



## FINAL REPORT

### **Animal-Mediated Seed Dispersal and Germination of Native and Invasive Plants in Western North America**

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**Abstract– Animal-mediated seed dispersal and germination of native and invasive plants in Western North America.** Cattle, elk, deer and other ruminants dominate most western landscapes; however, we know very little about their role in facilitating invasive plant spread via endozoochory (seed ingestion and defecation). The objective of this study is to provide information on seed characteristics which predispose invasive plants to long-distance seed dispersal by native and introduced ruminants to better inform invasive plant management and restoration activities.

#### **What was accomplished:**

Research was conducted to explore the role of ungulates in dispersing native and non-native seeds. In the Chihuahuan desert, we examined the role of exotic animals (introduced Oryx) on native and non-native seed dispersal. While in northeastern Oregon we examined seed dispersal by cattle, elk, and deer. This involved collecting fecal samples across three landscapes (Jornada Experimental Range, Zumwalt Prairie Preserve, and Starkey Experimental Forest and Range) and germinating seeds in the greenhouse. We then integrated data on ungulate density and the number of seeds dispersed by each ungulate to estimate seed rain across the landscape. Results indicate that cattle disperse nearly 100 times as many exotic seeds across the landscape as native ungulates are an important vector in spreading invasive seeds (Figure 1).

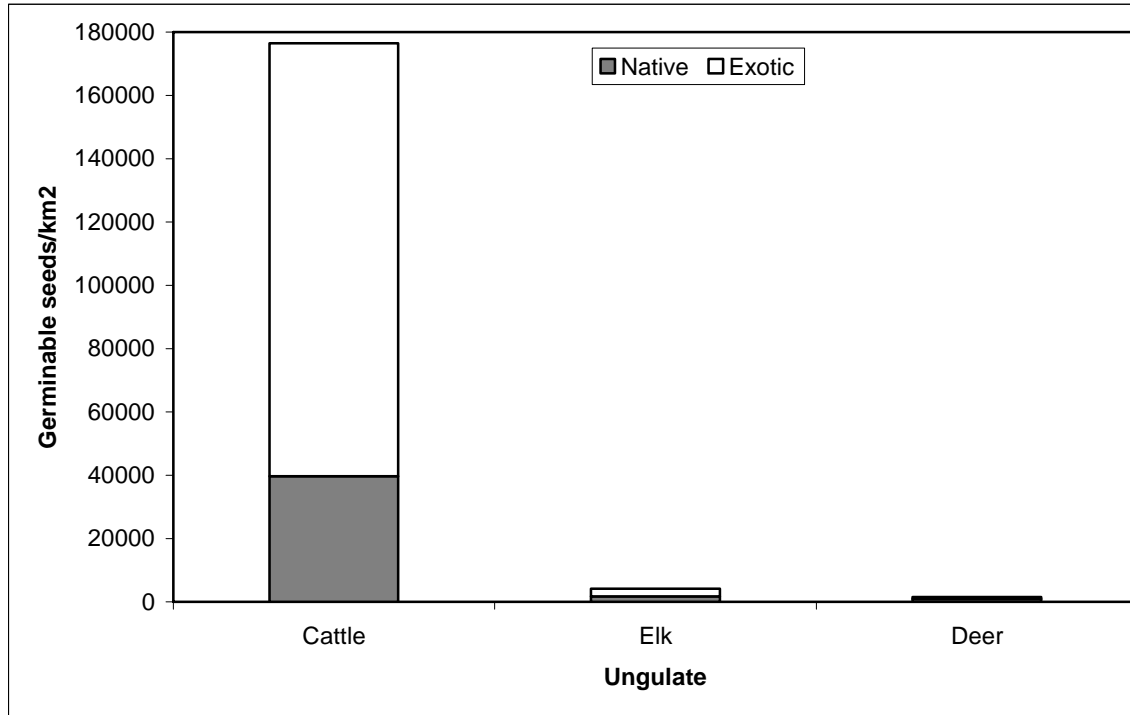


Figure 1: Estimated number of germinable native and non-native seeds dispersed by endozoochory per km<sup>2</sup>/year in the Wallowa-Whitman National Forest, in northeastern Oregon (manuscript in preparation).

**Manuscripts in preparation:** Three manuscripts are currently in preparation from research we conducted using CIPM funds. . Once complete, we are happy to send them to CIPM. They are:

1. The role of cattle in dispersing *Yucca bacata* seeds in the Chihuahuan Desert.
2. Seed dispersal by introduced exotic Oryx in the Chihuahuan Desert.
3. Do exotic animals facilitate exotic plant invasions in western rangelands? Seed dispersal by cattle, elk, and deer.

**The Value of CIPM funding to this project:** This funding allowed us to explore a new research avenue which as been fruitful. This work served as the foundation for a USDA NRI grant which I received in 2006 that explores native seed limitation as a key factor in invasive plant dominance.

Export Data as:  

<b>Project Start:</b>	<b>05/01/2005</b>	<b>Project End:</b>	<b>12/31/2006</b>
<b>Index:</b>	<b>U0393A FOR - MTSU Endress Seed Dispersal</b>	<b>Agency:</b>	<b>Montana State University</b>
<b>Fund:</b>	<b>U0393A FOR MTSU 1206 Endress Seed Dispersal</b>	<b>OPAA Accountant:</b>	<b>Amanda R Grimps-Barnes</b>
<b>Organization:</b>	<b>231520 FOR - Forest Science Oper</b>	<b>IC Rate:</b>	<b>10</b>
<b>Program:</b>	<b>15003 Spon Resrch On Campus Domestic</b>	<b>IC Basis:</b>	<b>TDC</b>

As of: **2/21/2007**Available Balance: **\$0.01**

## Salaries - Wages

Account	Budget	Actual	Encumbrance	Non-FIS Encumbrance	Pending F&A Charge	Available
10410 Temporary Employees Pay	<u>\$0.00</u>	<u>\$1,570.25</u>	\$0.00	\$0.00	\$0.00	(\$1,570.25)
10421 Overtime-Classified	<u>\$0.00</u>	<u>\$41.25</u>	\$0.00	\$0.00	\$0.00	(\$41.25)
10501 Student Pay - Regular Pay	<u>\$2,400.00</u>	<u>\$720.00</u>	\$0.00	\$0.00	\$0.00	\$1,680.00
<b>Salaries - Wages Subtotal:</b>	<b>\$2,400.00</b>	<b>\$2,331.50</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$68.50</b>

## OPE

Account	Budget	Actual	Encumbrance	Non-FIS Encumbrance	Pending F&A Charge	Available
10901 Other Payroll Expenses	<u>\$75.00</u>	<u>\$0.00</u>	\$0.00	\$0.00	\$0.00	\$75.00
10913 OPE Classified	<u>\$0.00</u>	<u>\$139.77</u>	\$0.00	\$0.00	\$0.00	(\$139.77)
10915 OPE Student	<u>\$0.00</u>	<u>\$3.66</u>	\$0.00	\$0.00	\$0.00	(\$3.66)
<b>OPE Subtotal:</b>	<b>\$75.00</b>	<b>\$143.43</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>(\$68.43)</b>

## Other Expenses

Account	Budget	Actual	Encumbrance	Non-FIS Encumbrance	Pending F&A Charge	Available
20001 Supplies Expense	<u>\$791.00</u>	<u>\$0.00</u>	\$0.00	\$0.00	\$0.00	\$791.00
20103 Laboratory Supplies	<u>\$0.00</u>	<u>\$228.39</u>	\$0.00	\$0.00	\$0.00	(\$228.39)
20200 Minor Equipment	<u>\$0.00</u>	<u>\$227.67</u>	\$0.00	\$0.00	\$0.00	(\$227.67)
20204 Other IT Related Peripherals	<u>\$0.00</u>	<u>\$149.71</u>	\$0.00	\$0.00	\$0.00	(\$149.71)
21053 Soil & Soil Media	<u>\$0.00</u>	<u>\$119.85</u>	\$0.00	\$0.00	\$0.00	(\$119.85)
22505 Express Mail	<u>\$0.00</u>	<u>\$6.97</u>	\$0.00	\$0.00	\$0.00	(\$6.97)
22511 Freight/Moving-Not Employee Related	<u>\$10.00</u>	<u>\$0.00</u>	\$0.00	\$0.00	\$0.00	\$10.00
39415 In-St Empl Program Travel	<u>\$0.00</u>	<u>\$462.26</u>	\$0.00	\$0.00	\$0.00	(\$462.26)
39500 Out-of-State Travel	<u>\$1,269.00</u>	<u>\$0.00</u>	\$0.00	\$0.00	\$0.00	\$1,269.00
39515 Out-St Empl Program Travel	<u>\$0.00</u>	<u>\$860.90</u>	\$0.00	\$0.00	\$0.00	(\$860.90)
70005 F & A Cost (formerly Indirect)	<u>\$455.00</u>	<u>\$469.31</u>	\$0.00	\$0.00	\$0.00	(\$14.31)
<b>Other Expenses Subtotal:</b>	<b>\$2,525.00</b>	<b>\$2,525.06</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>(\$0.06)</b>

<b>U0393A Totals:</b>	<b>Expense</b>	<b>\$5,000.00</b>	<b>\$4,999.99</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.01</b>
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<b>Less F&amp;A:</b>	<b>\$0.00</b>
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<b>Available Balance:</b>	<b><u>\$0.01</u></b>
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