

**RECORD OF PLAN CONFORMANCE AND
CATEGORICAL EXCLUSION (CX) DOCUMENTATION for
CATEGORICAL EXCLUSIONS NOT ESTABLISHED BY STATUTE
Bureau of Land Management (BLM)**

BLM Office: Lakeview District, Klamath Falls Resource Area
Proposed Action Title/Type: **Sagebrush Climate Change Study**
NEPA Log #: DOI-BLM-OR-L040-2016-0014- CX
Project Location: Gerber Block (see map)

A. Background

Description of Proposed Action:

The proposed action is for students and faculty from the Oregon Institute of Technology to implement a drought experiment within the Horsefly/Longbranch Creek enclosure area (less than 4 acres total) of the Gerber Block (refer to map below) within the Klamath Falls Resource Area, Lakeview District BLM. The experiment would be part of a larger network of concurrent drought experiments globally using the same methods called for in the International Drought Experiment (IDE) network. These experiments would involve sampling 2 x 2 m plots with a 50 cm buffer surrounding each plot. In cases where larger plots are appropriate, a 4 x 4 m sampling plot with a 1 m buffer will be used, with at least two replicates per core treatment.

Fixed shelters would be installed to passively reduce precipitation events by a constant, site-specific percentage and data collection on forage production and plant community composition over a four year period (2016-2020) in native sagebrush steppe communities. The fixed shelter roofs will be large enough to cover both the sampling plot plus buffer area (i.e. 3 x 3 m or 6 x 6 m). Shelters will not be installed lower than 80 cm above ground to avoid modifying microclimatic conditions. Trenching with hand tools (to a depth of <1 m) along the border of each shelter (and control plot) may be installed in order to hydrologically isolate each plot where necessary. Depth will be dependent on vegetation; a depth of at least 0.5 m is recommended for herbaceous systems, and deeper depths (up to 1 m depth) may be needed for shrublands. Excavated trenches will be lined with an impermeable barrier (e.g., 6 mm plastic) and refilled prior to the initiation of the experiment.

No new roads will be constructed and the plots will be accessed by vehicle on BLM existing system roads and hiking in on foot with supplies. The data gathered will be used to determine the effect of intense, longer-term simulated drought on the western sagebrush steppe ecosystem (refer to attachment for experimental design).

Purpose and Need for the Project:

The purpose of the Sagebrush Climate Change study is to gain knowledge on how and why terrestrial ecosystems may differ in their sensitivity to extreme drought over time. The information obtained will be used to guide future resource management decisions in the case of long-term drought conditions within the sagebrush steppe ecosystem. The need is to understand the consequences of how long-term drought may affect the sagebrush communities locally within the Klamath Falls Resource Area.

B. Land Use Plan Conformance

Land Use Plan Name: Klamath Falls Resource Area Resource Management Plan

Date Approved/Amended: June 1995

The proposed action is in conformance with the applicable LUP because it is specifically provided for in the following LUP decision(s):

- Klamath Falls Resource Area Record of Decision and Resource Management Plan and Botany Program Summary (KFRA ROD/RMP/RPS), approved June 1995. Refer to Management Actions/Direction for All Land Use Allocations and Resource Programs/Survey and Manage for Amphibians, Mammals, Bryophytes, Mollusks, Vascular Plants, Fungi, Lichens and Arthropods page 11 section 3 and page 12 section 4, Resource Programs: page 85 Monitoring and 86 Research.

C. Compliance with NEPA

The Proposed Action is categorically excluded from further documentation under the National Environmental Policy Act (NEPA) in accordance with 516 DM Appendix 4 (1.6) as follows: *“Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.”*

This categorical exclusion is appropriate in this situation because there are no extraordinary circumstances potentially having effects that may significantly affect the environment. The proposed action has been reviewed, and none of the extraordinary circumstances described in 516 DM 2, Appendix 2 apply. The following documentation describes whether or not the extraordinary circumstances apply to the project:

CX Extraordinary Circumstances Documentation		
Will the proposed categorical exclusion action:	YES	NO
2.1 Have significant impacts on public health or safety. Rationale: Consulted with field/district office health and safety specialist and no significant impacts were identified. Appropriate road construction signs shall be utilized during work.		X
2.2 Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); national monuments; migratory birds; and other ecologically significant or critical areas. Rationale: Such natural resources and unique geographic features are either not present or would not suffer significant impacts. The proposal would result in No Historic Properties Affected. Review by resource specialists resulted in no other ecologically significant or critical areas as described above.		X
2.3 Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources [NEPA Section 102(2)(E)]. Rationale: No highly controversial environmental effects or unresolved conflicts concerning alternative uses of available resources were identified by resource specialist during project analysis.		X
2.4 Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks. Rationale: There are no highly uncertain or potentially significant environmental effects because there are only 5 shelters being constructed in each plot with two total plots each within a 60 m X 60 m area. There is minimal ground disturbance associated with this study and only during initial set up. The proposed project will have no change from current management practices.		X

2.5 Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.		X
Rationale: BLM resource specialists have determined that this will not establish a precedent for future action, or represent a decision in principle about future actions with potentially significant environmental effects, because this is a routine action.		
2.6 Have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects.		X
Rationale: No direct relationships to other actions with individually insignificant but cumulatively significant environmental effects were identified by resource specialists during project analysis.		
2.7 Have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by either the bureau or office.		X
Rationale: This action is determined to be an undertaking under Section 106 of the National Historic Preservation Act. The APE is determined to be two areas within the enclosure on each side of Long Branch Creek where study plots would be established. One of these locations east of the creek is still being refined. The APE has been completely inventoried and no historic properties are present. The portion of the APE east of the creek will be kept away from sites as it is refined. The undertaking would result in No Historic Properties Affected.		
2.8 Have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species.		X
Rationale: The wildlife biologist has reviewed the project and determined that no proposed species, listed species, or designated critical habitat under the Endangered Species Act occur within the project area or would be affected by the project.		
2.9 Violate a Federal law, or a State, local, or tribal law or requirement imposed for the protection of the environment.		X
Rationale: BLM Interdisciplinary team review concluded that the project will not violate a Federal law, or a State, local, or tribal law or requirement imposed for the protection of the environment.		
2.10 Have a disproportionately high and adverse effect on low income or minority populations (Executive Order 12898).		X
Rationale: Review of the project area location shows no disproportionately high and adverse effect on low income or minority populations.		
2.11 Limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007).		X
Rationale: This action is determined not to limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites.		
2.12 Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and Executive Order 13112).		X
Rationale: Refer to Weed project design features (PDFs) in Appendix A.		

The proposed action would not meet any of the above extraordinary circumstances, or fail to comply with Executive Order 13212 (Actions to Expedite Energy-Related Projects) – to avoid direct or indirect adverse impact on energy development, production, supply, and/or distribution, or impact RMP exclusion and avoidance areas.

Surveys and Consultation

Surveys and/or consultation are not needed for special status plants and animals, for cultural resources, and other resources as necessary (appropriate fields are Initialed and Dated by responsible resource specialist):

Surveys	Are Completed	Will Be Completed	Are Not Needed
SS* Animals			SGH 05/18/2016
SS* Plants			KJ 4/26/16
Cultural Resources	LN 7/1/2016		
Consultation	Is Completed	Will Be Completed	Is Not Needed
SS* Animal Consultation			SGH 05/18/2016
Botanical Consultation			KJ 4/26/16
Cultural Consultation			LN 7/1/2016
*(SS = Special Status)			

Contact Person

For additional information concerning this CX review, contact: Kerry Johnston, Klamath Falls Resource Area, 2795 Anderson Avenue, Building 25, Klamath Falls, Oregon 97603-7891 or telephone: 541-883-6916

**Determination for Sagebrush Climate Change Study
DOI-BLM-ORWA-L040-2016-0014-CX**

I have determined that it is appropriate to proceed with the Proposed Action as described and shown on the attached map(s) in the Sagebrush Climate Change Study categorical exclusion.

Rationale

The proposed action has been reviewed by the Klamath Falls Resource Area staff and appropriate Project Design Features, as specified, will be incorporated into the proposal. The proposed action would not create adverse environmental effects, meet any of the above extraordinary circumstances, or fail to comply with Executive Order 13212 (Actions to Expedite Energy-Related Projects) – to avoid direct or indirect adverse impact on energy development, production, supply, and/or distribution.

Based on the attached NEPA (National Environmental Policy Act) Categorical Exclusion Review, I have determined the proposed action involves no significant impact to the human environment and no further environmental analysis is required.

Authorizing Official: /s/ Shane R. Durant, acting for
(Signature)

Date: 7/05/2016

Name: Donald J. Holmstrom
Title: Field Manager, Klamath Falls Resource Area

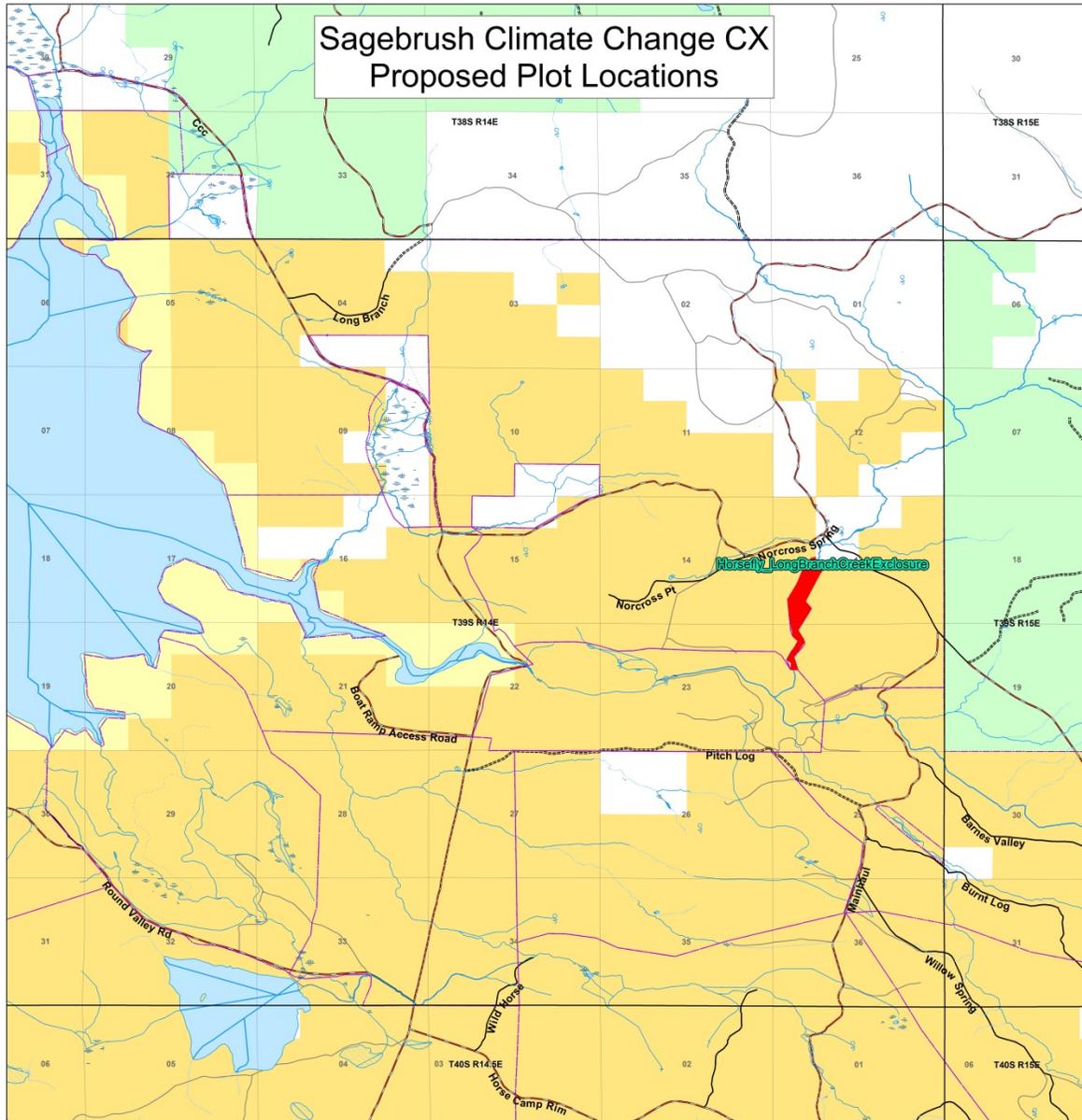
Appendix A - Project Design Features (PDFs)

Weeds and Non-Native Invasive Species

- Monitor the project area 1-3 years post implementation and treat new weed infestations of noxious weeds that were introduced due to project related activities.
- No new roads will be constructed and vehicles will remain on existing system roads for the duration of the project.
- Identify and use weed-free staging areas and minimize travel and disturbance within weed infested areas.

Soils

- Retain and establish adequate vegetative cover in accordance with RMP Best Management Practices (BMPs) to reduce erosion.
- Rehabilitate disturbed areas (disturbed soils at worksite, ruts created in roads, etc.).



Legend

- Township and Range
- Sections
- KFRA Highways
- Proposed_SagebrushCC_Plots
- Pastures

Streams - Periodicity - Cartographic PERIODICITY

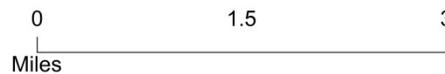
- Perennial
- Intermittent/seasonal
- Ephemeral
- Unknown/unclassified
- Springs

KFRA Roads by Surface Type

SurfaceType

- Bituminous/Paved
- Aggregate / Hard Surface / Pit Run
- Natural Improved
- Natural Unimproved
- Not Known

Gerber Area 1:25,000



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.



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 Prepared By: kjohnson
 Current Date: 03/08/2016 03:37:30 PM
 Creation Date: 3/7/2016 3:36:14 PM
 Computer Name: ILMORSO3C174VM

The International Drought Experiment: a distributed approach to assess terrestrial ecosystem responses to extreme drought

The goal of the International Drought Experiment (IDE) is to determine how and why terrestrial ecosystems may differ in their sensitivity to extreme drought. To accomplish this goal, a coordinated, distributed experiment imposing an extreme drought over a four-year period will be established in range of ecosystem types across the globe. Below is a description of the IDE experimental design, measurements, and sampling protocols. Please refer to the Drought-Net website for additional details about IDE (www.drought-net.org).

I. Experimental Design

A. Site Selection

- Participation is encouraged for, but not limited to, unmanaged ecosystems.
- Because of the relatively low sample size at each site, the site selected for establishment of the experiment should be relatively homogeneous, with respect soil properties and plant species composition.
- Ideally, the study site should not have experienced a major disturbance event (such as nutrient addition, severe soil disturbance, seed addition, etc.) within past several years or have been recently grazed by livestock (i.e., within the last 3-5 years) to avoid confounding the effects of disturbance or grazing release with the experimental treatments.

B. Treatments

Drought will be imposed using fixed shelters that passively reduce precipitation events by a constant, site-specific percentage (Fig. 1; also see Yahdjian & Sala 2002, Gherardi & Sala 2013). The manipulation will occur year-round where possible. In those instances where snowfall is significant, alternative means of precipitation reduction may be used (e.g., snow removal) or, alternatively, the roof can be removed during the period of heavy snowfall. In all cases, the total amount of precipitation reduction that is imposed must be quantified.

1. Core treatments – The core treatments will consist of 1) an ambient precipitation treatment (unsheltered control) and 2) an extreme drought treatment. The extreme drought treatment will be imposed for four consecutive years. For the drought treatment, the percentage reduction of each

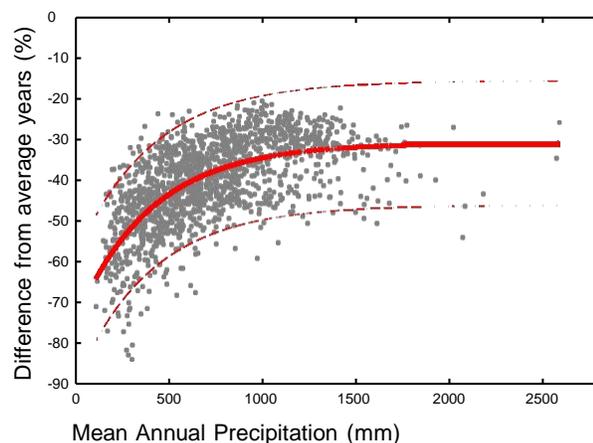


Fig. 1. Relationship between the difference (%) in precipitation amounts between normal years (amounts between the 45-55th % of years within a 100 year record) and extremely dry years (precipitation amounts in the lowest 10th % of years for a 100 yr record) and mean annual precipitation. Data (grey dots) are from 1614 climate stations arrayed across the globe, representing 12 ecoregions. Shown is the predicted relationship (solid red line) with upper and lower bounds of the 95% confidence interval (dashed red lines). Smith *et al.* in prep.

rainfall event will mimic an extreme drought, defined as an extreme reduction in precipitation (based on the 1st percentile of the long-term record), which is specific to a particular site. Sites will be asked to determine this level of extremity in one of two ways: 1) based on site-specific climate data greater than 50 years in length, or 2) based on interpolated 100-yr data. To assist with determination of extremity, an online tool will be made available on the Drought-Net website (www.drought-net.org).

2. Optional treatments – Sites are encouraged to implement the optional treatments, but these are not required for participation in the network.

a. Fixed treatment - Each site will reduce annual precipitation by 50% using passive shelters.

b. Infrastructure control – To account for shelter effects, sites are encouraged to establish infrastructure controls, which can be either inverted slats or deer netting (choice to be determined based on cost).

C. Replication and plot size

- The level of replication will, in part, be dependent upon cost. For herbaceous systems, each core treatment will be, at minimum, replicated three times. For those systems requiring larger plots (shrublands, forests), at least two replicates per core treatment are recommended (but not required). Plots can be set up randomly or in a blocked design if appropriate.

- Sampling plot size will be matched to vegetation structure (i.e., height, density, crown width). For short-stature vegetation (<2 m), minimum sampling plot size is 2 x 2 m with a 50 cm buffer surrounding the plot. In cases where larger plots are appropriate, a 4 x 4 m sampling plot with a 1 m buffer is recommended. Forest and savanna sites will need to scale their plot size appropriately.

- The shelter roof will be large enough to cover both the sampling plot plus buffer area (i.e. 3 x 3 m or 6 x 6 m). Shelters should not be installed lower than 80 cm above ground to avoid modifying microclimatic conditions.

D. Trenching

Trenching (to a depth of > 0.5 m) along the border of each shelter (and control plot) is encouraged but not mandatory in order to hydrologically isolate each plot. Depth will be dependent on vegetation; a depth of at least 0.5 m or greater is recommended for herbaceous systems, and deeper depths (at 1 m depth) are encouraged for shrublands and forests. Excavated trenches should be lined with an impermeable barrier (e.g., 6 mm plastic) and refilled prior to the initiation of the experiment. Given that trenching is not feasible at all sites, an alternative to trenching is to increase the size of the shelter to accommodate a larger buffer. If a site is located on a slope (>2%), the mitigation of run-on (e.g., via flashing or other means) is encouraged.

II. Measurements

Two levels of measurements are proposed. Level-1 measurements are designed to quantify three key response variables that will allow us to test network-level hypotheses, as well as provide important site characteristics. These measurements are required for inclusion in the network. Level-2 measurements provide additional response and explanatory variables. Level-2 measurements, although optional for inclusion in the network, should be made if possible. Many additional measurements may be of interest to network participants, but the two levels of measurements are meant to capture key responses and explanatory variables to address a range of network-level questions. Detailed methodologies will be provided on the Drought-Net website (www.drought-net.org).

A. Level 1 measurements

1. Site level

Each site must provide the following information:

- Latitude, longitude
- Bailey biogeographic region, biome type, ecosystem type, a more detailed description based on dominant vegetation/species
- Slope, aspect, elevation
- Long-term air temperature and precipitation data (preferably 50-100yr record, daily time scale)
- These data can be from a nearby representative weather station or based on interpolated data
- Other site characteristics (if known)
- Disturbance history
- Depth of known soil impediment (shallow bedrock, caliche layer, etc.)
- Average water table depth
- Other unusual site characteristics (saline, serpentine, etc.)

In addition, each site is required to make the following measurements during the study period:

Annual precipitation for each year of the study based on daily precipitation if possible, or less frequent data (i.e., weekly, monthly) if appropriate.

Annual average air temperature of each year of the study based on daily measurements, or less frequently if appropriate.

–List of plant species for the study site.

–Soil texture, bulk density, chemical characterization (pH, Ca, C, N, P, %OM, etc.).

2. Plot level

The core measurements required for participation in the network are focused on primary productivity, soil CN, and plant community composition.

1. Aboveground productivity and standing biomass will be measured annually using methods appropriate for a particular ecosystem (refer Fahey & Knapp 2007). These can include both destructive and/or non-destructive measurements. Estimates of biomass will be separated into live and dead biomass. Live biomass will be further separated by growth form (grass, forb, woody). Dead biomass will be separated into current and previous year's when appropriate. For herbaceous-dominated systems, we recommend following the Nutrient Network protocol (www.nutnet.umn.edu). For destructive measurements, no more than 25% of the subplot dedicated to productivity measurements will be harvested each year to avoid resampling over the 4-year study period.

2. Soil C and N concentration will be measured twice, once during the pre-treatment data collection year and in year 4 of the drought. For each plot, two to three soil samples will be collected to a depth of 0-15 cm and composited. Samples will be sent to a central lab (tbd) for analysis and archived. Standard protocols will be used for the analysis (including correcting for inorganic C if necessary, Robertson *et al.* 2007).

3. Plant community composition will be measured at least on an annual basis. Abundance (cover, density) will be estimated separately for each species rooted within each plot. For herbaceous-dominated vegetation, the Nutrient Network protocol is recommended

(www.nutnet.umn.edu). This protocol utilizes 1 x 1 m permanent sampling plots. For other systems, sampling plot size will increase dependent on vegetation type and protocol used (e.g., line intercept, laser point frame/pin frame, etc.).

4. Each site will provide qualitative trait data for all species found in the species composition sampling plots. These traits include: growth form (grass, forb, shrub, tree, succulent), photosynthetic pathway (C4, C3, CAM), N-fixer, life history (perennial, biennial, annual), and clonality (stoloniferous, rhizomatous, and for grasses caespitose or not).

B. Level 2 measurements

Level 2 measurements are not required for participation in the network but are strongly encouraged. These measurements include quantifying shelter effects and performance, precipitation inputs and changes in soil moisture, belowground productivity, decomposition rates, and plant traits. Of these, quantifying soil moisture content is the *highest priority* and most valuable for understanding drought impacts.

1. Soil moisture content will be measured for the drought and control treatments at a depth of at least 10 cm (preferred ≥ 15 cm). These measurements will be made as frequently as possible (e.g., continuous, bi-weekly, monthly). Ideally, continuous soil moisture measurements at two depths (0-15 cm and a deeper depth) are recommended.

2. Quantifying shelter effects and performance

Shelter effects will be quantified by measuring PAR interception, air temperature and soil temperature beneath the shelters and outside the shelters.

Shelter performance will be quantified for as many precipitation events as possible by measuring the amount of precipitation reaching each sheltered plot relative to outside the plot.

3. Root production and biomass

Annual root production will be estimated with root-ingrowth cores (recommended minimum of $n = 2$ per plot; Smit *et al.* 2000). In-growth core diameter and depth may vary by soil depth and/or type of vegetation. In-growth cores will be installed at end of each growing season and removed a year later. Estimates of root production will be provided in 10 cm intervals (0-10, 10-20, 20-30, etc.) for all sites.

Standing root biomass will be estimated from the cores extracted for root-ingrowth measurements.

4. As an index of decomposition, standardized substrates and protocols will be used at all sites (e.g., tea bags for aboveground, Keuskamp *et al.* 2013; wooden dowels/ tongue depressors for belowground, Robertson *et al.* 2007).

5. Light availability will be measured at the beginning and end of each growing season in the subplot designated for the plant species composition measurements.

6. For the most common plant species (those collectively comprising 90% of relative cover in plots), additional plant traits will be measured, including height, specific leaf area, and estimated rooting depth.