

# Appendix C- C-SIP Monitoring Protocol, Version 1.0

## Introduction

A required and supported element of the Climate Stewardship Incentive Program is monitoring the practices implemented with cost-share assistance. Monitoring is critical for demonstrating the effectiveness of the practices to the grant funders. The monitoring approach taken here provides forest stewards with funding support to document the implementation of the cost-shared practices and the effectiveness of these practices in meeting objectives.

The first step in monitoring most practices (other than projects that only include C-SIP 5.3 or 5.4 as cost-shared practices) is to create a map that shows where the cost-shared practices are to be implemented as part of the Practice Plan (see Appendix C). The second step is to document the implementation of the practices. A monitoring checklist and form are provided for each practice. The final step is to collect resilience data at several points within the treatment area to document the impact of practices on overall forest resilience. The resilience metrics are a subset of those collected by foresters when preparing a Forest Stewardship Climate Plan, and will be recognized by those foresters that have participated in Climate Forestry trainings held by DCR and Mass Audubon. For projects that only include cost-share for C-SIP 5 practices, a streamlined monitoring protocol is available that focuses on the installation and maintenance of the cost-shared BMPs.

Recognizing that these monitoring requirements may add time to installation and potentially require an additional visit to the site for post-treatment documentation, cost-share is available for this activity based on the size of the project:

Practice Acres	Rate
1 to 20 acres	\$400
21 to 50 acres	\$600
>51 acres	\$800

## Training in Monitoring Protocols and Tools

A smartphone-based C-SIP Monitoring app is provided by DCR for collecting all required monitoring data. This app allows the collection of spatial data and observations on the cost-shared practices. Training in the monitoring protocol and using the app will be provided by DCR in conjunction with Mass Audubon.

## Monitoring for C-SIP 5

Monitoring for C-SIP 5 (exclusive of 5.4 timber mat purchase) has two steps:

1. Document location of BMPs once installed. The Forest Resilience Monitoring app is used to note the location of each installed BMP, to record a photo of the BMP installed, and to take any notes.
2. Document that site has stabilized and/or erosion control remains in place and functional after harvest closeout (up to 12 months after project completion). The C-SIP Monitoring app is used to note the location of each installed BMP, to record a photo of the BMP installed, and to take any notes on site stabilization or the condition of the BMP.

## Monitoring for Practices other than C-SIP 5

Monitoring for all practices other than C-SIP 5 has 3 general steps that vary depending on practice:

1. Creation of a map showing the location and extent of all cost-shared practices. This map is completed, and spatial data submitted to DCR as part of completing the Practice Plan or the C-SIP 1 Harvest Layout practice. While this step is completed before monitoring commences, it is included here because the map provides a basis for subsequent monitoring. The accuracy of the spatial data is therefore important because subsequent monitoring depends on these maps. The C-SIP Monitoring app can be used to record this spatial data.
2. Pre-treatment documentation of forest condition. The C-SIP Monitoring app is used to both document general forest condition and make specific observations related to the practice being implemented.
3. Post-treatment documentation of forest condition. The C-SIP Monitoring app is used to both document general forest condition and make specific observations related to the practice being implemented.

## Practice-specific requirements

Each cost-shared practice has specific requirements, which are described here (except for C-SIP 5, see above section).

### C-SIP 1 Harvest Layout

1. The map must show the design and layout for skid trails and roads, the extent of landings, location of water control structures, and soil stabilization measures to protect forest soils during harvesting activities. Spatial data for the harvest area is submitted with the practice plan, while spatial data for layout (roads, landings, BMPs, etc.) are submitted when the C-SIP 1 Harvest Layout practice is completed.

2. Documentation that skid trails, landings, water control structures, and soil stabilization measures are marked in place before harvest. This is done as part of C-SIP 1 completion. The C-SIP Monitoring app is used to note the location, record photos, and any other characteristics of these elements.
3. Documentation that skid trails, landings, water control structures, and soil stabilization measures were installed as planned. The C-SIP Monitoring app is used to note the location, record photos, and any other characteristics of these elements after harvest completion.

## C-SIP 2 Legacy Tree Retention

1. The map must show the harvest area and the extent of legacy tree marking. This is done as part of the practice plan for the project.
2. Documentation of marked individual legacy trees and patches before harvest. The C-SIP Monitoring app can be used to note the location of trees and patches, record photos, and to take any notes. This is done as part of C-SIP 2 completion. In cases where permission is granted to mark legacy trees after a completed harvest, this step is not completed.
3. Documentation of marked individual legacy trees and patches after harvest. The C-SIP Monitoring app is used to note the location of trees and patches, record photos, and to take any notes.

## C-SIP 4 Invasive Plant Species Control

1. Prior to treatment, map the extent and intensity of invasive plant populations in treatment areas, and describe the timing and method of treatment for each treatment area. This is done as part of C-SIP 4 completion. The C-SIP Monitoring app can be used for this.
2. After treatment, identify species of invasive plants present and provide categorical estimates of the intensity of infestation within each of the treatment areas (also see General Forest Resilience Monitoring, below). The C-SIP Monitoring app is used for this. If applying for multiple years of treatment, this data is recorded in the growing season following each treatment (before subsequent treatment). The final monitoring visit is in the growing season following the last treatment.

## C-SIP 6 Temporary Barriers to Animal Browse

1. The map must show the extent of the area where tree tubes are deployed, and the density of seedlings to be protected. This is completed as part of the Practice Plan.
2. After installation of tree tubes, the site will be re-surveyed annually to check the condition of tubes, stakes, and bird caps, and to perform maintenance as necessary. Tubes should be removed when the diameter of the tree reaches 3 inches or greater, and prior to the potential for tree tubes to restrict the diameter growth of the tree. In addition, the species, survival and condition of tree seedlings

is documented during these monitoring visits. The C-SIP Monitoring app is used for this.

## General Forest Resilience Monitoring requirements

For cost-shared practices other than C-SIP 1 Harvest Layout and C-SIP 5 Climate-Smart Best Management Practices for Forest Operations, forest resilience monitoring at pre-determined points is required. These data are collected both prior to practice implementation and afterwards to document the impact the practices have on forest resilience (see *Assessing Vulnerability and Carbon in Massachusetts Forests* for more information on forest resilience monitoring). The C-SIP Monitoring app is used for collecting this data and its collection is integrated with the collection of the practice-specific monitoring elements described above. Specific metrics are listed below.

1. Forest Structure – basal area, canopy height and present cover, midstory percent cover, understory percent cover
2. Canopy Trees – species, abundance, outlook from forest health threats and climate change
3. Regeneration - species, abundance, outlook from forest health threats and climate change
4. Invasive Plants – species, percent cover
5. Deer Browse – impact scale
6. Stand Vulnerability – short term and long term

## C-SIP Monitoring app

The C-SIP Monitoring App developed by DCR and Mass Audubon enables collecting and recording monitoring data using a smartphone or tablet. The app uses an ArcGIS Survey123 form to record spatial data, photos, and observations using your device. The form can be used whether or not cell coverage is available in the area it is being used.

### Accessing the Survey Form

To access the survey form, please click [here](#).

or use this QR code:

