

# Pioneer Butte Restoration: 2022 Annual Report



Jan 2023

Report for the U.S. Forest Service, Siuslaw National Forest,  
Agreement #17-SA-11061200-016

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## PREFACE

IAE is a non-profit organization whose mission is to conserve native ecosystems through restoration, research, and education. IAE provides services to public and private agencies and individuals through development and communication of information on ecosystems, species, and effective management strategies. Restoration of habitats, with a concentration on rare and invasive species, is a primary focus. IAE conducts its work through partnerships with a diverse group of agencies, organizations, and the private sector. IAE aims to link its community with native habitats through education and outreach.



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## ACKNOWLEDGMENTS

The Pioneer Butte restoration project was funded by the U.S. Forest Service, Siuslaw National Forest, under agreement #17-SA-11061200-016. We are grateful to Matthew Smith, Restoration Botanist for the Siuslaw National Forest for his time and energy managing non-native species and providing input on management actions.

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**Cover photograph:** Diverse seed mix used at Pioneer Butte in 2022. Photo by Rolando Beorchia.

## SUGGESTED CITATION

Beorchia, R. and A. Esterson. 2023. Pioneer Butte Prairie restoration: 2022 annual report. Unpublished report for the U.S. Forest Service, Siuslaw National Forest. Institute for Applied Ecology, Corvallis, OR.

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# Pioneer Butte Restoration: 2022 Annual Report

## 1. EXECUTIVE SUMMARY

In 2022, the Institute for Applied Ecology (IAE) and the U.S. Forest Service (USFS) continued restoration actions at Pioneer Butte, a meadow owned and managed by the USFS, Siuslaw National Forest. IAE developed and purchased a native seed mix for units 6 and 7. The USFS applied herbicides to non-native species throughout the prairie. IAE organized and provided native seed mixes for units 3, 6 and 7 to the USFS for fall 2022 seeding efforts.

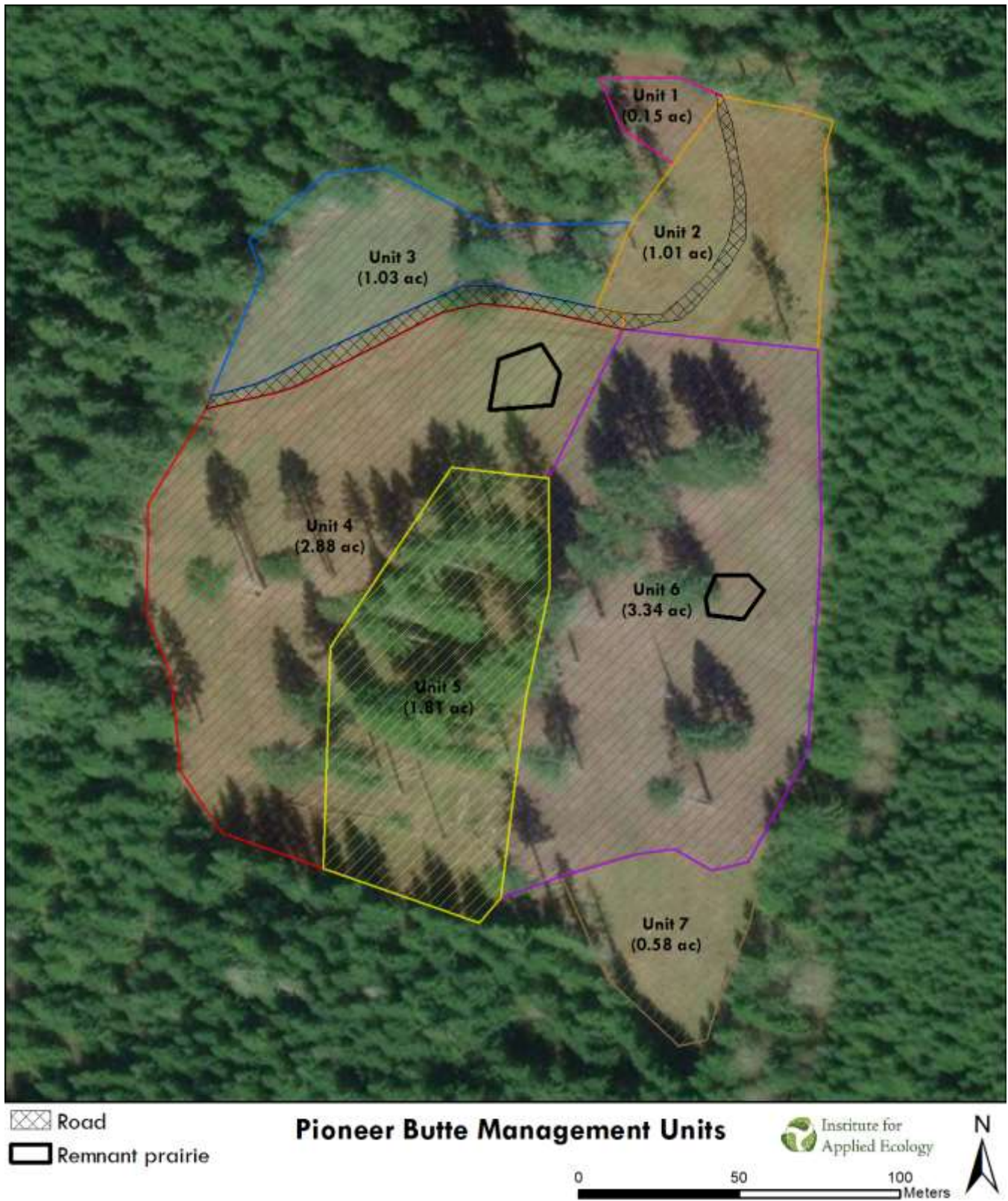
## 2. INTRODUCTION

Beginning in 2011, the U.S. Forest Service (USFS) funded the Institute for Applied Ecology (IAE) to conduct habitat restoration at Pioneer Butte in the Siuslaw National Forest. This report summarizes 2022 restoration activities under Agreement #17-SA-11061200-016.

Pioneer Butte is a mid-elevation prairie located at approximately 1,285 feet elevation in the Oregon Coast Range, west of Corvallis. It is part of the Siuslaw National Forest and managed by the USFS. IAE began conducting habitat restoration activities on a one-acre remnant prairie in 2011, with initial goals of managing non-native species, primarily false brome (*Brachypodium sylvaticum*) and collecting native mid-elevation prairie seed from the site to put into production. In 2016, the USFS removed trees and expanded prairie habitat to 11.25 acres. IAE completed a draft revegetation plan for Pioneer Butte in 2018. The plan divided Pioneer Butte into seven units to allow for unit-specific treatments (Figure 1). Since the inception of the revegetation plan, the USFS and IAE have performed numerous herbicide applications targeting non-native forbs, shrubs and grasses, built slash piles to remove woody debris, and sown native seed in units 1, 2, 4, and 5.

In 2022, project goals included:

- Treating invasive weeds with spot spray herbicide applications (USFS); and
- Purchasing and sowing native seed in units 3, 6, and 7 (IAE and USFS).



**Figure 1.** Pioneer Butte restoration units and remnant prairies.

### 3. RESTORATION ACTIONS

IAE and USFS staff completed restoration actions in 2022 at Pioneer Butte. 2022 actions are summarized in Table 1, while actions from previous years are provided in Appendix A.

**Table 1.** 2022 restoration actions completed at Pioneer Butte.

| Date   | Location      | Action                                                                                                 | Personnel* |
|--------|---------------|--------------------------------------------------------------------------------------------------------|------------|
| Mar 7  | All units     | Checked previous seeding efficacy, weed treatment efficacy, and new weed growth.                       | IAE        |
| May 27 | All units     | Thorough herbicide spot treatment in unit 7 and remainder of time spent spot treating the other units. | USFS       |
| Aug 25 | Units 3, 6, 7 | Assessed units 3, 6, and 7 and determined they were ready to be seeded in fall 2022.                   | IAE        |
| Nov 10 | Units 3, 6, 7 | Broadcasted native seed mix.                                                                           | USFS       |

\*Institute for Applied Ecology (IAE); U.S. Forest Service (USFS).

#### **Weed control**

USFS completed glyphosate herbicide applications using backpack sprayers in May 2022. Applications targeted non-native plants throughout the site, but primarily focused on unit 7. Species targeted included false brome, oxeye daisy (*Leucanthemum vulgare*), Canada and bull thistle (*Cirsium arvense* and *C. vulgare*), foxglove (*Digitalis purpurea*), and Scotch broom (*Cytisus scoparius*).

#### **Seeding**

IAE developed a native seed mix for units 6 and 7 with guidance from the Pioneer Butte Revegetation Plan (Esterson, 2018) and purchased seed from commercial nurseries. USFS staff broadcast the seed in early November 2022. Forty-seven pounds of seed was broadcasted throughout units 6 and 7 at a rate of 11.8 pounds per acre (Appendix D). However, the southern quarter acre of unit 7 had standing snow at the time of seeding so only the northern half received seed. Two pounds of the unit 7 seed mix was broadcast in the eastern half of unit 3 under the trees and in the remnant prairie patch in unit 4. Unit 3 received the entire 14-pound mix purchased in 2021 (Appendix C). Four pounds of seed was saved to fill patches disturbed by weed treatments in 2023 (Appendix D).

### 4. FUTURE MANAGEMENT RECOMMENDATIONS

Management of Pioneer Butte in future years will require regular weed treatments and periodic planting and seeding. We recommend a diverse weed treatment strategy including hand pulling, herbicide spraying, mowing and using prescribed fire. Mowing would provide an additional integrated pest management strategy that helps to compliment herbicide applications for a more effective long-term treatment of non-natives. If prescribed fire is used, we recommend a thorough follow-up spot spray treatment, seeding in the two months following the burn, and a spot spray treatment the following spring. Diversifying plant community composition at Pioneer Butte can be achieved with periodic seeding of forbs in disturbed areas, planting bulbs in the open meadow and planting shrubs at the forest edge.

The following management actions are recommended for Pioneer Butte in 2023 and following years:

- Continue herbicide applications to manage non-native species;
- Begin mowing treatments on biennial cycle for managing non-native species;
- Take photo points in mid-June (Appendix B);
- Burn slash piles (USFS);
- Draft a burn plan to periodically burn the meadow every 3-5 years (USFS);
- Broadcast seed mix to areas disturbed by management actions; and
- Augment meadow diversity and wildlife forage by adding plant materials when funding allows.

## 5. PLANT AUGMENTATION MATERIALS SOURCES

- Heritage Seedling and Liners Inc. sells premixed Willamette Valley-sourced seed mixes that could be utilized in future years. We recommend the “Burn-Pile” or “Disturbed Ground” mixes for fire-disturbed areas and the “Diverse Prairie,” “Tough and Tenacious” or one of the three “Upland Prairie” mixes to add diversity to patches of meadow where previous seeding was less successful. Mixes ranged from \$90-\$200 per pound in 2022. Mix lists and prices are available on their website.
- Seven Oaks Native Nursery is a wholesaler of native shrubs, bulbs, and other plant materials. Native shrubs could enhance meadow edges at Pioneer Butte, increasing wildlife habitat and forage, while bulb species could add diversity into the meadow. Bulbs ranged from \$0.40-\$1.50 per bulb in 2022 while shrubs ranged from \$3-\$25 depending on container size and species. To receive the full species catalog and price list sign up through their webpage.
- Jonny Native Seed specializes in wild collecting native species. If there is desire to increase diversity in the meadow and also maintain Coast Range-specific genetics, these collectors could fill that niche and gather seed otherwise not commercially available. 2022 prices varied quite widely between species, about \$60-\$400 per pound, but a periodic inventory and price sheet is sent out through email newsletter that can be subscribed to through the website.

## 6. REFERENCES

Esterson, A. 2018. Noble Thin Meadow Restoration Project: Pioneer Butte revegetation plan. Unpublished report for the U.S. Forest Service, Siuslaw National Forest. Institute for Applied Ecology, Corvallis, OR.

## APPENDICES

## Appendix A. Pioneer Butte management actions (2011-2022)

| Year | Season | Personnel* | Action                                                                                                                                                                                                                                                                                                |
|------|--------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2011 | Summer | IAE        | Removed false brome ( <i>Brachypodium sylvaticum</i> ) inflorescences.                                                                                                                                                                                                                                |
| 2012 | Summer | IAE        | Removed false brome inflorescences.<br>Pulled conifer seedlings.                                                                                                                                                                                                                                      |
|      | Fall   | IAE        | Broadcasted native seed mix where false brome was removed.                                                                                                                                                                                                                                            |
| 2013 | Summer | IAE        | Removed false brome inflorescences.                                                                                                                                                                                                                                                                   |
|      | Fall   | IAE        | Removed false brome inflorescences.<br>2% glyphosate solution (R-11 surfactant) was applied to false brome.                                                                                                                                                                                           |
| 2014 | Summer | USFS       | Herbicide application targeting false brome.                                                                                                                                                                                                                                                          |
|      |        | IAE        | Removed false brome inflorescences.<br>Collected 14.9g of California oatgrass ( <i>Danthonia californica</i> ).                                                                                                                                                                                       |
|      |        |            | Seed from selfheal ( <i>Prunella vulgaris</i> ), toughleaf iris ( <i>Iris tenax</i> ), common yarrow ( <i>Achillea millefolium</i> ), <i>Clarkia</i> sp., woolly sunflower ( <i>Eriophyllum lanatum</i> ), and narrow-leaf mule ears ( <i>Wyethia angustifolia</i> ) was collected for seed increase. |
|      | Fall   | IAE        | Seed production beds for <i>Eriophyllum lanatum</i> , <i>Prunella vulgaris</i> , <i>Achillea millefolium</i> , <i>Clarkia purpurea</i> , and <i>Wyethia angustifolia</i> established at the FSL beds in Corvallis.                                                                                    |
|      |        |            | Lower portion of meadow seeded with native prairie mix.                                                                                                                                                                                                                                               |
| 2015 | Spring | IAE        | Removed Scotch broom ( <i>Cytisus scoparius</i> ) along road.                                                                                                                                                                                                                                         |
|      | Summer | USFS       | Herbicide application targeting false brome, thistles ( <i>Cirsium</i> sp.), foxglove ( <i>Digitalis purpurea</i> ), oxeye daisy ( <i>Leucanthemum vulgare</i> ), hairy cat's ear ( <i>Hypochaeris radicata</i> ), and tall oatgrass ( <i>Arrhenatherum elatius</i> ).<br>Tree removal.               |
|      |        | IAE        | Collected seed from FSL beds.                                                                                                                                                                                                                                                                         |
| 2016 | Spring | USFS       | Herbicide application targeting false brome, thistles, foxglove, oxeye daisy hair cat's ear, and tall oatgrass.                                                                                                                                                                                       |
|      | Summer | USFS       | Tree removal.                                                                                                                                                                                                                                                                                         |
|      |        | IAE        | Collected seed from FSL beds.                                                                                                                                                                                                                                                                         |
| 2017 | Summer | USFS       | Cut woodland and tansy ragwort with string trimmer.                                                                                                                                                                                                                                                   |
|      | Fall   | USFS       | Herbicide application targeting all non-native species                                                                                                                                                                                                                                                |
|      |        | IAE        | Photo point established.                                                                                                                                                                                                                                                                              |

\*Institute for Applied Ecology (IAE); U.S. Forest Service (USFS); Cutaway Inc. (Cutaway).

| Year | Season | Personnel*   | Action                                                                                                                                                                   |
|------|--------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2018 | Spring | USFS         | Herbicide application targeting all non-native species.                                                                                                                  |
|      | Summer | IAE          | Collected seed from FSL beds.                                                                                                                                            |
|      |        |              | Seed from non-native species manually removed.                                                                                                                           |
|      |        | USFS         | Herbicide application targeting all non-native species.                                                                                                                  |
|      |        | Cutaway      | Stumps removed on units 1 and 2.                                                                                                                                         |
| 2019 | Winter | IAE          | Sixty-five volunteers, organized by the Community Engagement and Leadership Program of Oregon State University (OSU), removed slash from the meadow (292.5 total hours). |
|      | Spring | USFS         | Herbicide application targeting non-native forbs and grasses.                                                                                                            |
|      |        | IAE          | Four OSU student volunteers removed slash from the meadow (20 total hours).                                                                                              |
|      |        |              | Thirty volunteers worked to remove conifer saplings from summit meadows at Marys Peak (180 total hours used as match for Pioneer Butte. Both were part of Noble thin).   |
|      |        |              | Stumps were marked with spray paint for contractor to grind stumps.                                                                                                      |
|      |        | USFS         | Herbicide application targeting non-native forbs and grasses.                                                                                                            |
|      | Summer | IAE          | Removed flowering heads of tall oatgrass ( <i>Arrhenatherum elatius</i> ) to prevent seed production.                                                                    |
|      |        |              | Site visit to assess weed control and slash removal.                                                                                                                     |
|      |        |              | Planned seed mix for fall broadcast to units 1, 2, 4, and 5.                                                                                                             |
|      |        | Cutaway      | Contractor removed stumps with a stump grinder in units 2 and 6 and piled material in unit 2.                                                                            |
|      |        | IAE and USFS | Site visit by IAE and USFS staff to discuss restoration progress and plan for burning slash piles and other parts of the meadow.                                         |
|      | Fall   | IAE and USFS | IAE and USFS staff hosted 26 OSU students organized by the Community Engagement and Learning Program to pile slash in the meadow (104 volunteer hours).                  |
|      |        | IAE          | Four OSU student piled slash in the meadow (21 volunteer hours).                                                                                                         |
|      |        |              | Broadcast native seed mixes to units 1, 2, 4, and 5.                                                                                                                     |
|      |        |              | IAE staff and 12-person AmeriCorps Blue 5 crew piled slash in the meadow for two days.                                                                                   |
| 2020 | Winter | IAE          | Site visit to assess weeds and seeding success.                                                                                                                          |
|      |        | USFS         | USFS spot sprayed non-native annual grasses with glyphosate.                                                                                                             |
|      | Spring | IAE          | Site visit to assess weeds, seeding success, and take photo points.                                                                                                      |
|      |        | USFS         | USFS contractor spot sprayed non-native plants with glyphosate throughout the meadow.                                                                                    |

\*Institute for Applied Ecology (IAE); U.S. Forest Service (USFS); Cutaway Inc. (Cutaway).

| Year | Season | Personnel*   | Action                                                                                                                                                                                                                                                                                                                  |
|------|--------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2020 | Summer | IAE and USFS | Site visit with Matt Smith to discuss fall 2020 actions. Collected photo points.                                                                                                                                                                                                                                        |
|      |        | USFS         | Spot herbicide application targeting non-native forbs and grasses in Units 2, 3, 6, and 7 with glyphosate. Units 1 and 2 were spot treated with clopyralid and triclopyr. Units 4 and 5 were weeded by hand.                                                                                                            |
|      |        | IAE          | Develop seed mix for fall broadcast to units 1, 2, 3, 4 and 5.                                                                                                                                                                                                                                                          |
|      | Fall   | IAE          | Broadcast native seed mixes to units 1, 2, 3, 4, and 5.                                                                                                                                                                                                                                                                 |
| 2021 | Spring | IAE          | Chemically treated oxeye daisy ( <i>Leucanthemum vulgare</i> ), Canada and bull thistle ( <i>Cirsium arvense</i> and <i>C. vulgare</i> ), foxglove ( <i>Digitalis purpurea</i> ), false brome ( <i>Brachypodium sylvaticum</i> ), and Scotch broom ( <i>Cytisus scoparius</i> ) with glyphosate herbicide in all units. |
|      | Summer | IAE and USFS | Chemically treated Canada and bull thistle ( <i>Cirsium arvense</i> and <i>C. vulgare</i> ) and non-native perennial grasses with glyphosate herbicide in unit 3.                                                                                                                                                       |
| 2022 | Spring | IAE          | Checked previous seeding efficacy, weed treatment efficacy and new weed growth.                                                                                                                                                                                                                                         |
|      |        | USFS         | Spot sprayed herbicide in all units                                                                                                                                                                                                                                                                                     |
|      | Summer | IAE          | Assessed if units 3, 6 and 7 are ready to be seeded fall 2022.                                                                                                                                                                                                                                                          |
|      | Fall   | USFS         | Broadcasted native seed mix                                                                                                                                                                                                                                                                                             |

\*Institute for Applied Ecology (IAE); U.S. Forest Service (USFS); Cutaway Inc. (Cutaway).

## Appendix B. Photo point coordinates

| Photo point | Longitude  | Latitude |
|-------------|------------|----------|
| 1           | -123.47708 | 44.53845 |
| 2           | -123.47652 | 44.53753 |
| 3           | -123.47767 | 44.537   |
| 4           | -123.47838 | 44.53768 |
| 5           | -123.4779  | 44.53861 |



● Photo point locations  
□ Prairie boundary

### Pioneer Butte Photo Points

Institute for  
Applied Ecology

0 50 100 Meters



## Appendix C. 2022 seed mix for unit 3

| Species                                  | Common name                   | Amount purchased<br>2021 (lbs) |
|------------------------------------------|-------------------------------|--------------------------------|
| <i>Achillea millefolium</i>              | common yarrow                 | 0.27                           |
| <i>Aquilegia formosa</i>                 | red columbine                 | 0.57                           |
| <i>Clarkia amoena ssp. lindleyi</i>      | farewell-to-spring            | 0.46                           |
| <i>Collinsia grandiflora</i>             | large-flowered blue-eyed Mary | 0.51                           |
| <i>Eriophyllum lanatum</i>               | woolly sunflower              | 0.36                           |
| <i>Festuca roemerii</i>                  | Roemer's fescue               | 0.66                           |
| <i>Geum macrophyllum</i>                 | large-leaved avens            | 0.50                           |
| <i>Gilia capitata</i>                    | bluehead gilia                | 0.47                           |
| <i>Iris tenax</i>                        | toughleaf iris                | 0.40                           |
| <i>Lomatium utriculatum</i>              | spring gold                   | 1.19                           |
| <i>Lupinus polycarpus</i>                | small-flowered lupine         | 2.41                           |
| <i>Madia elegans</i>                     | showy tarweed                 | 1.99                           |
| <i>Plectritis congesta</i>               | shortspur seablush            | 0.29                           |
| <i>Potentilla glandulosa</i>             | sticky cinquefoil             | 0.17                           |
| <i>Potentilla gracilis</i>               | slender cinquefoil            | 0.27                           |
| <i>Prunella vulgaris var. lanceolata</i> | common selfheal               | 1.49                           |
| <i>Ranunculus occidentalis</i>           | western buttercup             | 1.18                           |
| <i>Sidalcea malviflora ssp. virgata</i>  | dwarf checkermallow           | 0.88                           |
| <b>Total</b>                             |                               | <b>14.06 lbs</b>               |

## Appendix D. 2022 seed mix for units 6 and 7

| Scientific Name                                 | Common Name                          | Unit 6/7         | Seed Saved for 2023 |
|-------------------------------------------------|--------------------------------------|------------------|---------------------|
| <i>Achillea millefolium</i>                     | common yarrow                        | 0.41             | 1                   |
| <i>Acemisson americanus</i>                     | American bird's-foot trefoil         | 1.36             |                     |
| <i>Allium amplexans</i>                         | narrow-leaf onion                    | 2.12             |                     |
| <i>Aquilegia formosa</i>                        | red columbine                        | 1.19             |                     |
| <i>Bromus carinatus</i>                         | California brome                     | 6.53             |                     |
| <i>Calochortus tolmiei</i>                      | Tolmie's star-tulip, cat's ear lilly | 0.57             |                     |
| <i>Carex pachystachya</i>                       | chamisso sedge                       | 0.43             |                     |
| <i>Carex tumulicola</i>                         | splitawn sedge                       | 1.21             |                     |
| <i>Clarkia amoena</i> ssp. <i>Lindleyi</i>      | farewell-to-spring                   | 0.72             |                     |
| <i>Collinsia grandiflora</i>                    | large-flowered blue-eyed Mary        | 0.84             |                     |
| <i>Collomia grandiflora</i>                     | large-flowered collomia              | 2.68             |                     |
| <i>Danthonia californica</i>                    | California oatgrass                  | 2.80             |                     |
| <i>Elymus glaucus</i>                           | blue wildrye                         | 2.27             | 1                   |
| <i>Eriophyllum lanatum</i>                      | woolly sunflower                     | 0.34             |                     |
| <i>Festuca roemerii</i>                         | Roemer's fescue                      | 1.05             |                     |
| <i>Geum macrophyllum</i>                        | large-leaved avens                   | 0.64             |                     |
| <i>Gilia capitata</i>                           | bluehead gilia                       | 0.49             |                     |
| <i>Iris tenax</i>                               | toughleaf iris                       | 3.53             | 2                   |
| <i>Lomatium utriculatum</i>                     | spring gold                          | 1.77             |                     |
| <i>Lupinus polycarpus</i>                       | small-flowered lupine                | 6.00             |                     |
| <i>Madia elegans</i>                            | showy tarweed                        | 1.84             |                     |
| <i>Plectritis congesta</i>                      | shortspur seablush                   | 0.37             |                     |
| <i>Potentilla glandulosa</i>                    | sticky cinquefoil                    | 0.43             |                     |
| <i>Potentilla gracilis</i>                      | slender cinquefoil                   | 0.35             |                     |
| <i>Prunella vulgaris</i> var. <i>lanceolata</i> | common selfheal                      | 0.02             |                     |
| <i>Ranunculus occidentalis</i>                  | western buttercup                    | 0.88             |                     |
| <i>Sidalcea malviflora</i> ssp. <i>virgata</i>  | dwarf checkermallow                  | 2.21             |                     |
| <i>Wyethia angustifolia</i>                     | mule ears                            | 4.29             |                     |
| <b>Total (lbs)</b>                              |                                      | <b>47.35 lbs</b> | <b>4 lbs</b>        |