FRD01 – On Farm Research and Demonstration

Enhancement Description
On farm research and demonstration consists of the implementation of applied research projects on working farms to gather information and demonstrate the efficacy of the activity. The projects must fit within identified state priority topic areas.

The farmer will need to conduct one of the following types of research: 1) randomized and replicated experiment, paired comparison, or multiple activity comparison on the farm where data is collected and assessed to determine which activities might best enhance conservation or resource condition on their farming operation and others in their region, or 2) intense record keeping and analysis where data is collected on implementation, efficacy, and/or outcomes of one or more conservation practices or enhancements over a period of time and used for better decision-making concerning the farmer's activities addressing conservation concerns on working lands.

Land Use Applicability
Cropland, Pastureland, Rangeland and/or Forest land, each approved project will have a land use designated.

Benefits
On-farm research, documentation, and evaluation of alternative conservation techniques can help farmers and NRCS personnel develop more effective approaches to protecting resources and improving resource condition. Dissemination of findings through on farm field days, written summaries, and other means promotes adoption of the most effective current and new conservation practices and enhancements.

Farmers often need willing researchers to help them design research and demonstration projects they initiate. It is also true that researchers often need willing farmers to help them carryout out research projects on working farms. Regardless of who takes the lead in initiating the project, participating in such projects can help farmers learn about new technologies while helping researchers determine the results of new technologies. The results of the research can help NRCS identify new and innovative techniques to address on farm conservation problems.

Conditions Where Enhancement Applies
This enhancement applies to all crop, pasture, range or forest land use acres.

Criteria

On-Farm Research and Demonstration projects consists of implementing applied research on working land to gather information and demonstrate the effectiveness of new and innovative conservation activities. The research projects must be conducted by an individual or entity that seeks to determine the value of a conservation practice, component, treatment, or process. The individual or entity must have the means and expertise to conduct the research, analyze the findings and develop conclusions from the findings that are relevant to NRCS. Projects are preapproved by the NRCS State Conservationist in each state.

This is not intended to require farmers to initiate on farm research and demonstrations but rather to encourage them to participate in new or ongoing research projects sponsored by other responsible parties such as universities or other research oriented entities. However, if farmers have the necessary capability to conduct scientific research, they can initiate their own projects within the topic areas identified by their state and the criteria of this activity.

The farmer may chose to work independently, or to collaborate with other farmers, a non-governmental organization, extension, university, NRCS, and/or other entities to help with trial design and protocol, and the conduct of the study or data collection. The farmer is not required to work with an outside group. However, if working independently, the participant must be able to demonstrate the ability to manage and lead an applied research project.

When field trials or other research on a particular practice, enhancement, or conservation topic are conducted on multiple farms, each farm is eligible for this enhancement. However, enrollment in the CSP is not a requirement for all farms participating in a multiform research project under this enhancement.

Participants will need to follow criteria as outlined for each project that include:

- Goals of the research and demonstration
- A schedule showing completion of the project during the contract period
- A chronological list or plan of activities expected to take place during the project
- Planned end products or outcomes from the project
- Acreage needed
- Years research is to be conducted
- Farm inputs, equipment needs, etc.
- Expected assistance with data collection

Adoption Requirements

This enhancement is considered adopted when the pre-approved applied research project has been implemented and monitored according protocols developed specifically for the project and events to publicize the project have been held.

Documentation Requirements

- Research plan, including objectives, resource concerns addressed, experimental design, and data to be gathered.

- Results or conclusions from the research and demonstration
- Plan for disseminating project outcomes
- The farmer is committed to sharing research plans, data summary, and project outcomes in writing with NRCS and with other farmers and the general public through written summaries, on-farm events, or oral presentations.
- Farmers are encouraged but not required to work with their NRCS and/or extension agents to have at least one field day/open house where the experimental practices can be reviewed and discussed with the public.
- Documentation of the CSP participant's participation in the research project including:
  - A schedule of activities undertaken by the participant
  - Fields or other areas of the farm involved in the research

Conservation Stewardship Program
On-Farm Research and Demonstration Projects and Research Entity Requirements

Overview

The Conservation Stewardship Program (CSP) encourages participants to address resource concerns in a comprehensive manner by undertaking additional conservation activities, and improving, maintaining, and managing existing conservation activities. This enhancement is eligible for cropland, pastureland, rangeland, and non-industrial private forestland. CSP enhancements means a type of activity installed and adopted to treat natural resources and improve conservation performance. Many of the CSP enhancements are related to existing NRCS conservation practice standards, but at a management intensity level that exceeds minimum practice standards.

On-Farm Research and Demonstration projects consists of implementing applied research on working land to gather information and demonstrate the effectiveness of new and innovative conservation activities. The research projects must be conducted by an entity that seeks to determine the value of a conservation practice, component, treatment, or process. These projects are designed to encourage applicants to participate in new or ongoing research where participation is needed from working land. Interested researchers gain access to farmers that are willing to follow research protocols on their farm across a broad landscape. Farmers participating in such projects learn about new technology first hand, helping to determine how new technology will be applied.

NRCS invites interested researchers to submit their projects for inclusion as eligible On-Farm Research and Demonstrations. The purpose of this activity is not to provide primary funding for a research project, but to expand the area and acreage from which research data is collected. CSP applicants that choose to participate in On-Farm Research and Demonstrations are awarded conservation performance points that improve their CSP ranking and increase annual payment levels.

Project Criteria:

Eligible Entities

Research Entity Requirements

Entities must be able to demonstrate their means and expertise to conduct on-farm research, analyze findings, and develop conclusions that are relevant to NRCS. Eligible research institutions include land grant universities and others, who have ongoing research or the potential for research in the focus areas. Individual farmers are encouraged to participate in identified on-farm projects. However, if they have the necessary capability to conduct scientific research they can initiate their own proposal for consideration.

Research Project Requirements

Projects must address one of the resource concerns identified by NRCS as a national technology focus area and be conducted by a creditable research entity. States will identify specific projects within the national focus areas that they want to offer to CSP applicants in their states. Research projects should follow scientific methods that include project goals, hypotheses, data collection methods, results, summary, etc.

Project Documentation

Creditable research entities must submit a copy of their research project documentation for a State to use in selecting those projects that will be offered to applicants. The document should include:

a. Title of Research Project
b. Research Director/Manager work affiliation and contact information (phone, email, etc.)
c. Name and brief description of the research entity submitting the proposal, along with similar information for other collaborating researchers, if applicable
d. General description and/or summary of research to be conducted, specifying the national focus that is being addressed:
   - Air
   - Animal
   - Energy
   - Plant
   - Soil Erosion
   - Soil Quality
   - Water Quality
   - Water Quantity
e. The geographic location (e.g. state, county) or farm enterprise (peach growers, cattle producers) targeted by the research
f. Researcher expectation of participants, explaining what the participants will need to provide as part of the project. This should include acreage, number of years research is to be conducted, farm inputs, equipment needs, and/or assistance with data collection.
g. Total number of on-farm research sites needed
h. Copy of research projects final report for NRCS use

Evaluation Criteria

States should select research projects that will be offered to applicants based on the following or similar evaluation criteria:

a. Research purpose and goals as related to the resource focus area
b. Potential for success and adoption on a broad scale
c. Number of participants the research can appropriately involve
d. Demonstration of new and innovative approach to conservation
e. Design and implementation of research based on sound methodology and/or demonstrated technology
f. Capability of the entity to conduct scientific research
g. Potential to transfer the approach or technology nationally or to other geographic or socio-economic areas
h. Development or improvement of NRCS technical or related materials that will help foster expanded adoption of the innovative technology or approach

This information can be presented to interested participants as a fact sheet that outlines their involvement. Enhancement Job Sheet must be provided for additional information. States will notify the Field of the selected projects and associated entities that will be offered and available to applicants.

FRD01 – OR On-Farm Research and Demonstration

NOTE: This enhancement may be incompatible with enhancement PLT15. Refer to this enhancement to ensure no duplicative efforts occur.

Oregon Criteria

Only one option is being made available in Oregon as an On-farm Research and Demonstration Enhancement and is described below.

Pollinator Enhancement Research and Demonstration

General Description

For this enhancement a farmer/producer would chose between two site preparation approaches and three planting "treatments" to help evaluate success of these techniques in establishing pollinator habitat. The two site preparation approaches are: 1) Cultivate and chemical fallow (Table 1.) or 2) Organic Option (Table 2.). The three planting "treatments" are: 1) Island, 2) Strip, or 3) Simple seeding of grasses and forbs together (see Figures 1 and 2 for Island and Strip treatments). For Island and Strip planting treatments, grasses and wildflowers are separate, expanding herbicide and mowing options in controlling weeds.

The minimum size of a planting installation will be ¼ acre and the research project must be maintained for a minimum of three years after installment. The farmer/producer is responsible for purchasing plant materials, installing, and maintaining the pollinator enhancement. To assist in the evaluation of pollinator plantings, NRCS needs general information about establishment and maintenance of these projects. Producers will allow access to their Research and Demonstration projects by NRCS and/or Oregon State University staff in order to evaluate these projects. Forms are attached at the end of this document and should be completed and shared with NRCS to assist in developing successful pollinator plantings. NRCS additionally needs information about costs of installation and maintenance. This information should be recorded by the landowner and provided to NRCS.

For guidance on plants to establish for pollinator habitat, please refer to the *Oregon Plant Materials Technical Note No. 13 - Plants for Pollinators in Oregon"*. It can be downloaded at: http://www.or.nrcs.usda.gov/technical/ecs/plants/plants-technotes.html . For Eastern Oregon plant recommendations also refer to the *Washington Plant Biology Technical Note No. 24 - Plants for Pollinators in the Inland Northwest* which can be downloaded at ftp://ftp-fc.sc.egov.usda.gov/ID/programs/technotes/tn2b_pollinators_inland_nw.pdf
Other species not contained in the above Technical Notes may be appropriate for use. For approval for other species, and for additional information and guidance, please contact:

Kathy Pendergrass
Oregon NRCS Plant Materials Specialist
Portland, Oregon
503-414-3266
kathy.pendergrass@or.usda.gov

Contact Kathy Pendergrass if you'd like a spreadsheet sent to you that is filtered for plant selections for your specific Major Land Resource Area (MLRA – roughly equivalent to ecoregion) to assist in plant selections.

Site Preparation and Treatment Approaches

Table 1. Cultivation and chemical fallow - Research Scenario – 1

	Treatment 1	Treatment 2	Treatment 3
Year 1			
Fall	1. Cultivate early to maximize germination of weed seed. 2. Prepare a level seedbed. 3. Spray with non-selective herbicide after fall flush of weeds. 4. Minimize soil disturbance from this point onward.	1. Cultivate early to maximize germination of weed seed. 2. Prepare a level seedbed. 3. Spray with non-selective herbicide after fall flush of weeds. 4. Minimize soil disturbance from this point onward.	1. Cultivate early to maximize germination of weed seed. 2. Prepare a level seedbed. 3. Spray with non-selective herbicide after fall flush of weeds. 4. Minimize soil disturbance from this point onward.
Spring	Apply non-selective topical herbicide to chemical fallow after vegetation has grown 4 to 6 inches.	Apply non-selective topical herbicide to chemical fallow after vegetation has grown 4 to 6 inches.	Apply non-selective topical herbicide to chemical fallow after vegetation has grown 4 to 6 inches.
Summer	Spray with non-selective herbicide as needed to control weeds.	Spray with non-selective herbicide as needed to control weeds.	Spray with non-selective herbicide as needed to control weeds.
Year 2			
Fall	1. Spray with non-selective herbicide after fall flush of weeds. 2. Plant mix of wildflowers and native grasses (grasses <25% of total mix). 3. Plant "islands" of selected pollinator plants (containerized plants not seed).	1. Spray with non-selective herbicide after fall flush of weeds. 2. Plant alternating strips of native bunch grasses and wildflowers species strips (3+ species with matching flowering times)	1. Spray with non-selective herbicide after fall flush of weeds. 2. Plant native grasses (grasses <25% of total mix) and wildflowers.
Spring	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand- hoeing, cultivating or using selective herbicides if necessary. Evaluate Planting.	If needed, mow native grass planting and treat broadleaf weeds with selective herbicide if necessary. Treat wildflowers strips with mowing or selective herbicide if necessary. Evaluate Planting.	Evaluate and mow as needed. Spot-spray appropriate herbicide if necessary and feasible.
Summer	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing, cultivating or using selective herbicides. Evaluate Planting.	If needed, mow native grass planting and treat broadleaf weeds with selective herbicide if necessary. Treat wildflowers strips with mowing or selective herbicide if necessary. Evaluate Planting.	Evaluate and mow as needed. Apply appropriate herbicide if necessary and feasible.
YEAR 3	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing, cultivating or using selective herbicides. Evaluate Planting.	If needed, mow native grass planting and treat broadleaf weeds with selective herbicide if necessary. Treat wildflowers strips with mowing or selective herbicide if necessary. Evaluate Planting.	Evaluate and mow as needed. Apply appropriate herbicide if necessary and feasible.
YEAR 4	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing, cultivating or using selective herbicides. Evaluate Planting.	If needed, mow native grass planting and treat broadleaf weeds with selective herbicide if necessary. Treat wildflowers strips with mowing or selective herbicide if necessary. Evaluate Planting.	Evaluate and mow as needed. Apply appropriate herbicide if necessary and feasible.
YEAR 5	Evaluate. Mow and apply herbicide if necessary. Evaluate Planting	If needed, mow native grass planting and treat broadleaf weeds with selective herbicide. Treat wildflowers strips with mowing or selective herbicide if necessary. Evaluate Planting.	Evaluate and mow as needed. Apply appropriate herbicide if necessary and feasible.

Table 2. Organic Option - Research Scenario - 2.

	Treatment 1	Treatment 2	Treatment 3
Year 1			
Fall	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)
Spring	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)	Cultivate early with 1st flush of vegetation. Cultivate regularly to prevent weeds from setting seed (every 1 to 2 weeks)
Summer	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).
Year 2			
Fall	1. Cultivate after fall flush of weeds. 2. Prepare seedbed. 3. Seed native grass matrix. 4. Plant "islands" of selected pollinator plants (containerized plants not seed).	1. Cultivate after fall flush of weeds. 2. Prepare seedbed. 3.Plant alternating strips of native bunch grasses and wildflowers species strips(≥3 species with matching flowering times)	1. Cultivate after fall flush of weeds. 2. Prepare seedbed. 3. Plant native grasses (<25% of total mix) and wildflowers.
Spring	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing or cultivating. Evaluate Planting.	If needed, mow native grass planting and mechanically remove broadleaf weeds in native grasses. Hand weed wildflower strips as needed. Evaluate Planting.	Evaluate, mow and hand weed as needed.
Summer	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).	Cultivate with additional weed flushes, as needed, to prevent weeds from setting seed (every 1 to 2 weeks).
YEAR 3	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing or cultivating. Evaluate Planting.	If needed, mow native grass planting and mechanically remove broadleaf weeds in native grasses. Hand weed wildflower strips as needed. Evaluate Planting.	Evaluate, mow and hand weed as needed.
YEAR 4	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing or cultivating. Evaluate Planting.	If needed, mow native grass planting and mechanically remove broadleaf weeds in native grasses. Hand weed wildflower strips as needed. Evaluate Planting.	Evaluate, mow and hand weed as needed.
YEAR 5	If needed, mow planting avoiding "islands". Remove weeds from "islands" by hand hoeing or cultivating. Evaluate Planting.	If needed, mow native grass planting and mechanically remove broadleaf weeds in native grasses. Hand weed wildflower strips as needed. Evaluate Planting.	Evaluate, mow and hand weed as needed.

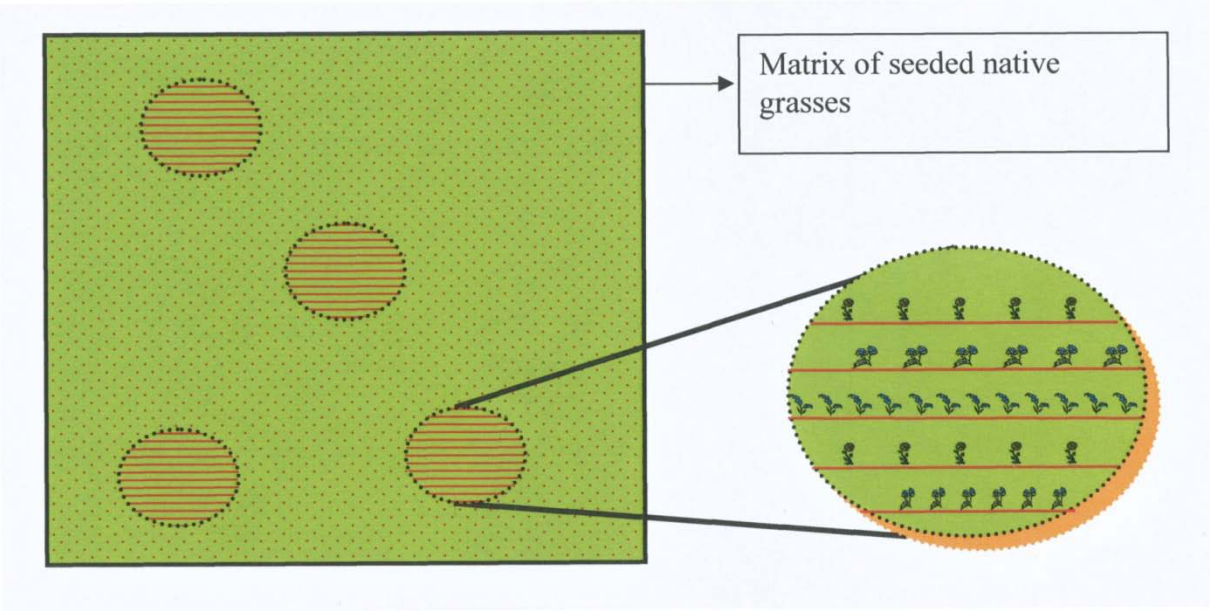


Figure 1. "Island" planting. Islands of containerized native wildflowers are planted in seeded areas to provide seed sources to spread naturally within the planting. In this planting scheme, a block area would be seeded to native grasses and then forb plugs or containerized stock is planted in patches in this area. Wildflower patches could be planted by time of maturity (i.e. early, mid and late blooming) thus providing more mowing options for controlling weeds. This planting scheme will allow for use of broadleaf herbicide control in the area seeded only to grasses. Weed control in the forb planting should be easier with the plants in rows (e.g. easier weeding).

Native Grasses
Wildflower Mix (Fall)
Native Grasses
Wildflower Single Species (Summer)
Native Grasses
Wildflower Single Species (Spring)

Figure 2. Strip planting. Strips of wildflowers are alternated with strips of native grasses. Strips may be either mixed species or single species in separate rows. This is where a block area would be seeded alternately with native grasses and wildflowers to help simplify maintenance. Broadleaf weed control could be used in the grass strips and grass-specific herbicide could be used in the wildflower strips. The wildflower mixtures would be planting according to bloom timing with each strip-planting containing only early, mid and late blooming wildflowers. Wildflowers are planted by time of maturity providing more mowing options (e.g. mowing could occur in blocks before or after flower blooming, thus providing a greater number of options for weed control).

Further Information

Planting Flower-Rich Pollinator Habitats

Establishing pollinator habitat from seed can be a challenging experience, particularly when using native flowering species. In most areas of the country, native wildflowers planted in the late summer and fall have the best chance of success. Many native plants need to go through a rosette stage during the winter or have developed adaptations that require exposure to cold temperatures and damp conditions for germination to occur (cold stratification). These types of seed planted in the fall will not emerge until the following spring.

Site Selection: Weed competition is the most common cause for stand failure when direct seeding native pollinator species. Scout your prospective planting site during the growing season prior to planting. Knowing what weeds may be present will assist you in selecting site preparation methods that minimize weed problems. Perhaps the best way to handle weeds is to avoid sites with heavy weed stands. Selecting a site that is already in a good, weed free stand of crop plants, introduced turf or pasture species may be easier to convert to wild flowers and other native species than old row crop ground that has not had weed control in several years. If using native plants in a planting, avoid sites that have higher levels of inherent fertility or have been fertilized heavily in the recent past. Many wildflowers prefer low or poor soil fertility and are often out competed by weeds in loose, well-drained, nutrient-rich soils.

Species Selection: Species choice affects the probability of successful stand establishment. It is crucial to use species that are native to your state and/or adapted to your site conditions to achieve initial establishment and long-term success. Soil type, moisture, cold and/or heat tolerance, and sun or shade preference all need to be considered. The NRCS Plant Material Specialist or personnel at your local Plant Materials Center can provide technical assistance in determining species selection for Pilot projects.

In addition to species selection, seed source can also affect success, particularly when using native plants. When discussing seed purchase with a supplier, ask about the origin of the seed. Studies have shown that seed derived from wildflower populations that originate close to your state or ecoregion often have better growth, survival, and flowering than seed of the same species collected in other areas of the country. Most wildflower seed has not been selected for wide adaptability and thus is most adapted to its area of origin. If seed or plants are not available from sources within your region, you may consider purchasing seeds or plants from a nearby ecological region similar in climate and elevation to the project site (or the next harsher region nearby).

Seeds may also be found from a number of vendors as pre-mixed assemblages (i.e. prairie mix, butterfly mix, etc.); many of these mixtures may be good selections for using as a pollinator planting. If you have questions about appropriate mixtures or species selections, please contact Kathy Pendergrass at kathy.pendergrass@or.usda.gov; Plant Material Specialist for Oregon NRCS. Please also refer to a summary of vendors at our website: ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Plant%20Materials/PMC09.pdf.

Site Preparation: The goal of site preparation is to minimize interference from weeds and forage/turf grasses while maximizing wildflower seed germination and growth. The more time and effort spent on reducing the weed-seed bank in the soil and preparing the site prior to planting will generally determine whether a planting fails or succeeds. We recommend at least one-full season of site clean-up prior to planting any pollinator enhancement. After soil has been cultivated, the seedbed may need to be firmed prior to seeding/planting by cultipacking or rolling to produce a firm mineral-soil seedbed. A good rule of thumb for checking seedbed firmness is that a footprint leaves an impression no deeper than ¼ inch. It is preferable to prepare the seedbed and then plan to minimized soil disturbance for a period of time and with continued weed and seed-bank removal (e.g. several seasons of chemical fallow) until the desired plants are seeded or planted.

Seed/plant Purchase: Purchase seed that has been tested by a registered seed laboratory. This seed should have a label that lists percent germination and percent purity. This will enable you to calculate pure live seed (PLS) by using the following formula:

$$\textbf{PLS} = \frac{\textbf{\% purity X \% germination}}{\textbf{100}}$$

Seeding rates developed using bulk pounds do not provide the desired seed/ft^2. Only by calculating seeding rates using PLS can you be assured that you are planting correct rates.

One of the best place to find seeds of native plants is at the Native Seed Network website: http://www.nativeseednetwork.org/ ; this is a native seed clearing-house for connecting seed sellers to seed buyers. The California Flora website also has a vendor finder search that may help in finding plants that you may be looking for: http://www.cnplx.info/query.html . A list of plant vendors that supply plants and seed appropriate for Oregon is available from your Plant Material Specialist at: kathy.pendergrass@or.usda.gov . Please also refer to a summary of vendors at our website: ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Plant%20Materials/PMC09.pdf

Seeding Methods: To get good soil to seed contact, seeding with a no-till seed drill may be the optimum method to use, however these drills may not be available to all customers. Alternative methods may be used that take advantage of equipment available to customers. Many native wildflower species have small seed that may require light to germinate, so they can easily be buried too deep to germinate and establish – broadcast seeding may be the optimum method to use when using small-seeded species. Broadcasting may also be an optimum way to get a site entirely occupied by desired seeded plants as there are no unseeded inter-row spaces where only weed seeds will be present to germinate. After broadcast seeding, a roller should be used to press seed to the soil for good germination and establishment.

1. ***Frost Seeding (where applicable)***

   In areas with snowfall, seed may be "frost seeded" directly onto a surface of snow on a warm, sunny late winter day. Seed warmed in the sun, melt through the snow and are gradually deposited on the soil surface. Melting spring snow will further settle the seed, ensuring good seed to soil contact and providing moisture for germination. When performed correctly, frost seeding can result in rapid and very successful plant establishment. Frost seeding works well on bare soil.

2. Scattering By Hand

If the planting site is well prepared (see Site Preparation above), broadcasting seed by hand can be a low cost, low tech option. Wildflower seed are often very small and may need to be mixed with a carrier to achieve even distribution. Carriers such as sawdust, coarse sand, peat moss, rice hulls, clay-based cat litter or vermiculite may be used.

If possible, when broadcasting seed, divide the seed into lots of large seed and small seed. These lots should be broadcast separately for even distribution. Divide the lots into two equal portions, apply half of the mix walking in one direction. Take the second half of the mix and spread walking in the perpendicular direction. This will result in a relatively equal distribution of seed over the planting site.

After planting, running a cultipacker or turf roller over the planted area is essential to ensure seed to soil contact and will assist in preventing seed loss. Applying a thin (half inch or less) layer of weed and seed-free straw (straw from forages such as fescue or ryegrass is typically not seed free) or mulch after cultipacking will also help prevent seed from being lost to seed predation or blown or washed away.

3. Mechanical Broadcaster

A hand-operated, broadcast seed spreader or one mounted on an ATV can be used for small areas. For larger areas, a tractor-mounted spreader or drop seeder may be preferred. A tractor mounted drop seeder (i.e., Brillion seeder) typically used for alfalfa or grass mixtures may be used, however, use of this equipment may require replacing the standard seed box agitators with special native seed, bristle agitators. Depending on the planting equipment and the seed mix, inert carrier material, as described in the hand broadcasting section, may be needed to ensure proper seed distribution. This method should only be used on well prepared sites or bare ground.

Following the same method as with hand broadcasting, the seed mixture should be divided in half and planted in perpendicular passes to ensure proper seed distribution. Broadcast seedings should be cultipacked or rolled and can additionally be protected by a thin layer of weed free mulch as described in the previous section or by use of a cultipacker or turf roller.

4. No-till native and Conventional Seed Drill

Specialized native seed planters are the best way to plant flower rich habitats, however these may not be available in many areas. These native seed drills are able to plant seed in rough, untilled soil. Using this technique is advantageous in areas where large amount of dormant weed seed are present and may germinate when brought to the surface by conventional cultivation. Use of a no-till drill for a Pilot planting will be useful if the site had not been cultivated for some time (e.g. if last cultivated in previous Fall and didn't want to disturb the soil again - and seedbed was prepared and ready for planting) and had been repeatedly chemical fallowed. Use of a no-till drill would help minimize soil disturbance and thus the redistribution of viable weed seeds to the soil surface to germinate and compete with your new seeding. Seed drills, which provide better planting depth and spacing control, usually require half the amount of seed than broadcasting requires for the same area. The negative aspect of drill seeding is equipment availability. In some locations, these machines can be rented from private conservation organizations. Large native seed producers may have this equipment and provide custom planting on a contract basis. Examples of common native seed drill manufacturers include the Tye, Truax, Great Plains, etc.

On-Farm Assessment & Evaluation for Flower Rich Pollinator Habitat

Client	Cooperating Plant Materials Specialist or Center	Cooperating Field Office
Name:	**Name:**	**Name:**
Address:	**Address:**	**Address:**
Email:	**Email:**	**Email:**
Phone:	**Phone:**	**Phone:**

Documentation

Use the following table for documentation and attach a plan map showing the location of the field(s) where the planting is being implemented.

Farm	Tract	Field	Acres

Client Certification

I certify that I have established On-farm plantings in the fields listed above.

Client Name: _____

Signature: _____ Date: _____

Reviewed By: _____ Date: _____

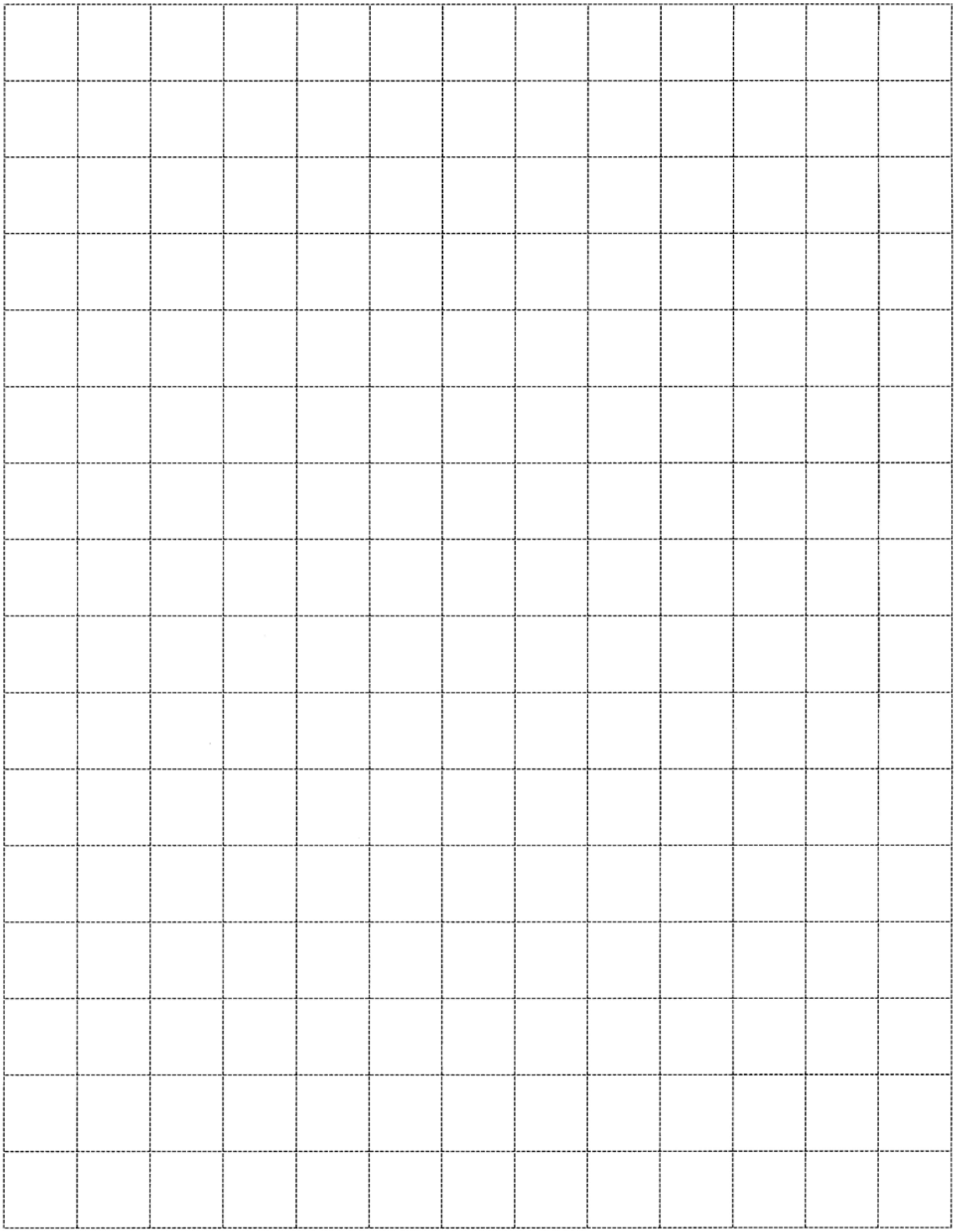
PLANTING INSTALLATION	**Date:** _____				
Please rate the following conditions.	Excellent	Good	Fair	Poor	Very poor
• Condition of plant materials (seed or containerized) when received					
• Site preparation at time of planting (a well prepared, firm, weed free seed bed is excellent)					
• Moisture conditions at time of planting					

• Soil Series	
• Soil Texture	
• Soil pH level (ex: 6.4)	

• Planting Method: DR = Drill BR = Broadcast HP = hand plant PL= plugs OT = Other (*specify*)				
• Kind of material: S = Seed, CT = Containerized,OT = Other (*specify*)				
• Container size (type/size) i.e. pot/1gallon; cone-tainer/6 inch)				
• Spacing between plants and rows (ex: 10' X 10')				
• Did you use mulch or fabric?		YES		NO

• Did you irrigate the planting?		YES		NO
• Did you apply pre or post emergence herbicides		YES		NO
If YES, indicate kind and rate				
• Did you apply fertilizer at planting?		YES		NO
If YES, indicate analysis and amount (ex: 15-10-5 at 200lbs/acre)				

Sketch of Project Layout (Scale 0.5” = _____ ft.).



Installation shall be in accordance with the specified drawings, specifications, and special requirements. **No changes are to be made in the drawings or specifications without prior approval from the technical specialist developing the plan.**

Plant (Common Name and Species)	Seeding			Max. Height (feet)	Bloom Period	Seed (S) or Containerized (C)	Adaptation (xeric, mesic, hydric)	Planting Date
	% of mix	PLS*/ft^2	Method					
Native Bunch Grasses (if used, should be less than 25% of total mix)								
Wildflowers and/or shrubs (at least 3 early, 3 mid and 3 late bloomers)								