	<i>Plantago lanceolata</i>	2	0.0007142857143	0.071
Unknown Avens species	<i>Geum</i> spp.	2	0.0007142857143	0.071
sweet-scented bedstraw	<i>Galium triflorum</i>	2	0.0007142857143	0.071
Pacific Ninebark	<i>Physocarpus capitatus</i>	1	0.0003571428571	0.036
Wild carrot	<i>Daucus carota</i>	0.5	0.0001785714286	0.018
Sum		2800	1	100

Total Relative Abundance - July 2021				
[Element]		[total coverage]	[proportional cover]	[% cover]
Woodchips		950	0.3392857143	33.92857143
Yarrow	<i>Achillea millefolium</i>	201	0.07178571429	7.178571429
Entire-leaved gumweed	<i>Grindelia stricta</i>	194	0.06928571429	6.928571429
Rock		148	0.05285714286	5.285714286
Douglas' aster	<i>Symphyotrichum subspicatum</i>	130	0.04642857143	4.642857143
Vetch	<i>Vicia</i> spp.	129	0.04607142857	4.607142857
Self-heal	<i>Prunella vulgaris</i>	114	0.04071428571	4.071428571
Woolly sunflower	<i>Eriophyllum lanatum</i>	112	0.04	4
Grass C		103	0.03678571429	3.678571429
Snowberry	<i>Symphoricarpos albus</i>	96	0.03428571429	3.428571429
Canada thistle	<i>Cirsium arvense</i>	88	0.03142857143	3.142857143

Canada goldenrod	<i>Solidago canadensis</i>	82	0.02928571429	2.928571429
Grass A		59	0.02107142857	2.107142857
Dandelion	<i>Taraxacum spp.</i>	57	0.02035714286	2.035714286
Coastal strawberry	<i>Fragaria chiloensis</i>	43	0.01535714286	1.535714286
Cinquefoil species	<i>Potentilla spp.</i>	32	0.01142857143	1.142857143
Fireweed	<i>Chamaenerion angustifolium</i>	29	0.01035714286	1.035714286
Curled dock	<i>Rumex crispus</i>	25	0.008928571429	0.8928571429
Cut-leaved geranium	<i>Geranium dissectum</i>	22	0.007857142857	0.7857142857
Grass F		22	0.007857142857	0.7857142857
Mock orange	<i>Philadelphus lewisii</i>	20	0.007142857143	0.7142857143
Red flowering currant	<i>Ribes sanguineum</i>	16	0.005714285714	0.5714285714
Black twinberry	<i>Lonicera involucrata</i>	15	0.005357142857	0.5357142857
Hairy honeysuckle	<i>Lonicera hispidula</i>	15	0.005357142857	0.5357142857
Wild carrot	<i>Daucus carota</i>	11	0.003928571429	0.3928571429
Prickly lettuce	<i>Lactuca serriola</i>	8	0.002857142857	0.2857142857
Pacific ninebark	<i>Physocarpus capitatus</i>	8	0.002857142857	0.2857142857
Dewey's sedge	<i>Carex deweyana</i>	8	0.002857142857	0.2857142857
Moss species		8	0.002857142857	0.2857142857
Dull Oregon grape	<i>Mahonia nervosa</i>	6	0.002142857143	0.2142857143
Grass E		6	0.002142857143	0.2142857143
Leaf litter		5	0.001785714286	0.1785714286
Hairy clover species		5	0.001785714286	0.1785714286
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	5	0.001785714286	0.1785714286
Creeping buttercup	<i>Ranunculus repens</i>	5	0.001785714286	0.1785714286
Henderson's checkermallow	<i>Sidalcea hendersonii</i>	5	0.001785714286	0.1785714286

Grass B		4	0.001428571429	0.1428571429
Purple leaved willowherb	<i>Epilobium ciliatum</i>	4	0.001428571429	0.1428571429
Unknown shrub A (Hardhack?)	<i>Spiraea douglasii?</i>	3	0.001071428571	0.1071428571
Unknown dead grass		2	0.0007142857143	0.07142857143
Grass D		2	0.0007142857143	0.07142857143
Unknown clover species	<i>Trifolium spp.</i>	1	0.0003571428571	0.03571428571
Sage species		1	0.0003571428571	0.03571428571
Nootka rose	<i>Rosa nutkana</i>	1	0.0003571428571	0.03571428571
Sum		2800	1	100

Appendix B: PM Public Engagement Flyer Summer 2021



BEE A PART OF OUR POLLINATOR MEADOW PROJECT!

The Gorge Waterway Action Society, in collaboration with the Township of Esquimalt, has planted native shrubs and wildflowers in our Pollinator Meadow to create habitat for a variety of pollinating insects in Esquimalt Gorge Park.

OUR NEXT STEPS:

The surrounding landscape can have a significant impact on the long-term health of pollinator populations at a site. We used the average foraging range for most insects (400 m) to look at the landscape around our pollinator meadow.

Your neighbourhood (shown in yellow) has been identified as falling within this foraging range.

What does this mean? What you plant at home can contribute to the success of our project!



If you would like to be a part of our Pollinator Meadow project, your task is simple: **plant native species!** See the guide on the back of this page for a list of some of the herbaceous plants we have in our meadow. Integrate these plants into your own garden to create pollinator habitat at home!

DID YOU KNOW?

Native pollinators and native plants have developed **specialized evolutionary relationships** over time, making native plant resources important for pollinator insect survival. A diversity of colours, shapes, sizes, heights, and blooming times is optimal.

Insects are important parts of our ecosystem. They are the primary way that energy is transferred from plants to other animals in a food web. **Attracting insects means encouraging overall biodiversity!**

Caterpillars are important food sources for baby birds because they are soft and packed with nutrients.

For more details, come by the Nature House or email gorgewaterway@gmail.com

NATIVE FLOWERS in the POLLINATOR MEADOW



FUN FACT: Some Pollinator Meadow plants are **host plants**, meaning they provide shelter or food for larval stages of pollinator insects throughout the year. Common host plants in our region include pearly everlasting, common yarrow, native garry oaks, willows, alders, and maples.

DOUGLAS' ASTER (*Symphyotrichum subspicatum*)



- Full sun to partial shade
- Normal to wet soils
- Blue/purple/yellow flowers
- Blooms July-September
- Attracts bees & butterflies

WOOLLY SUNFLOWER (*Eriophyllum lanatum*)



- Full sun
- Dry soils
- Yellow flowers
- Blooms May-August
- Attracts bees & butterflies

PEARLY EVERLASTING (*Anaphalis margaritacea*)



- Full sun
- Dry to moist soils
- White/cream/yellow flowers
- Blooms July-September
- Attracts bees & butterflies

YARROW (*Achillea millefolium*)



- Full sun to partial shade
- Dry to moist soils
- White to pink flowers
- Blooms June-November
- Attracts bees

ENTIRE-LEAVED GUMWEED (*Grindelia stricta*)



- Full sun to partial shade
- Normal to moist soils
- Yellow flowers
- Blooms July-October
- Attracts bees

RED COLUMBINE (*Aquilegia formosa*)



- Full sun to partial shade
- Normal to moist soils
- Red/yellow flowers
- Blooms May-August
- Attracts bees & hummingbirds

FIREWEED (*Epilobium angustifolium*)



- Full sun
- Moist soils
- Pink flowers
- Blooms June-September
- Attracts bees & hummingbirds

CANADA GOLDENROD (*Solidago canadensis*)



- Full sun
- Dry to moist soils
- Yellow flowers
- Blooms August-September
- Attracts bees

HAIRY HONEYSUCKLE (*Lonicera hispidula*)



- Partial shade to shade
- Dry to moist soils
- Pink/yellow flowers
- Blooms June-August
- Attracts hummingbirds

SELF-HEAL (*Prunella vulgaris*)



- Full sun to partial shade
- Moist soils
- Purple flowers
- Blooms May-September
- Attracts bees & butterflies

Images sourced from: E-Flora BC

For a full list of information & image sources, visit our website at: <http://gorge.ca/ycp-references/>