Interactions of Forest Management and Herbivory on Community and Crop-tree Establishment (Camera Data)

Metadata:
- Identification Information
- Data Quality Information
- Entity and Attribute Information
- Distribution Information
- Metadata Reference Information

Identification Information:
Citation:
Originator: Thomas D. Stokely
Originator: Jake Verschuyl
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Originator: Matthew G. Betts
Publication Date: 2017
Title: Interactions of Forest Management and Herbivory on Community and Crop-tree Establishment (Camera Data)
Geospatial Data Presentation Form: Comma-separated values (.csv) file
Publication Information:
Publication Place: Reston, VA
Publisher: U.S. Geological Survey
Online Linkage: https://doi.org/10.5066/F7H1307W

Description:
Abstract:
Land management practices often directly alter vegetation structure and composition, but the degree to which ecological processes such as herbivory interact with management to influence biodiversity is less well understood. We hypothesized that intensive forest management and large herbivores have compounding effects on early-seral plant communities and plantation establishment (i.e., tree survival and growth), and the degree of such effects is dependent on the intensity of management practices. We established 225 m² wild ungulate (deer and elk) exclosures nested within a manipulated gradient of management intensity (no-spray Control, Light herbicide, Moderate herbicide and Intensive herbicide treatments), replicated at the scale of whole harvest units (10-19 ha). Herbivory and herbicide applications interacted to drive vegetation structure, composition and crop-tree establishment, with herbivory effects most evident at intermediate herbicide treatments. Control stands were too forage-rich and Intensive stands too forage-poor to be substantially affected by herbivory. However, with Moderate herbicide treatment – which approximates treatments applied to > 2.5 million hectares in Pacific Northwest U.S.A. – foraging by deer and elk exacerbated the effect of the herbicides, resulting in simplified, low-cover plant communities resembling the Intensive herbicide treatment. In the Light herbicide treatment, herbivory suppressed shrub growth following herbicide treatment, improving planted conifer seedling survival, likely via competitive release from shrubs. Minor reductions in management intensity from the Moderate to Light herbicide treatments therefore facilitated the capacity of wild ungulates to benefit seedling survival – which constitutes early evidence of an ecosystem service. However, this ‘service’ may be to the detriment of native early-seral plant communities. These results demonstrate that by changing community composition and vegetation structure, intensive forest management alters foraging selectivity and subsequent plant-herbivore interactions; such shifts in early-seral communities are likely to influence understory plant communities and tree growth in later stages of forest development.

Purpose:
The data were collected to test the relative effects of silvicultural vegetation management on the use of forest plantations by deer and elk as part of the Intensive Forest Management and Biodiversity research collaborative.

Time Period of Content:
Time Period Information:
Range of Dates/Times:
Beginning Date: 20120601
Ending Date: 20121231
Currentness Reference:
ground condition

Status:
Progress: Complete
Maintenance and Update Frequency: Not planned
Spatial Domain:
Description of Geographic Extent:
Western Oregon, USA
Bounding Coordinates:
West Bounding Coordinate: -123.35
East Bounding Coordinate: -123.8333

about:blank
North Bounding Coordinate: 45.75
South Bounding Coordinate: 44.7333

Keywords:
- Theme: herbivory
- Theme: community
- Theme: cervidae
- Theme: ungulate
- Theme: biodiversity
- Theme: management
- Theme: herbicides
- Theme: silviculture
- Theme: plantation
- Theme: early-seral
- Theme: trophic
- Theme: forage
- Theme: deer
- Theme: elk
- Theme: forestry

Place:
- Place: Pacific Northwest
- Place: Oregon Coast Range
- Place: Polk County, Oregon
- Place: Tillamook County, Oregon
- Place: Lincoln County, Oregon
- Place: Yamhill County, Oregon

Taxonomy:
- Keywords/Taxon:
  USGS Biocomplexity Thesaurus
  Taxonomic_Keyword: Mammals

Classification_System:
- Classification_System_Citation:
  Citation_Information:
  Originator: Integrated Taxonomic Information System
  Publication_Date: 2016
  Title: Integrated Taxonomic Information System
  Geospatial_Data_Presentation_Form: comma-separated file
  Publication_Information:
    Publication_Date: unknown
    Publisher: unknown
  Online_Linkage: unknown

- Taxonomic_Procedures:
  expert advice
  Taxonomic_Completeness:
  All species were unambiguously identified.

General_Taxonomic_Coverage:
- All mammals were identified to species.

Taxonomic_Classification:
- Taxon_Rank_Name: Kingdom
- Taxon_Rank_Value: Animalia
- Taxon_Rank_Name: Subkingdom
Taxon_Rank_Value: Bilateria
Taxonomic_Classification:
Taxon_Rank_Name: Infrakingdom
Taxon_Rank_Value: Deuterostomia
Taxonomic_Classification:
Taxon_Rank_Name: Phylum
Applicable_Common_Name: chordates
Taxonomic_Classification:
Taxon_Rank_Name: Subphylum
Applicable_Common_Name: vertebrates
Taxonomic_Classification:
Taxon_Rank_Name: Infraphylum
Taxon_Rank_Value: Gnathostomata
Taxonomic_Classification:
Taxon_Rank_Name: Superclass
Taxon_Rank_Value: Tetrapoda
Taxonomic_Classification:
Taxon_Rank_Name: Class
Applicable_Common_Name: mammals
Taxonomic_Classification:
Taxon_Rank_Name: Subclass
Taxon_Rank_Value: Theria
Taxonomic_Classification:
Taxon_Rank_Name: Infraclass
Taxon_Rank_Value: Eutheria
Taxonomic_Classification:
Taxon_Rank_Name: Order
Taxon_Rank_Value: Artiodactyla
Applicable_Common_Name: artiodactyls, porco do mato, veado, cloven-hoofed ungulates, even-toed ungulates
Taxonomic_Classification:
Taxon_Rank_Name: Family
Taxon_Rank_Value: Cervidae
Applicable_Common_Name: cervids, caribou, deer, moose, wapiti
Taxonomic_Classification:
Taxon_Rank_Name: Subfamily
Taxon_Rank_Value: Cervinae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Applicable_Common_Name: red deer, deer, wapiti
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: elaphus
Applicable_Common_Name: elk, wapiti, Ciervo común, wapiti or elk, wapiti, Red Deer
Taxonomic_Classification:
Taxon_Rank_Name: Subspecies
Applicable_Common_Name: Roosevelt elk

Taxonomic_Classification:
Taxon_Rank_Name: Subfamily
Taxon_Rank_Value: Capreolinae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Applicable_Common_Name: mule deer, white-tailed deer
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: hemionus
Applicable_Common_Name: mule
deer, Venado bura, Mule Deer

**Taxonomic Classification:**
- **Taxon_Rank_Name:** Subspecies
- **Taxon_Rank_Value:** columbianus

**Applicable Common Name:** black-tailed deer

**Access_Constraints:** none
**Use_Constraints:** none
**Point_of_Contact:**
- **Contact_Person_Primary:** USGS Forest and Rangeland Ecosystem Science Center
- **Contact_Address:**
  - **Address_Type:** mailing and physical
  - **Address:** 777 NW 9th Street, Suite 400
  - **City:** Corvallis
  - **State_orProvince:** Oregon
  - **Postal_Code:** 97330
  - **Country:** USA
- **Contact_Voice_Telephone:** (541) 750-1030
- **Contact_Electronic_Mail_Address:** fresc_outreach@usgs.gov

**Data_Set_Credit:**
Weyerhaeuser Company, Forest Capital Partners, Hancock Natural Resources Group, Plum Creek Timber Company, Inc. and the Oregon Department of Forestry provided land access and implemented silvicultural treatments; funding was provided by the United States Department of Agriculture, Agriculture Food and Research Initiative grant (AFRI-2009-04457), the National Council for Air and Stream Improvement to MGB, the Giustina Foundation, the Oregon Forest Industries Council, and the Oregon State University College of Forestry Noble fund and Dean’s fund; Codey Mathis assisted with photo sorting and data collection/entry.

**Analytical_Tool:**
- **Analytical_Tool_Description:** R statistical software

**Tool_Access_Information:**
- **Online_Linkage:** http://www.R-project.org/
- **Tool_Access_Instructions:** http://www.R-project.org/

**Tool_Citation:**
- **Citation_Information:**
  - **Originator:** R Core Team
  - **Publication_Date:** 2012
  - **Title:** R: A language and environment for statistical computing

**Geospatial_Data_Presentation_Form:** statistical software

**Data_Quality_Information:**

**Attribute_Accuracy:**
- **Attribute_Accuracy_Report:**
  To ensure accuracy of data collection, we double checked picture information for errors in date, entry, species and behavioral information.

**Logical_Consistency_Report:**
- **Logical_Consistency_Report:** No formal logical accuracy tests were conducted

**Completeness_Report:**
- **Completeness_Report:**
  We excluded data from a single Moderate treatment stand (128R) due to camera malfunctioning, which rendered the camera inoperable throughout the sampling period. We also excluded a research block from enclosure construction and data collection as the site was too steep for feasible fence construction. The 128R treatment stand was also excluded from models assessing the differences in plant cover between Excluded and Open treatments as a function of the interaction between stand use and herbicide treatment.

**Positional_Accuracy:**
- **Horizontal_Positional_Accuracy:**
  - **Horizontal_Positional_Accuracy_Report:**
    No formal positional accuracy tests were conducted

**Vertical_Positional_Accuracy:**
- **Vertical_Positional_Accuracy:**
  - **Vertical_Positional_Accuracy_Report:**
    No formal positional accuracy tests were conducted

**Lineage:**
Methodology:

Methodology Type: Field

Methodology Description:
To assess the use of stands by deer and elk among herbicide treatments, we deployed camera traps from June through December of 2012 (O'Connell et al. 2011). Camera traps were installed on metal t-posts at 1.5 m from the ground in a corner of each Open herbivory plot, placed to maximize the field of view. We used Bushnell trophy cameras with motion/infrared triggering and infrared flash. We estimated ‘use’ as the sum of the number of individual deer and elk among new capture events per stand over the sampling period (Kuijper 2009). New capture events were considered when more than an hour had passed without detection and individuals were distinguishable from previously captured animals. For the analysis, we excluded data from a single Moderate treatment stand due to camera malfunctioning, which rendered the camera inoperable throughout the sampling period.

Methodology Citation:
Citation Information:
Publication Date: 2011
Title: Camera traps in animal ecology: methods and analyses
Geospatial Data Presentation Form: book
Online Linkage: http://dx.doi.org/10.1007/978-4-431-99495-4

Process Step:
Process Description:
Original data collection 2012-2013
Process Date: 2013

Process Step:
Process Description:
Process Date: 2015

Entity and Attribute Information:
Detailed Description:
Entity Type:
Entity Type Label: Forest Management and Cervid Herbivory (Camera Data)
Entity Type Definition:
Comma-separated value (.csv) spreadsheet
Entity Type Definition Source: dataset developer
Attribute:
Attribute Label: BLOCK
Attribute Definition:
Four-digit alphabetic code identifying experimental herbicide treatment replicate blocks
Attribute Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
Enumerated Domain Value: BLRO
Enumerated Domain Value Definition: Black Rock
Enumerated Domain Value Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
Enumerated Domain Value: LUCK
Enumerated Domain Value Definition: Luckiamute
Enumerated Domain Value Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
Enumerated Domain Value: WILL
Enumerated Domain Value Definition: Willamina
Enumerated Domain Value Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
Attribute: Attribute_Label: STAND
Attribute_Definition: Four-digit code identifying individual stands nested within blocks, four stands per block.
Attribute_Definition_Source: dataset developer
Attribute Domain Values: Unrepresentable_Domain: Unbounded list of text

Attribute: Attribute_Label: HCID
Attribute_Definition: Herbicide treatment identifier; describes the herbicide treatment randomly applied to each of the four stands per block.
Attribute_Definition_Source: dataset developer
Attribute Domain Values: Enumerated_Domain: Enumerated_Domain_Value: C
Enumerated_Domain_Value_Definition: Control
Enumerated_Domain_Value_Definition_Source: dataset developer
Attribute Domain Values: Enumerated_Domain: Enumerated_Domain_Value: L
Enumerated_Domain_Value_Definition: Light
Enumerated_Domain_Value_Definition_Source: dataset developer
Attribute Domain Values: Enumerated_Domain: Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: Moderate
Enumerated_Domain_Value_Definition_Source: dataset developer
Attribute Domain Values: Enumerated_Domain: Enumerated_Domain_Value: X
Enumerated_Domain_Value_Definition: Intensive
Enumerated_Domain_Value_Definition_Source: dataset developer

Enumerated_Domain_Value: GRRO
Enumerated_Domain_Value_Definition: Grand Ronde
Enumerated_Domain_Value_Definition_Source: dataset developer

Enumerated_Domain_Value: FOGR
Enumerated_Domain_Value_Definition: Forest Grove
Enumerated_Domain_Value_Definition_Source: dataset developer

Enumerated_Domain_Value: TRSK
Enumerated_Domain_Value_Definition: Trask
Enumerated_Domain_Value_Definition_Source: dataset developer

Enumerated_Domain_Value: SLTZ
Enumerated_Domain_Value_Definition: Siletz
Enumerated_Domain_Value_Definition_Source: dataset developer
Attribute Label: DATE
Attribute Definition:
Date on which photograph was taken
Attribute Definition Source: dataset developer
Attribute Domain Values:
Unrepresentable Domain:
Unbounded list of dates in M/DD/YYYY format

Attribute:
Attribute Label: TIME
Attribute Definition:
Time of day the photograph was taken
Attribute Definition Source: dataset developer
Attribute Domain Values:
Unrepresentable Domain:
Unbounded list of times in 24-hour, hh:mm format

Attribute:
Attribute Label: EVENT
Attribute Definition:
The value 1 denotes a new capture event, which were used to assess the cumulative use among individuals among capture events for the sampling period. 0’s are consecutive captures within each event. Only rows with 1 values were used in the analysis.
Attribute Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
  Enumerated Domain Value: 1
  Enumerated Domain Value Definition:
  Denotes a new capture event.
  Enumerated Domain Value Definition Source: dataset developer

Attribute Domain Values:
Enumerated Domain:
  Enumerated Domain Value: 0
  Enumerated Domain Value Definition:
  Denotes consecutive captures within each event.
  Enumerated Domain Value Definition Source: dataset developer

Attribute:
Attribute Label: PIC
Attribute Definition:
Picture number, unique entries for each stand. "(2)" or ".2" denotes photos with redundant number labels.
Attribute Definition Source: dataset developer
Attribute Domain Values:
Unrepresentable Domain:
Unbounded list of numbers

Attribute:
Attribute Label: SPP
Attribute Definition:
Four-digit code identifying cervid species in photograph.
Attribute Definition Source: dataset developer
Attribute Domain Values:
Enumerated Domain:
  Enumerated Domain Value: ODHE
  Enumerated Domain Value Definition:
  Odocoileus hemionus columbianus
  Enumerated Domain Value Definition Source: dataset developer

Attribute Domain Values:
Enumerated Domain:
  Enumerated Domain Value: CEEL
  Enumerated Domain Value Definition:
  Cervus elaphus roosevelti
  Enumerated Domain Value Definition Source: dataset developer

Attribute Domain Values:
Enumerated Domain:
Enumerated Domain Value: UNK
Enumerated Domain Value Definition: Unknown species that were confirmed as either deer or elk.
Enumerated Domain Value Definition Source: dataset developer

Attribute Domain Values:
Enumerated Domain:
Enumerated Domain Value: NA
Enumerated Domain Value Definition: Indicates species no data reported for this record.
Enumerated Domain Value Definition Source: dataset developer

Attribute:
Attribute Label: N
Attribute Definition: Number of individual animals of each species appearing in each photograph. "NA" indicates no data.
Attribute Definition Source: dataset developer

Attribute Domain Values:
Range Domain:
Range Domain Minimum: 0
Range Domain Maximum: 9
Attribute Units of Measure: number of target species in photograph

Distribution Information:
Distributor:
Contact Information:
Contact Person Primary: U.S. Geological Survey
Contact Organization: U.S. Geological Survey - ScienceBase
Contact Address:
Address Type: mailing and physical
Address: Denver Federal Center, Building 810, Mail Stop 302
City: Denver
State or Province: Colorado
Postal Code: 80225
Country: USA
Contact Voice Telephone: 1-888-275-8747
Contact Electronic Mail Address: sciencebase@usgs.gov

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Standard Order Process:
Digital Form:
Digital Transfer Information:
Format Name: Comma-separated value (.csv) file
Format Version Number: none
Digital Transfer Option:
Online Option:
Computer Contact Information:
Network Address: https://doi.org/10.5066/F7H1307W
Fees: None. No fees are applicable for obtaining the data set.

Metadata Reference Information:
Metadata Date: 20170228
Metadata Contact:
Contact Information:
Contact Person Primary:
Contact Person: FRESC Science Data Coordinator
Contact Organization: USGS Forest and Rangeland Ecosystem Science Center
Contact Address:
  Address Type: mailing and physical
  Address: 777 NW 9th Street, Suite 400
  City: Corvallis
  State or Province: Oregon
  Postal Code: 97330
  Country: USA
Contact Voice Telephone: (541) 750-1030
Contact Electronic Mail Address: fresc_outreach@usgs.gov
Metadata Standard Name: FGDC Biological Data Profile of the Content Standard for Digital Geospatial Metadata