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## Does Personality Affect the Probability That Piute Ground Squirrels (*Urocitellus Mollis*) Will Be Shot by Recreational Hunters?

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## Does Personality Affect the Probability That Piute Ground Squirrels (*Urocitellus Mollis*) Will Be Shot by Recreational Hunters?

### Abstract

Recreational shooting of Piute ground squirrels (*Urocitellus mollis*) in southern Idaho is an activity growing in popularity. One factor that may influence shooting success is the personality of individuals within a population. We hypothesized that bold individual ground squirrels would be more/less likely to be targeted by a hunter and would be more/less disturbed by gun fire. To test these hypotheses, we simulated recreational shooting to identify which personalities are more susceptible hunters and more responsive to gun fire. We performed simulations in March of 2015 on a population of Piute ground squirrels with known personalities. Bold and shy individuals were coded by dyeing the fur of squirrels in a way distinguishable by observers during simulations which took place at three sites with varying vegetative cover. We recorded the frequency of detection of each personality type through a hunting scope. In addition, we observed the behavioral response (e.g. flee, vigilance, alarm call) of ground squirrels to a recording of a .22 caliber fire. We also identified whether raptors were attracted to the simulated shooting area for scavenging in response to the sound of the gun fire. We calculated whether the detection and behavioral responses of squirrel personalities in shooting simulations was disproportionate to that of the marked population. This information can lead to a greater understanding of the role of behavioral factors in the survival of Piute ground squirrels and provide insight into how recreational shooting could influence the personality landscape of a dominant prey species.

### Keywords

squirrels, personality, habitat, ravens

### Disciplines

Other Life Sciences

### Authors

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# PERSONALITY, HABITAT, AND SOUND EFFECTS ON THE RECREATIONAL SHOOTING OF PIUTE GROUND SQUIRRIELS



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Background	Research Methods	Results																		
<ul style="list-style-type: none"> <li>Public lands provide important ecosystems services for Idahoans such as wildlife habitat and recreation activity.</li> <li>The Snake River Birds of Prey National Conservation Area (NCA) is a popular area for recreation by Treasure Valley residents.</li> <li>The NCA has many types of recreational activities such as hiking, off-roading, bird-watching, shooting, etc..</li> <li>Conflicts may arise between recreationists and wildlife .</li> <li>Recreational shooting of ground squirrels common in NCA.</li> <li>Shooting of squirrels may impact multiple species in ways that are not apparent.</li> <li>Shooter may target specific squirrels which exhibit Bold vs. Docile personality traits.</li> <li>Three potential major effects of recreational shooting include:                             <ul style="list-style-type: none"> <li><b>Recreational shooting could influence distribution and frequency of personality of prey across landscape.</b></li> <li><b>Vegetation type (e.g. grass vs shrubs) may influence hunting success.</b></li> <li><b>Sound from recreational shooting may attract aerial predators and scavengers.</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Focus on two sites that differ in vegetation: High sagebrush density (SAGE) and native grass (GRASS) (Fig. 1).</li> <li>Squirrels (N=106) were marked with dye as either bold or docile based on personality tests.</li> <li>4 consecutive days of shooting simulations where a range finder with cross hairs was used to simulate a hunting scope.</li> <li>The live trapping webs were used as simulation boundaries (Fig. 3).</li> <li>Gunfire playback was played 2 of 4 days (Figure 4).</li> <li>Observations of animals occurred within a 60° section of view. There were a total of 6 sections.</li> <li>Observers were stationed at the center of the trapping web and surveyed 60° sections in clockwise order (skipping alternating sections) before reversing direction and performing the same technique on the remaining sections (example order: A-C,E-G,I-K, I-G, E-C, A-K).</li> <li>The fox pro speaker was place in the center of the web.</li> <li>Each simulation lasted 30 min per 60° section for a total of 3 hours per day per habitat type.</li> <li>Observers identified ground squirrels within a section. Positioning cross hairs of scope on body of squirrel was recorded as a successful shot.</li> </ul>	<p><b>Simulations Targeted Personalities Equally</b></p> <ul style="list-style-type: none"> <li><math>\chi^2_1 = 0.708, p = 0.40</math></li> <li>Chi-Square analysis for targeting personalities. This suggests no difference among targeted personalities.</li> </ul> <p><b>Squirrels are Targeted More Frequently in Grass Habitats</b></p> <ul style="list-style-type: none"> <li><math>\chi^2_1 = 165.48, p = 7.2E-38</math></li> <li>Chi-Square analysis for targeting squirrels in different habitat types: Grass, Sage. This suggests squirrels are targeted more frequently in grass habitats</li> </ul> <p><b>Response of Gunfire Did Not Differ Among Personality</b></p> <ul style="list-style-type: none"> <li><math>\chi^2_1 = 0.117, p = 0.73</math></li> <li>Partial chi-square analysis for the response of squirrels from sound based on personality type. This suggests response of squirrels from sound did not differ among personality type.</li> </ul>																		
		<p><b>Gunfire Attracted Ravens, but Not Raptors. 43% Increase</b></p> <table border="1"> <caption>Data for Figure 5: Number of Observed Animals</caption> <thead> <tr> <th>Animal</th> <th>No Gunfire Playback</th> <th>Gunfire Playback</th> </tr> </thead> <tbody> <tr> <td>Raptors</td> <td>~5</td> <td>~5</td> </tr> <tr> <td>Ravens</td> <td>~30</td> <td>~43</td> </tr> </tbody> </table>	Animal	No Gunfire Playback	Gunfire Playback	Raptors	~5	~5	Ravens	~30	~43									
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<p>Figure 1: Wyoming big sagebrush (Sage) (<i>Artemisia tridentata wyo.</i>) and Sandberg's bluegrass (Grass)(<i>Poa secunda</i>). Squirrels were targeted more frequently at grass site.</p>	<p>Figure 2: Wiggly test to determine personality. Photo By Shawn Smith.</p> <p>Piute Ground Squirrel. Photo By Shawn Smith.</p> <p>Figure 3: Simulation boundaries.</p>	<p>Figure 5: Column graph depicting the number of raptor and ravens observed during simulation with and without gunfire playback. 43% more ravens were observed during simulations with gunfire playback</p>																		
<p><b>Objectives</b></p>	<p><b>FoxPro Reproduced Gunfire at 91.8 +/- 0.6 dB(A)</b></p> <table border="1"> <caption>Data for Figure 4: FoxPro Reproduced Gunfire Intensity</caption> <thead> <tr> <th>Shot</th> <th>Front of Speaker (dB(A))</th> <th>Side of Speaker (dB(A))</th> </tr> </thead> <tbody> <tr> <td>Shot 1</td> <td>~91.8</td> <td>~83.6</td> </tr> <tr> <td>Shot 2</td> <td>~91.8</td> <td>~83.6</td> </tr> <tr> <td>Shot 3</td> <td>~91.8</td> <td>~83.6</td> </tr> <tr> <td>Shot 4</td> <td>~91.8</td> <td>~83.6</td> </tr> <tr> <td>Shot 5</td> <td>~91.8</td> <td>~83.6</td> </tr> </tbody> </table>	Shot	Front of Speaker (dB(A))	Side of Speaker (dB(A))	Shot 1	~91.8	~83.6	Shot 2	~91.8	~83.6	Shot 3	~91.8	~83.6	Shot 4	~91.8	~83.6	Shot 5	~91.8	~83.6	<p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>Personality of squirrels did not influence probability of being shot. This may be due to:                             <ul style="list-style-type: none"> <li>Low sample size, impact of weather (e.g. wind and temperatures) on above ground activity by squirrels, and poor ability to distinguish dye patterns.</li> <li>More squirrels shot in native grass sites. This may be due to:                                     <ul style="list-style-type: none"> <li>Lower concealment of squirrels in grass compared to shrub habitat.</li> </ul> </li> </ul> </li> <li>Gunfire attracted ravens, but not raptors. This may be due to:                             <ul style="list-style-type: none"> <li>Squirrel death is contributed to gunfire, attaching scavenging birds such as ravens.</li> </ul> </li> </ul>
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<ul style="list-style-type: none"> <li>Investigate the effects of personality, habitat, and sound on recreational shooting of Piute ground squirrels.</li> <li>Our Objectives:                             <ul style="list-style-type: none"> <li>Determine if bold squirrels are successfully targeted more frequently than docile squirrels.</li> <li>Compare hunting success of targeting squirrels between two habitats types.</li> <li>Determine if gunfire from recreational shooting will attract aerial predators or scavengers.</li> </ul> </li> </ul>	<p>Figure 4: Live gunfire recorded in the NCA produces 125.7 dBa. Gunfire was recorded and played back during 2 of 4 simulations. The Front of the speaker produce an average of 91.8 +/- 0.6 dB(A). The side produced an average of 83.6 +/- 3.5 dB(A).</p>	<p><b>Acknowledgements</b></p> <p>We would like to thank the Managing Idaho's Landscapes for Ecosystem Services (MILES) Undergraduate Research and Internships (MURI) program, the Idaho Army National Guard, and the Boise State Dept. Biological Sciences for supporting this research.</p>																		