### Nesting Phenology: 2015–2018

#### Southern Great Basin (n = 40)

<table>
<thead>
<tr>
<th>Event</th>
<th>Mean Date</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation</td>
<td>18 Feb</td>
<td>27 Jan – 12 Mar</td>
</tr>
<tr>
<td>Hatching</td>
<td>3 Apr</td>
<td>12 Mar – 25 Apr</td>
</tr>
<tr>
<td>Fledging</td>
<td>10 Jun</td>
<td>20 May – 3 Jul</td>
</tr>
</tbody>
</table>

#### Northern Great Basin* (n = 45)

<table>
<thead>
<tr>
<th>Event</th>
<th>Mean Date</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>Incubation</td>
<td>21 Feb</td>
<td>5 Feb – 23 Mar</td>
</tr>
<tr>
<td>Hatching</td>
<td>6 Apr</td>
<td>21 Mar – 6 May</td>
</tr>
<tr>
<td>Fledging</td>
<td>14 Jun</td>
<td>21 May – 14 Jul</td>
</tr>
</tbody>
</table>

* With assistance from Wildlife Resource Consultants LLC: 2016–18

Dates estimated backdating from nestlings (Driscoll 2010), and using 45 days for incubation and 70 days until fledging.
Nesting Phenology

★ Pooled mean estimated laying, hatching, and fledging dates
Nesting Phenology and Bighorn Sheep Lambs

Sensitive lambing seasons based primarily on NDOW Game Biologist expert opinion

Pooled mean estimated laying, hatching, and fledging dates
Occupancy Study Areas

- Initiated study in primary study area in 2014 (15 territories)
- Secondary study areas investigated in 2015 and 2018 (28 territories)
- Ground surveys conducted during courtship breeding stage (December – January)
- Surveys assessed territory occupancy:
  - Adults at nest/nest cliff
  - Courtship/territorial defense
  - Nest building/maintenance
Study Sites
Occupancy Surveys

Primary Study Area

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>Total</th>
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<tbody>
<tr>
<td>Checked territories</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>69</td>
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<tr>
<td>Occupied territories</td>
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<td>14</td>
<td>15</td>
<td>15</td>
<td>12</td>
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<td>Territories assessed for</td>
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<tr>
<td>breeding</td>
<td></td>
<td></td>
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<tr>
<td>Breeding attempts</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>31</td>
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<tr>
<td>Successful attempts</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>3</td>
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</table>

- Secondary study area occupancy: 28 of 28 territories
- 2018 was a very low lagomorph year (2019?)
Ground vs. Aerial Surveys

- **Ground Survey: 7-9 January 2018**
  - 18 of 18 territories occupied
  - Mean 16 min/survey (range 4–67 min per survey)

- **Aerial Survey: 21 February**
  - 13 of 23 (57%) territories occupied
  - 11 of 18 (61%) ground surveyed territories occupied
  - 14 of 18 (78%) territories occupied after 2nd aerial survey on 29 May

- **Pairs initiated incubation 12 Feb – 23 Mar (mean = 2 Mar)**

Surveys conducted by JGB & Wildlife Resource Consultants LLC
Movement Data (PTT): successful adult female

January
Movement Data (PTT): successful adult female

March
Movement Data (PTT): successful adult female

May
Movement Data (PTT): unsuccessful adult female

January
Movement Data (PTT): unsuccessful adult female

March
Movement Data (PTT): unsuccessful adult female May
Movement Data (PTT): nonbreeding adult male

March
Movement Data (PTT): nonbreeding adult male

May
Summary

- Generally high year-round territory occupancy across the Great Basin in Nevada

- Aerial surveys, particularly those later in the breeding season, tend to underestimate population size

- Aerial surveys are good at locating nests, but assessing occupancy is biased toward breeding pairs, and successful breeding attempts

- Early ground surveys are very good detecting territory occupancy, but can be limited when assessing nests

- Rugged terrain can make some areas nearly impossible to thoroughly ground survey
Recommendations

- Recommend using a mix of ground and aerial surveys to accurately determine the potentially impacted population size and to track occupancy and productivity.

- Initial ground surveys should occur during courtship whenever possible.

- Initial aerial surveys are potentially more effective once pairs have begun incubating, but remain biased in assessing occupancy.

- Study detection rates (ground and aerial methodology) for successfully locating and assessing occupancy status of Golden Eagle territories and nests.
Special Thanks

- Nevada Department of Wildlife
  - Jennifer Newmark
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  - Laura Richards
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  - Todd Trapp & Alicia Styles
  - Sandra Brewer
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- Hycroft Mining Corporation
  - Tracey Thom
- Wildlife Resource Consultants LLC
  - Sue Fox and Matt Kiesse
- Spring Valley Wind TAC
- Multiple field assistants