

## Data Management Plan

**Name of Contractor:**

University of Wyoming  
Kristina Hufford  
Joellyn Moine

**Name of the Project:**

Revegetation Success and Weed Resilience of Wyoming Right-of-Way Reclamation

**Project Duration: Start Date:** 10/2017      **End Date:** 1/2023

**DMP Version: 1**

**Date Amended, if any:**

**Name and ORCID (Open Researcher and Contributor Identifier) Number for each author:**

Kristina M. Hufford 0009-0008-6871-7258

Joellyn Moine 0009-0002-9286-7877

R. Scott Gamo 0000-0001-8672-3485 R. Scott Gamo

**WYDOT Project Number:**

WY2304F

**I. Peer reviewed publications:**

None at this time.

**II. The purpose of this research project is to:**

Objectives are to evaluate different reclamation seed mixes along roadsides over twenty years to determine the rate of reseeding success and better define combinations of species and site variables that contribute to successful revegetation outcomes. Sites and seed mixes will be evaluated for resilience to invasion by high impact species such as cheatgrass.

**III. Data Types and Storage**

The types of data and/or datasets generated and/or used in this project include:

Field data representing 73 sites and 12 roadways in southern and central Wyoming. Line-intercept transect data will consist of plant cover, species composition, plant height, soil cover and chemical characteristics, vegetation gap number and length. Soil data will include soil texture, including the percent sand, silt and clay; pH; percent total nitrogen and carbon; electrical conductivity (mmhos/cm); the exchangeable cations of calcium (Ca), magnesium (Mg), sodium

(Na), and potassium (K) in meq/L; the sodium adsorption ratio (SAR); the ppm of nitrate-nitrogen (NO<sub>3</sub>-N), which serves as an indicator of soil nitrogen available to plants; and the ppm of heavy metals including cadmium (Cd), copper (Cu), lead (Pb), and zinc (Zn).

Field data will be collected following the assessment, inventory and monitoring (AIM) protocols develop by the USDA Agricultural Research Service (ARS) Jornada Experimental Range. ([https://jornada.nmsu.edu/files/Core\\_Methods.pdf](https://jornada.nmsu.edu/files/Core_Methods.pdf)) Soil samples will be submitted to the Colorado State University Soil, Water, and Plant Testing Laboratory for analyses.

Data will be documented using field sheets for initial data collection and then transcribed into database format using Excel software. All data collected from the research and all derived data products described in this proposal will be housed on secure data repositories at the University of Wyoming that are regularly backed up to off-campus locations. Data will also be submitted to the Environmental Services division at the Wyoming Department of Transportation.

#### **IV. Data Organization, Documentation, and Metadata**

The plan for organizing, documenting, and using descriptive metadata to assure quality control and reproducibility of these data includes:

1. Field data sheets for initial line-intercept transects.
2. Excel spreadsheets of transcribed data.
3. Any r software code (open access CRAN network; <https://cran.r-project.org/>) or related software analyses

All data will be stored with open file standards (e.g., plain text, CSV, Markdown, PDF, JPEG). Proprietary data formats will be avoided, if possible, to guarantee compatibility with existing data repositories and programs.

#### **V. Data and/or Database Access and Intellectual Property**

During the project duration, access to data will be mostly limited to the primary research team consisting of the PIs, senior personnel, graduate and undergraduate students working on the project, and cooperators such as the personnel at the Wyoming Department of Transportation. Once a dataset is published in a peer-reviewed manuscript, it will be made public using the UW repository or other open access data warehouses such as Dryad (<https://datadryad.org/stash>), depending on journal requirements.

#### **VI. Data Sharing and Reuse**

All raw and derived data from this project will be made publicly available over time with the appropriate metadata through online sharing described above. All data used in individual

publications will be made public at the time of publication and can be downloaded for free. This will include all necessary metadata, attribution, and citation information. Researchers downloading the data will agree to terms of use to protect intellectual rights of the author(s).

## **VI. Data Preservation and Archiving**

The data will be preserved and archived in the following way(s).

All data collected from the research and all derived data products described in this proposal will be housed on secure data repositories at the University of Wyoming that are regularly backed up to off-campus locations. This method is safe and secure and relevant for use by University of Wyoming authors and data will include metadata as required by the National Transportation Library. Data will be retained for a minimum of 5 years at the University of Wyoming, and indefinitely in online warehouses that are linked to journal publications.

### Metadata Schema

Elements	Example of what is expected for each element
<b>Title<sup>1</sup></b>	Revegetation Success and Weed Resilience of Wyoming Right-of-Way Reclamation
<b>Creator/contact point</b>	0009-0008-6871-7258 Kristina Hufford 0009-0002-9286-7877 Joellyn Moine 0000-0001-8672-3485 R. Scott Gamo
<b>Publication Date(s)</b>	March 2023
<b>Description/Abstract</b>	<p>Roadside revegetation within highway rights-of-way is a final step in road construction, and often occurs in areas that are difficult to reclaim due to harsh climate conditions and impacts of land disturbance, including topsoil removal, soil compaction, and the presence of noxious and invasive weeds. Wyoming, Department of Transportation managers have focused on reseeding native plant species since the 1990s, and seed mixes are designed for application among six Level II ecoregions across the state. A study of 73 sites along 12 highways in central and southern Wyoming revealed that 36percent of seeded species were present among sampled sites between two and twenty years after projects were completed. In addition, a minimum of one seeded species was detected along transects for all 31 roadside projects. Grasses were the most likely plant type to establish from seed mixes despite both the number of forbs in seed mixes, and the large number of native and non-native forbs present at field sites. While many seeded species were not detected along reclaimed roadsides, a higher abundance of plant success of one or more seeded species corresponded to a significantly lower number of introduced weeds. Moreover, a higher number of weeds along roadsides positively correlated with a higher number of weeds over the fence line, providing evidence that weeds may be spreading along road corridors and into nearby, undisturbed rangeland. Results of this study support seeding roadsides with native vegetation to minimize the number and abundance of undesirable, non-native species. Further study is needed to determine the factors that prevent establishment of seeded forbs along road rights-of-way in Wyoming</p>
<b>Subject and Keywords</b>	The topic of the content of the resource. Tags (or keywords) help users discover your dataset; please include terms that would be used by technical and non-technical users.

<sup>1</sup> To include alternate title; conference title; and journal title, if they are different.

<b>Identifier<sup>2</sup> and/or source</b>	
<b>Collection and Related Documents</b>	
<b>Edition</b>	1
<b>Related Documents</b>	
<b>Coverage</b>	Central and southern Wyoming, 2019
<b>Language</b>	English
<b>Publisher/Distributor</b>	FHWA and Wyoming Department of Transportation List all other publishing companies that this publication has been sent to.
<b>Funding agency</b>	FHWA and Wyoming Department of Transportation
<b>Access Restrictions</b>	Restricted public (Data asset is available under certain use restrictions).
<b>Intellectual Property and Other Rights</b>	Data publicly available upon publication of project results.
<b>License</b>	
<b>Code and software needs</b>	None
<b>Format</b>	xlsx
<b>Choice of Repository</b>	University of Wyoming

**NOTE: Each separate report, dataset, collection, existing collection, and software developed must have its own table. All fields in this Schema must be completed at the time of the final report.**

**NOTE: This Metadata Schema is created as a derivative from the Common Core required fields that can be found at <https://project-open-data.cio.gov/schema/>**

---

<sup>2</sup> To include record numbers; report numbers; NTIS number; TRIS Accession Number; OCLC Number; ISBN; ISSN; contract number; and DOI if available.