Conservation Estate Portfolio for the
Grasshopper Sparrow
(*Ammodramus savannarum*)

Bird Conservation Region 23
(Prairie Hardwood Transition)

http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/Grasshopper_Sparrow_dtl.html

U.S. Department of the Interior
U.S. Geological Survey
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Email: wthogmartin@usgs.gov

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Preface

Mapped patterns in the distribution and abundance of rare or focal species can be useful in identifying priority areas for conservation. We have modeled and mapped rare bird abundance in the upper midwestern United States for more than a dozen species of conservation concern. Our work has focused on the Prairie Hardwood Transition (Bird Conservation Region 23). This portfolio describes the conservation context of one species in the Prairie Hardwood Transition. We outlined areas of peak predicted abundance relative to federal, tribal, and state managed lands. This juxtaposition of predicted relative abundance and land management authorities is the conservation estate for this focal species. Identifying these land management authorities relative to areas in which the species is most abundant may help to focus conservation resources in those areas in which they may do the most good.

Data References

Major Cities depicted using data acquired from the National Atlas of the United States web site (http://nationalatlas.gov/mld/citiesx.html). Major cities were determined to be those that had a population in 2000 of greater than 5,000 persons.

Major Roads depicted using data acquired from the National Atlas of the United States web site (http://nationalatlas.gov/mld/roadtrl.html). Roads were determined to be Major if they were classified as Principal Highway or Limited Access Highway according to the data field “Feature”.

States data were created by Geographic Data Technology, Inc. This data was published by Environmental Systems Research Institute (ESRI) and made available for distribution.

Counties data were acquired from the National Atlas of the United States web site (http://www.nationalatlas.gov/mld/countyp.html).

Federal and State lands depicted using Protected Areas Database, version 4: (http://www.consbio.org/cbi/projects/PAD/index.htm). Federal and State lands were identified based upon the data field “Owner”.


Methodology

For detailed methodology on avian abundance modeling, see: http://www.umesc.er.usgs.gov/terrestrial/migratory_birds/bird_conservation_methods.html
Predicted Relative Abundance and 10-Highest Peaks of Predicted Relative Abundance for the Grasshopper Sparrow

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlaid with Federal Lands

Overview Map

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Bird Conservation Region (BCR) 23 Boundary
- Federal Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

- 0.92 - 1.00
- 1.01 - 1.25
- 1.26 - 1.50
- 1.51 - 1.75
- 1.76 - 2.00
- 2.01 - 2.25
- 2.26 - 2.50
- 2.51 - 2.75
- 2.76 - 3.00
- 3.01 - 3.25
- > 3.25

Overview Map

Hotspots 1, 2, and 3
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Federal Lands

Hotspot 4 Overview Map

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Bird Conservation Region (BCR) 23 Boundary
- Federal Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Federal Lands

Hotspots 7, 8, and 9

Overview Map
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Federal Lands

Hotspot 10

Overview Map

1:214,930

Miles

0 1 2 4

Major Cities
Major Roads
Hotspot Boundaries
States
Counties
Bird Conservation Region (BCR) 23 Boundary
Federal Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlaid with State Lands

Overview Map

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Bird Conservation Region (BCR) 23 Boundary
- State Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25

1:727,312

Miles

0 4 8 16

N
E
W
S

10 of 25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with State Lands

Hotspot 4

Overview Map
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with State Lands

Overview Map

Hotspots 5 and 6

Major Cities
Major Roads
Hotspot Boundaries
States
Counties
Bird Conservation Region (BCR) 23 Boundary
State Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

- 0.92 - 1.00
- 1.01 - 1.25
- 1.26 - 1.50
- 1.51 - 1.75
- 1.76 - 2.00
- 2.01 - 2.25
- 2.26 - 2.50
- 2.51 - 2.75
- 2.76 - 3.00
- 3.01 - 3.25
- > 3.25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with State Lands

Overview Map

Major Cities
Major Roads
Hotspot Boundaries
States
Counties
Bird Conservation Region (BCR) 23 Boundary
State Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25

0 5 10 20
Miles

1:1,060,160

Hotspots 7, 8, and 9

Overview Map

13 of 25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlaid with State Lands

Hotspot 10

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Bird Conservation Region (BCR) 23 Boundary
- State Lands (Protected Areas Database IV)

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25

Overview Map

1:214,930

14 of 25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Tribal Lands

Overview Map

Major Cities
Major Roads
Hotspot Boundaries
States
Counties
Tribal Lands
Bird Conservation Region (BCR) 23 Boundary

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

0.92 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
2.51 - 2.75
2.76 - 3.00
3.01 - 3.25
> 3.25

Hotspots 1, 2, and 3
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Tribal Lands

Hotspots 5 and 6

Map Overview

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Tribal Lands
- Bird Conservation Region (BCR) 23 Boundary

Grasshopper Sparrow Relative Abundance
(Predicted Mean Count / Breeding Bird Survey)

- 0.92 - 1.00
- 1.01 - 1.25
- 1.26 - 1.50
- 1.51 - 1.75
- 1.76 - 2.00
- 2.01 - 2.25
- 2.26 - 2.50
- 2.51 - 2.75
- 2.76 - 3.00
- 3.01 - 3.25
- > 3.25

1:403,749

Miles

17 of 25
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlayed with Tribal Lands

Overview Map

Hotspots 7, 8, and 9
Grasshopper Sparrow (GRSP) Predicted Relative Abundance Overlaid with Tribal Lands

Hotspot 10

Grasshopper Sparrow Relative Abundance (Predicted Mean Count / Breeding Bird Survey)

- Major Cities
- Major Roads
- Hotspot Boundaries
- States
- Counties
- Tribal Lands
- Bird Conservation Region (BCR) 23 Boundary

Legend:
- 0.92 - 1.00
- 1.01 - 1.25
- 1.26 - 1.50
- 1.51 - 1.75
- 1.76 - 2.00
- 2.01 - 2.25
- 2.26 - 2.50
- 2.51 - 2.75
- 2.76 - 3.00
- 3.01 - 3.25
- > 3.25

*Overview Map*

Miles: 1:214,930

19 of 25
# Grasshopper Sparrow Predicted Relative Abundance Summary by Hotspot

Federal Managed Lands Versus Lands Not Under Federal Management

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Mean Predicted Count / Breeding Bird Survey</th>
<th>SD</th>
<th>Sum*</th>
<th>Percent Area Managed/ Unmanaged</th>
<th>Percent Sum* Managed/ Unmanaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotspot 1 - Unmanaged by Federal</td>
<td>216.99</td>
<td>Min 0.00 Mean 0.84 Max 1.11 Range 1.11</td>
<td>0.35</td>
<td>203,565</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 1 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 2 - Unmanaged by Federal</td>
<td>43.29</td>
<td>Min 0.00 Mean 0.88 Max 1.06 Range 1.06</td>
<td>0.30</td>
<td>42,471</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 2 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 3 - Unmanaged by Federal</td>
<td>82.71</td>
<td>Min 0.00 Mean 0.95 Max 1.11 Range 1.11</td>
<td>0.23</td>
<td>86,975</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 3 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 4 - Unmanaged by Federal</td>
<td>3,047.90</td>
<td>Min 0.00 Mean 1.09 Max 1.79 Range 1.79</td>
<td>0.39</td>
<td>3,704,870</td>
<td>99.96</td>
<td>99.97</td>
</tr>
<tr>
<td>Hotspot 4 - Managed by Federal</td>
<td>1.21</td>
<td>Min 0.00 Mean 0.87 Max 1.13 Range 1.13</td>
<td>0.45</td>
<td>1,166</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Hotspot 5 - Unmanaged by Federal</td>
<td>289.26</td>
<td>Min 0.00 Mean 1.00 Max 1.28 Range 1.28</td>
<td>0.27</td>
<td>322,789</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 5 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 6 - Unmanaged by Federal</td>
<td>252.18</td>
<td>Min 0.00 Mean 0.93 Max 1.01 Range 1.01</td>
<td>0.17</td>
<td>259,734</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 6 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 7 - Unmanaged by Federal</td>
<td>4,170.23</td>
<td>Min 0.00 Mean 1.01 Max 3.30 Range 3.30</td>
<td>0.83</td>
<td>4,693,380</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 7 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 8 - Unmanaged by Federal</td>
<td>82.44</td>
<td>Min 0.00 Mean 0.87 Max 1.17 Range 1.17</td>
<td>0.38</td>
<td>79,264</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 8 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 9 - Unmanaged by Federal</td>
<td>889.78</td>
<td>Min 0.00 Mean 1.18 Max 1.91 Range 1.91</td>
<td>0.58</td>
<td>1,162,970</td>
<td>99.95</td>
<td>99.99</td>
</tr>
<tr>
<td>Hotspot 9 - Managed by Federal</td>
<td>0.47</td>
<td>Min 0.00 Mean 0.23 Max 0.98 Range 0.98</td>
<td>0.41</td>
<td>121</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>Hotspot 10 - Unmanaged by Federal</td>
<td>91.35</td>
<td>Min 0.00 Mean 0.91 Max 1.03 Range 1.03</td>
<td>0.21</td>
<td>92,565</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 10 - Managed by Federal</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SUMMARY**

<table>
<thead>
<tr>
<th></th>
<th>Total Area Unmanaged (sq km)</th>
<th>Sum* Total Unmanaged</th>
<th>10,648,584</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area Managed (sq km)</td>
<td>1.68</td>
<td>Sum* Total Managed</td>
<td>1,287</td>
</tr>
<tr>
<td>Total Area (sq km)</td>
<td>9,167.81</td>
<td>Total Sum*</td>
<td>10,649,871</td>
</tr>
</tbody>
</table>

* Sum refers to the cumulative predicted relative abundance values for each cell (900 sq meters) in each managed category.

A note on interpretation: If the "Total Area Unmanaged" and "Sum* Total Unmanaged" exceeds that of their respective Managed cells, this indicates a majority of the area and population is outside of direct governmental jurisdiction. If the "Sum* Total Managed %" is less than the "Total Area Managed %", this indicates that the conservation estate does a poorer job than a random placement of managed lands. Conversely, if the "Sum* Total Managed %" exceeds that of the "Total Area Managed %", then the conservation estate does a better job than a random placement of the conservation estate.
# Grasshopper Sparrow Predicted Relative Abundance Summary by Hotspot

**State Managed Lands Versus Lands Not Under State Management**

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Mean Predicted Count / Breeding Bird Survey</th>
<th>SD</th>
<th>Sum*</th>
<th>Percent Area Managed/Unmanaged</th>
<th>Percent Sum* Managed/Unmanaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotspot 1 - Unmanaged by State</td>
<td>216.83</td>
<td>0.00    0.84  1.11  1.11</td>
<td>0.35</td>
<td>203,430</td>
<td>99.92</td>
<td>99.93</td>
</tr>
<tr>
<td>Hotspot 1 - Managed by State</td>
<td>0.16</td>
<td>0.00    0.74  1.04  1.04</td>
<td>0.46</td>
<td>135</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td>Hotspot 2 - Unmanaged by State</td>
<td>43.29</td>
<td>0.00    0.88  1.06  1.06</td>
<td>0.30</td>
<td>42,471</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 2 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 3 - Unmanaged by State</td>
<td>82.71</td>
<td>0.00    0.95  1.11  1.11</td>
<td>0.23</td>
<td>86,975</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 3 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 4 - Unmanaged by State</td>
<td>2,961.49</td>
<td>0.00    1.10  1.79  1.79</td>
<td>0.38</td>
<td>3,629,760</td>
<td>97.13</td>
<td>97.94</td>
</tr>
<tr>
<td>Hotspot 4 - Managed by State</td>
<td>87.62</td>
<td>0.00    0.78  1.63  1.63</td>
<td>0.53</td>
<td>76,271</td>
<td>2.87</td>
<td>2.06</td>
</tr>
<tr>
<td>Hotspot 5 - Unmanaged by State</td>
<td>289.26</td>
<td>0.00    1.00  1.28  1.28</td>
<td>0.27</td>
<td>322,789</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 5 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 6 - Unmanaged by State</td>
<td>252.18</td>
<td>0.00    0.93  1.01  1.01</td>
<td>0.17</td>
<td>259,734</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 6 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 7 - Unmanaged by State</td>
<td>4,090.88</td>
<td>0.00    1.02  3.30  3.30</td>
<td>0.83</td>
<td>4,625,720</td>
<td>98.10</td>
<td>98.56</td>
</tr>
<tr>
<td>Hotspot 7 - Managed by State</td>
<td>79.35</td>
<td>0.00    0.77  3.18  3.18</td>
<td>0.80</td>
<td>67,664</td>
<td>1.90</td>
<td>1.44</td>
</tr>
<tr>
<td>Hotspot 8 - Unmanaged by State</td>
<td>82.44</td>
<td>0.00    0.87  1.17  1.17</td>
<td>0.38</td>
<td>79,264</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 8 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotspot 9 - Unmanaged by State</td>
<td>889.39</td>
<td>0.00    1.18  1.91  1.91</td>
<td>0.58</td>
<td>1,162,900</td>
<td>99.90</td>
<td>99.98</td>
</tr>
<tr>
<td>Hotspot 9 - Managed by State</td>
<td>0.86</td>
<td>0.00    0.20  1.08  1.08</td>
<td>0.41</td>
<td>194</td>
<td>0.10</td>
<td>0.02</td>
</tr>
<tr>
<td>Hotspot 10 - Unmanaged by State</td>
<td>91.35</td>
<td>0.00    0.91  1.03  1.03</td>
<td>0.21</td>
<td>92,565</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 10 - Managed by State</td>
<td>0.00</td>
<td>0.00    0.00  0.00  0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SUMMARY**

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Sum* Total Unmanaged</th>
<th>Total Managed (sq km)</th>
<th>Sum* Total Managed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area Unmanaged</td>
<td>8,999.82</td>
<td>10,505,609</td>
<td>168.00</td>
<td>144,264</td>
</tr>
<tr>
<td>Total Area Managed</td>
<td>9,167.82</td>
<td>10,649,872</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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</thead>
<tbody>
<tr>
<td>Hotspot 1 - Unmanaged by Tribal</td>
<td>216.99</td>
<td>Min 0.00  Mean 0.84  Max 1.11  Range 1.11</td>
<td>0.35</td>
<td>203.565</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Hotspot 1 - Managed by Tribal</td>
<td>0.00</td>
<td></td>
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<td>Hotspot 3 - Unmanaged by Tribal</td>
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<td>Hotspot 5 - Unmanaged by Tribal</td>
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<td>322.789</td>
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<td>Hotspot 5 - Managed by Tribal</td>
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<td>Hotspot 6 - Unmanaged by Tribal</td>
<td>252.18</td>
<td>Min 0.00  Mean 0.93  Max 1.01  Range 1.01</td>
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<td>Hotspot 6 - Managed by Tribal</td>
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<td>Hotspot 7 - Unmanaged by Tribal</td>
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<td>4,693.380</td>
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<td>Hotspot 10 - Unmanaged by Tribal</td>
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<td>Min 0.00  Mean 0.91  Max 1.03  Range 1.03</td>
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### SUMMARY

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<tr>
<th>Total Area Unmanaged (sq km)</th>
<th>9,167.82</th>
<th>Sum* Total Unmanaged</th>
<th>10,649,864</th>
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</thead>
<tbody>
<tr>
<td>Total Area Managed (sq km)</td>
<td>0.00</td>
<td>Sum* Total Managed</td>
<td>0</td>
</tr>
<tr>
<td>Total Area (sq km)</td>
<td>9,167.82</td>
<td>Total Sum*</td>
<td>10,649,864</td>
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</table>

<table>
<thead>
<tr>
<th>Total Area Unmanaged %</th>
<th>100.00</th>
<th>Sum* Total Unmanaged %</th>
<th>100.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area Managed %</td>
<td>0.00</td>
<td>Sum* Total Managed %</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* Sum refers to the cumulative predicted relative abundance values for each cell (900 sq meters) in each managed category.

A note on interpretation: If the "Total Area Unmanaged" and "Sum* Total Unmanaged" exceeds that of their respective Managed cells, this indicates a majority of the area and population is outside of direct governmental jurisdiction. If the "Sum* Total Managed %" is less than the "Total Area Managed %", this indicates that the conservation estate does a poorer job than a random placement of managed lands. Conversely, if the "Sum* Total Managed %" exceeds that of the "Total Area Managed %", then the conservation estate does a better job than a random placement of the conservation estate.
Grasshopper Sparrow Predicted Relative Abundance Summary by State
Federal Managed Lands Versus Lands Not Under Federal Management

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Mean Predicted Count / Breeding Bird Survey</th>
<th>SD</th>
<th>Sum*</th>
<th>Percent Area Managed/ Unmanaged</th>
<th>Percent Sum* Managed/ Unmanaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA - Unmanaged by Federal</td>
<td>6,982.18</td>
<td>Min 0.00 Mean 0.25 Max 0.94 Range 0.94</td>
<td>0.21</td>
<td>1,950,470</td>
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<td>99.65</td>
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<tr>
<td>IA - Managed by Federal</td>
<td>230.67</td>
<td>Min 0.00 Mean 0.03 Max 0.60 Range 0.60</td>
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<td>6,909</td>
<td>3.20</td>
<td>0.35</td>
</tr>
<tr>
<td>IL - Unmanaged by Federal</td>
<td>3,208.05</td>
<td>Min 0.00 Mean 0.41 Max 1.01 Range 1.01</td>
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<td>1,452,420</td>
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<td>99.69</td>
</tr>
<tr>
<td>IL - Managed by Federal</td>
<td>110.30</td>
<td>Min 0.00 Mean 0.04 Max 0.25 Range 0.25</td>
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<td>4,457</td>
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<td>0.31</td>
</tr>
<tr>
<td>IN - Unmanaged by Federal</td>
<td>13,070.80</td>
<td>Min 0.00 Mean 0.41 Max 1.91 Range 1.91</td>
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<td>5,998,760</td>
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<td>IN - Managed by Federal</td>
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<td>4,965</td>
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<tr>
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<td>0</td>
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<td>0.00</td>
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<tr>
<td>MN - Unmanaged by Federal</td>
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<tr>
<td>OH - Unmanaged by Federal</td>
<td>110.41</td>
<td>Min 0.00 Mean 0.03 Max 0.06 Range 0.06</td>
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<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>OH - Managed by Federal</td>
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<td>Min 0.00 Mean 0.00 Max 0.00 Range 0.00</td>
<td>0</td>
<td>0</td>
<td>99.00</td>
<td>99.72</td>
</tr>
</tbody>
</table>

**SUMMARY**

| Total Area Unmanaged (sq km) | 226,649.24 | Sum* Total Unmanaged | 41,187,166 |
| Total Area Managed (sq km)   | 3,133.12   | Sum* Total Managed   | 80,133     |
| Total Area (sq km)           | 229,782.36 | Total Sum*           | 41,267,299 |

* Sum refers to the cumulative predicted relative abundance values for each cell (900 sq meters) in each managed category.

A note on interpretation: If the "Total Area Unmanaged" and "Sum* Total Unmanaged" exceeds that of their respective Managed cells, this indicates a majority of the area and population is outside of direct governmental jurisdiction. If the "Sum* Total Managed %" is less than the "Total Area Managed %", this indicates that the conservation estate does a poorer job than a random placement of managed lands. Conversely, if the "Sum* Total Managed %" exceeds that of the "Total Area Managed %", then the conservation estate does a better job than a random placement of the conservation estate.
## Grasshopper Sparrow Predicted Relative Abundance Summary by State

### State Managed Lands Versus Lands Not Under State Management

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Mean Predicted Count / Breeding Bird Survey</th>
<th>SD</th>
<th>Sum*</th>
<th>Percent Area Managed/Unmanaged</th>
<th>Percent Sum* Managed/Unmanaged</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IA - Unmanaged by State</strong></td>
<td>7,046.34</td>
<td>0.00 0.25 0.94 0.94</td>
<td>0.22</td>
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<tr>
<td><strong>IL - Unmanaged by State</strong></td>
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<td>1,451,480</td>
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<td><strong>IL - Managed by State</strong></td>
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<td><strong>IN - Unmanaged by State</strong></td>
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<td><strong>IN - Managed by State</strong></td>
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### SUMMARY

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<tr>
<th>Description</th>
<th>Total Area Unmanaged (sq km)</th>
<th>Sum* Total Unmanaged</th>
<th>Total Area Managed (sq km)</th>
<th>Sum* Total Managed</th>
<th>Total Area (sq km)</th>
<th>Total Sum*</th>
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<tr>
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<td>477,435</td>
<td>229,782.19</td>
<td>41,267,226</td>
</tr>
</tbody>
</table>

* Sum refers to the cumulative predicted relative abundance values for each cell (900 sq meters) in each managed category.

A note on interpretation: If the "Total Area Unmanaged" and "Sum* Total Unmanaged" exceeds that of their respective Managed cells, this indicates a majority of the area and population is outside of direct governmental jurisdiction. If the "Sum* Total Managed %" is less than the "Total Area Managed %", this indicates that the conservation estate does a poorer job than a random placement of managed lands. Conversely, if the "Sum* Total Managed %" exceeds that of the "Total Area Managed %", then the conservation estate does a better job than a random placement of the conservation estate.
Grasshopper Sparrow Predicted Relative Abundance Summary by State
Tribal Managed Lands Versus Lands Not Under Tribal Management

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (sq km)</th>
<th>Mean Predicted Count / Breeding Bird Survey</th>
<th>SD</th>
<th>Sum*</th>
<th>Percent Area Managed/Unmanaged</th>
<th>Percent Sum* Managed/Unmanaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA - Unmanaged by Tribal</td>
<td>7,212.85</td>
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<td>0.22</td>
<td>1,957,380</td>
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<td>IA - Managed by Tribal</td>
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<td></td>
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</tr>
<tr>
<td>IL - Unmanaged by Tribal</td>
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<tr>
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</tr>
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<td>IN - Managed by Tribal</td>
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</tr>
<tr>
<td>MI - Unmanaged by Tribal</td>
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<tr>
<td>MI - Managed by Tribal</td>
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<td>0.04</td>
</tr>
<tr>
<td>MN - Unmanaged by Tribal</td>
<td>47,959.20</td>
<td>0.00 0.05 1.11 1.11</td>
<td>0.13</td>
<td>2,624,670</td>
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<td>99.71</td>
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<td>7,666</td>
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<td>OH - Unmanaged by Tribal</td>
<td>110.41</td>
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<td>0.02</td>
<td>3,597</td>
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<td>100.00</td>
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</tr>
<tr>
<td>WI - Unmanaged by Tribal</td>
<td>96,268.00</td>
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<td>19,635,800</td>
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</tr>
<tr>
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<td>0.03</td>
<td>16,209</td>
<td>1.26</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**SUMMARY**

- Total Area Unmanaged (sq km): 226,135.61
- Sum* Total Unmanaged: 41,239,697
- Total Area Managed (sq km): 3,646.51
- Sum* Total Managed: 27,572
- Total Area (sq km): 229,782.12
- Total Sum*: 41,267,268

* Sum refers to the cumulative predicted relative abundance values for each cell (900 sq meters) in each managed category.

A note on interpretation: If the "Total Area Unmanaged" and "Sum* Total Unmanaged" exceeds that of their respective Managed cells, this indicates a majority of the area and population is outside of direct governmental jurisdiction. If the "Sum* Total Managed %" is less than the "Total Area Managed %", this indicates that the conservation estate does a poorer job than a random placement of managed lands. Conversely, if the "Sum* Total Managed %" exceeds that of the "Total Area Managed %", then the conservation estate does a better job than a random placement of the conservation estate.