



Avian post development monitoring along the lower Colorado River using constant effort mist netting.

Wildlife Team Bureau of Reclamation- lower Colorado Regional Office



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Managing Water in the West

Multi Species Conservation Plan

Restored habitat	Acres	Hectares
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Cottonwood/willow habitat	5,940 acres	2,406 hectares
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Honey mesquite habitat	1,320 acres	535 hectares
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Marsh	512 acres	207 hectares
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Backwaters of site as habitat	300 acres	121 hectares
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Post development monitoring- to evaluate development

Avian post development monitoring through constant effort mist netting

- MSCP covered species.
- Avian parameters on restored sites and non restored sites (baseline).
 - Species abundance
 - Species composition
 - Condition
 - Age and sex ratios
 - Demographic indices (productivity and survivorship)
 - Overwinter site persistence and annual return rate.
- Avian parameter changes as site matures.
- Habitat Characteristics



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Cibola Nature Trail Restoration Site



Pratt Restoration Site



Headgate Rock Dam Site



Non-breeding season (winter)

- Nov 2002-Feb 2004
 - Three 4-day periods between November and February (Pratt and Cibola 2002-03 and 2003-04 season).
 - Ten 12m nets at Pratt, nine 12m nets and two 6m nets at Cibola.
- Nov 2004-Feb 2005
 - Five 2-day periods between November and March (Pratt and Cibola 2004-05 season).
 - Twelve 12m nets at Cibola and Pratt.



Breeding season (May-August)



- Two mist netting stations according to Monitoring Avian Productivity and Survivorship (MAPS) protocol (DeSante *et al.* 2002), Headgate Rock site (2000-2004) and Cibola site (2003-2004).
- Nets set up 30 minutes before sunrise and operated for 5 hours.
- Nine 12m nets and two 6m nets at each site.

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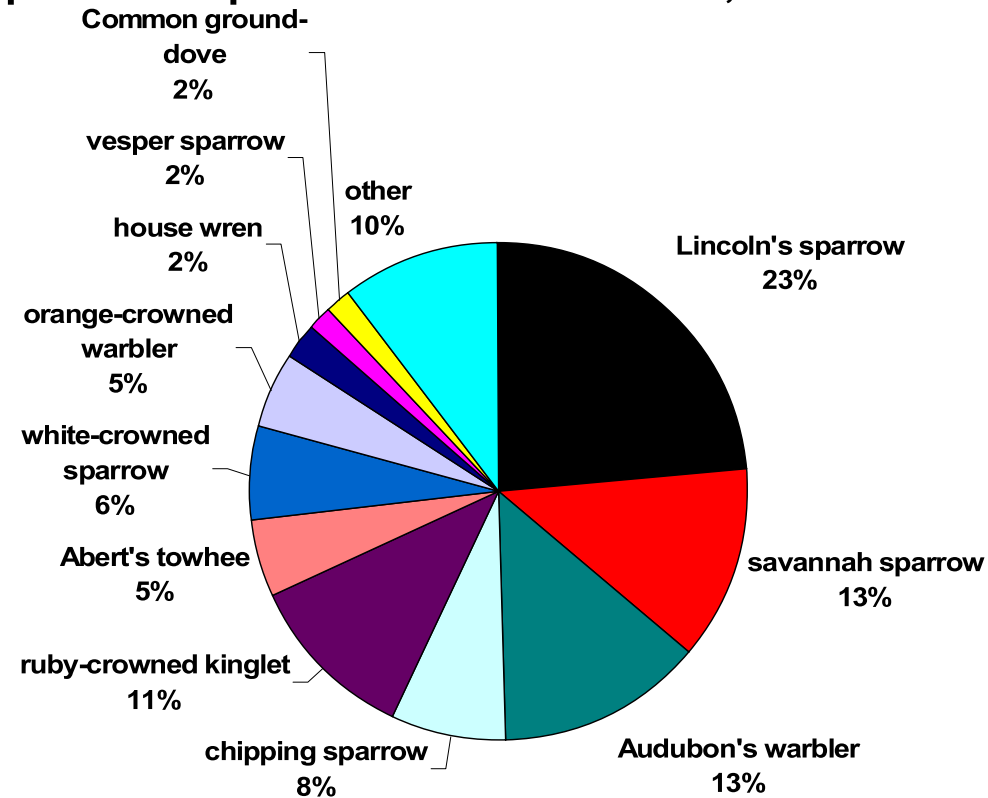
Data Analysis



- Birds per net hour
- Over winter site persistence and annual return rate (Latta and Faaborg 2001 and 2002).
- Single Factor ANOVA test was used to determine significant difference of capture rates between years and sites.

Results non-breeding (winter) Cibola

Species Composition at the Cibola Site, winter 2002-05

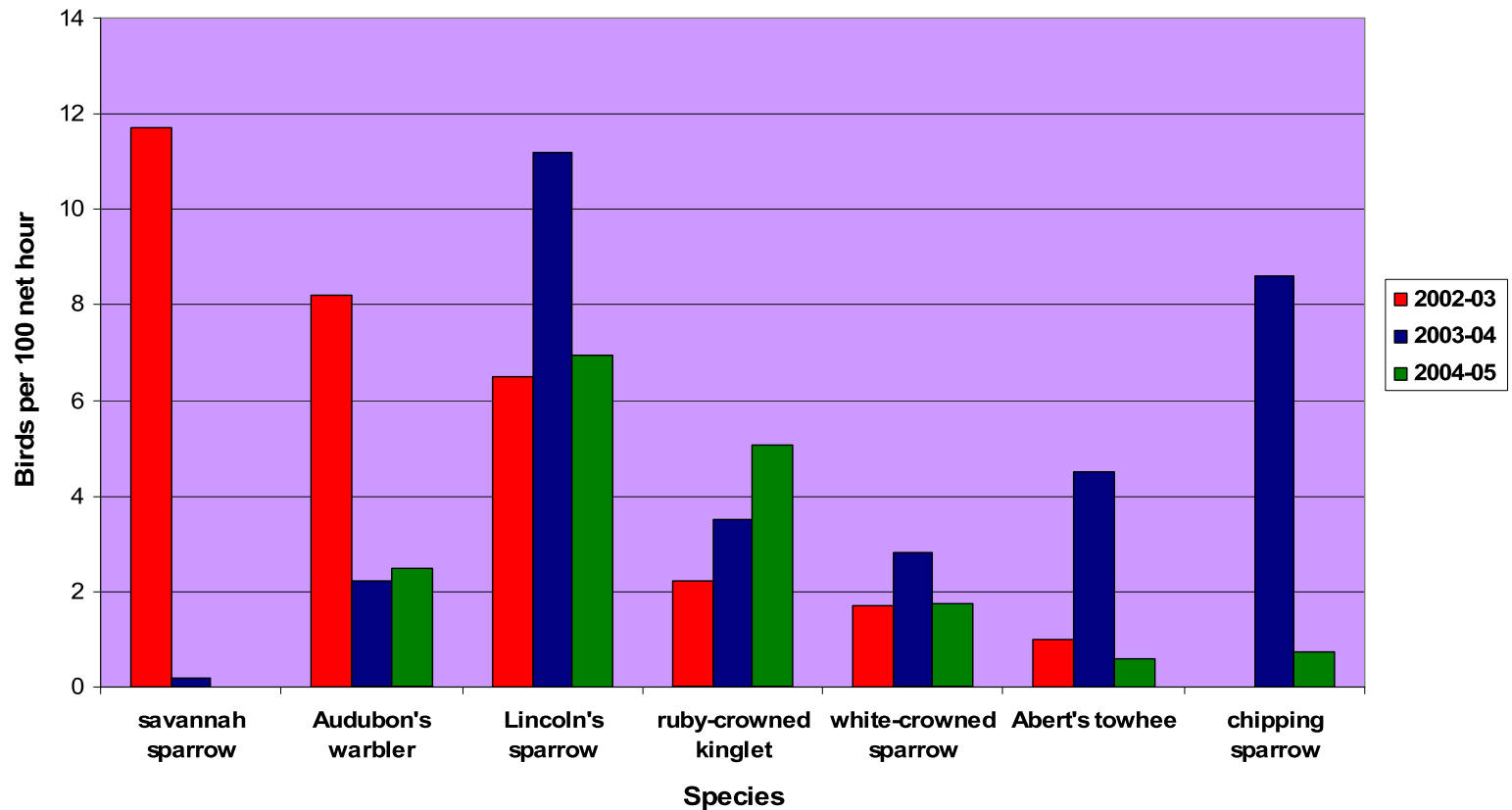


Total Capture Rate=33 birds per 100 net
hours comprising 37 species

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Results non-breeding (winter) Cibola

Birds per 100 net hours, per year, of species that comprised over 80% of total birds captured at the Cibola Site, winter 2002- 05



Total Capture Rate

2002-03=37

2003-04=43

2004-05=24

Results non-breeding (winter) Cibola

Annual Return Rate

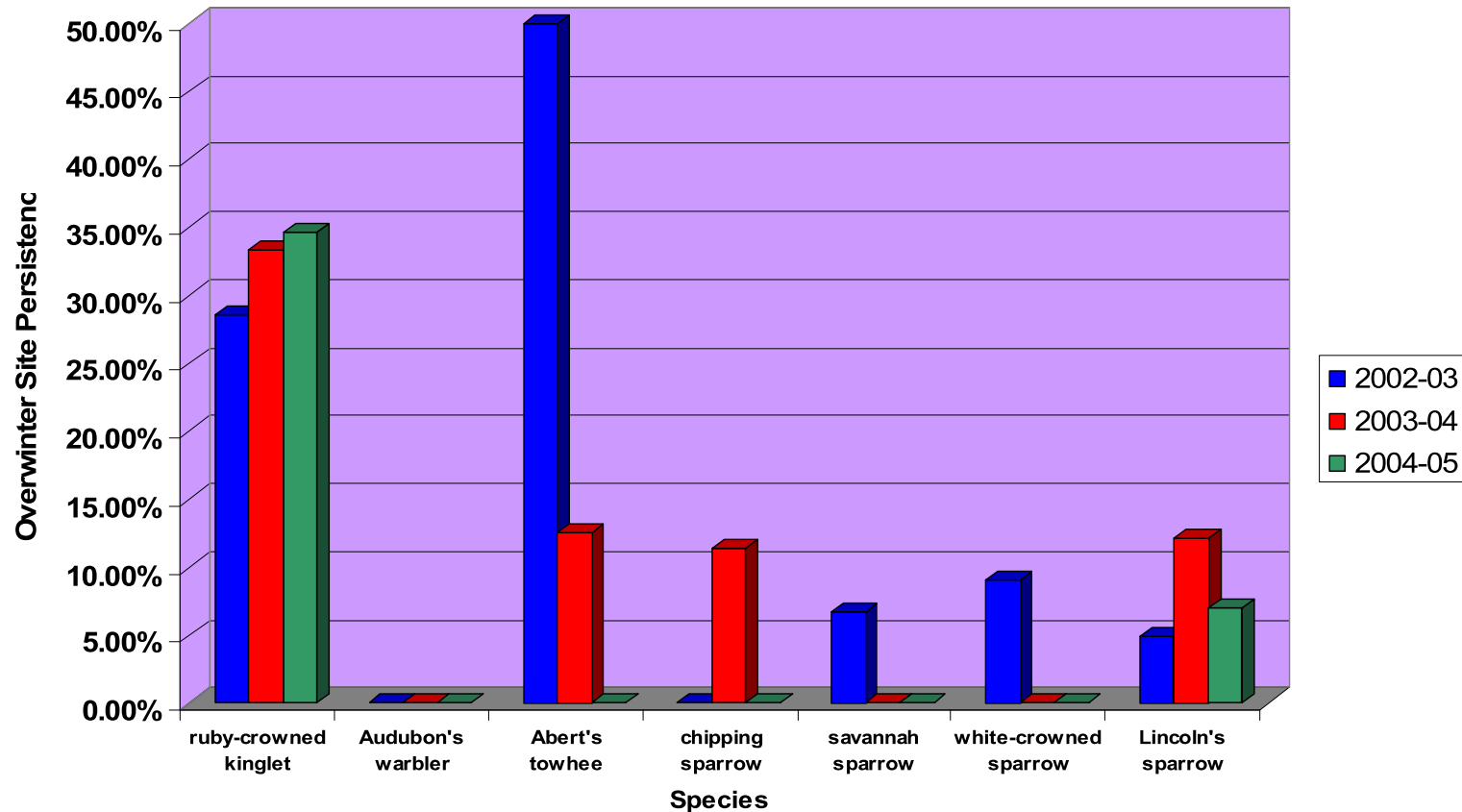
Orange-crowned warblers=8%

Ruby-crowned kinglets=7%

Lincoln's sparrow=4%

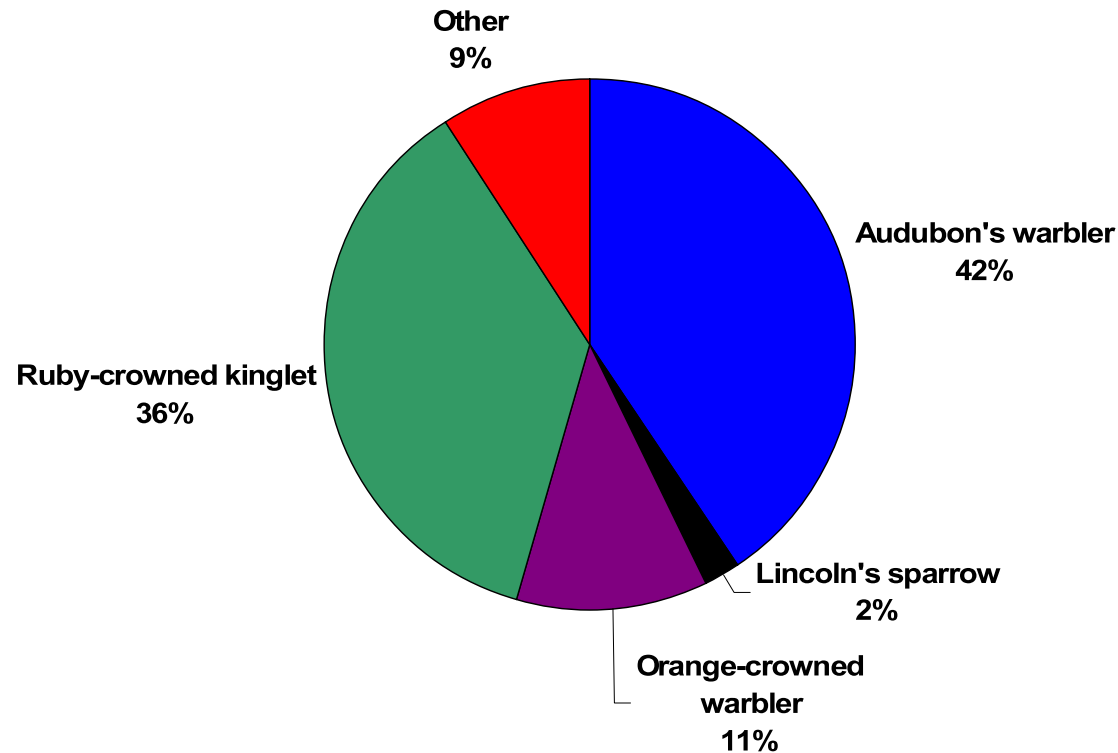
Chipping sparrow=3%

Overwinter Site Persistence at the Cibola Site, winter 2002-05



Results non-breeding (winter) Pratt

Species Composition at the Pratt Site, winter 2002-05

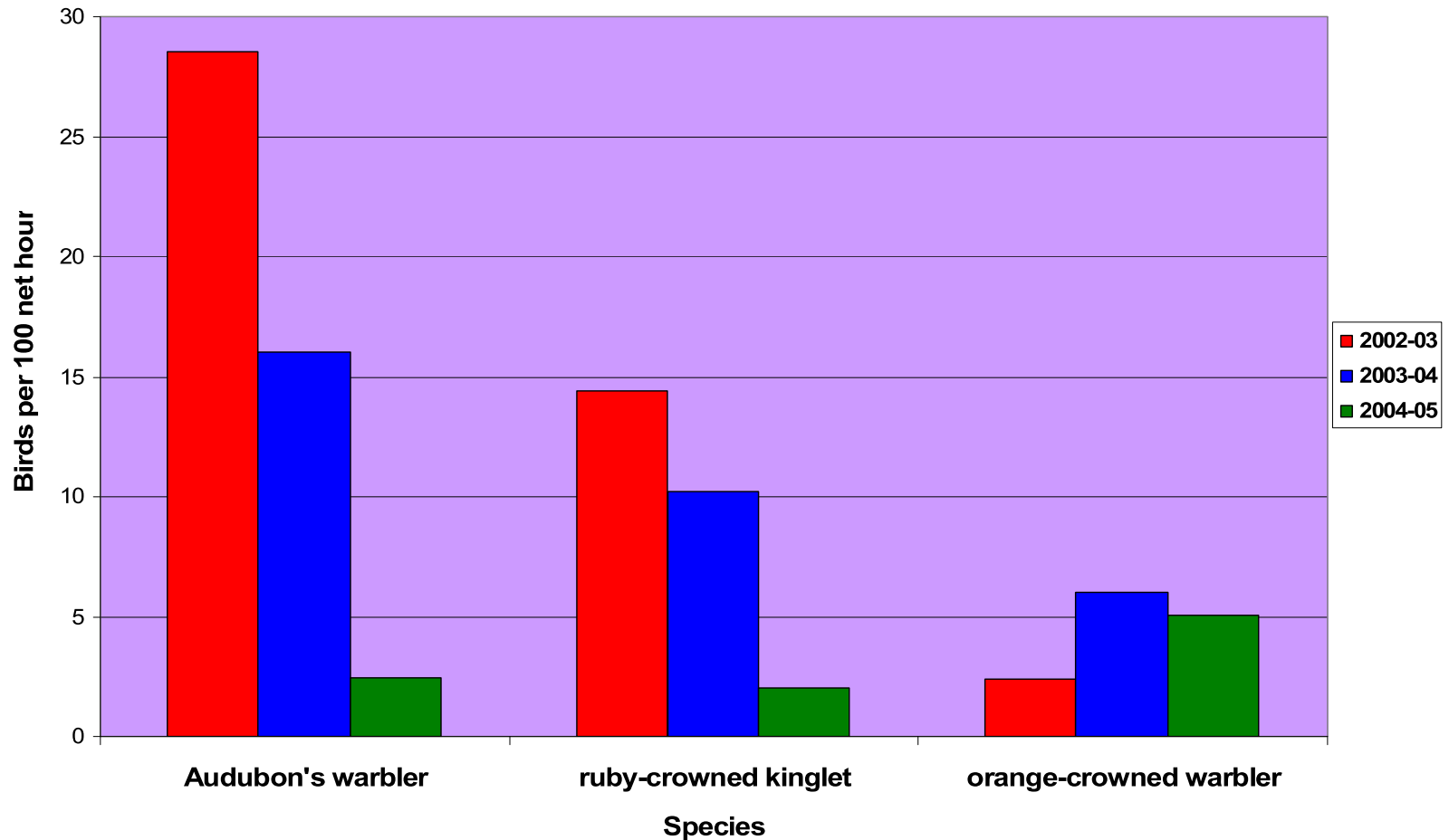


Total Capture Rate=40 birds per 100 net hours
comprising 26 species

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Results non-breeding (winter) Pratt

Birds per 100 net hours, per year, of species that comprised over 80% of total birds captured at the Pratt Site, 2002-05



Total Capture Rate

2002-03=50

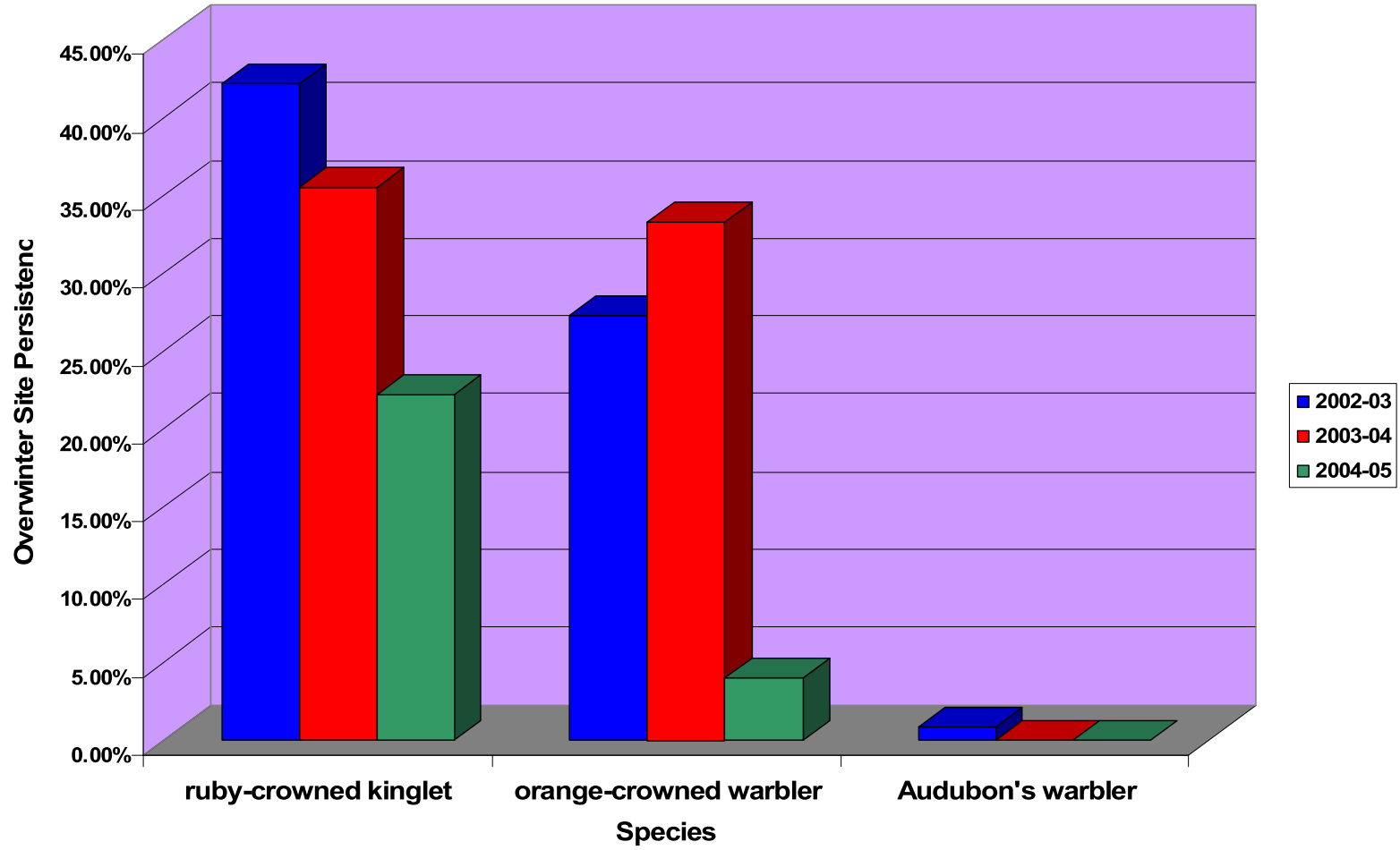
2003-04=39

2004-05=28

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Results non-breeding (winter) Pratt

Overwinter Site Persistence at the Pratt Site, winter 2002-05



Annual Return Rate

Ruby-crowned kinglets-7%

Orange-crowned warbler-15%

Non-breeding (winter) Cibola and Pratt

- Species diversity high at both sites.
- Species composition variable between years especially at the Cibola site.
 - Chipping sparrow , savannah sparrow, Abert's towhee and Audubon's warblers.
- Moderate overwinter site persistence and annual return rate.

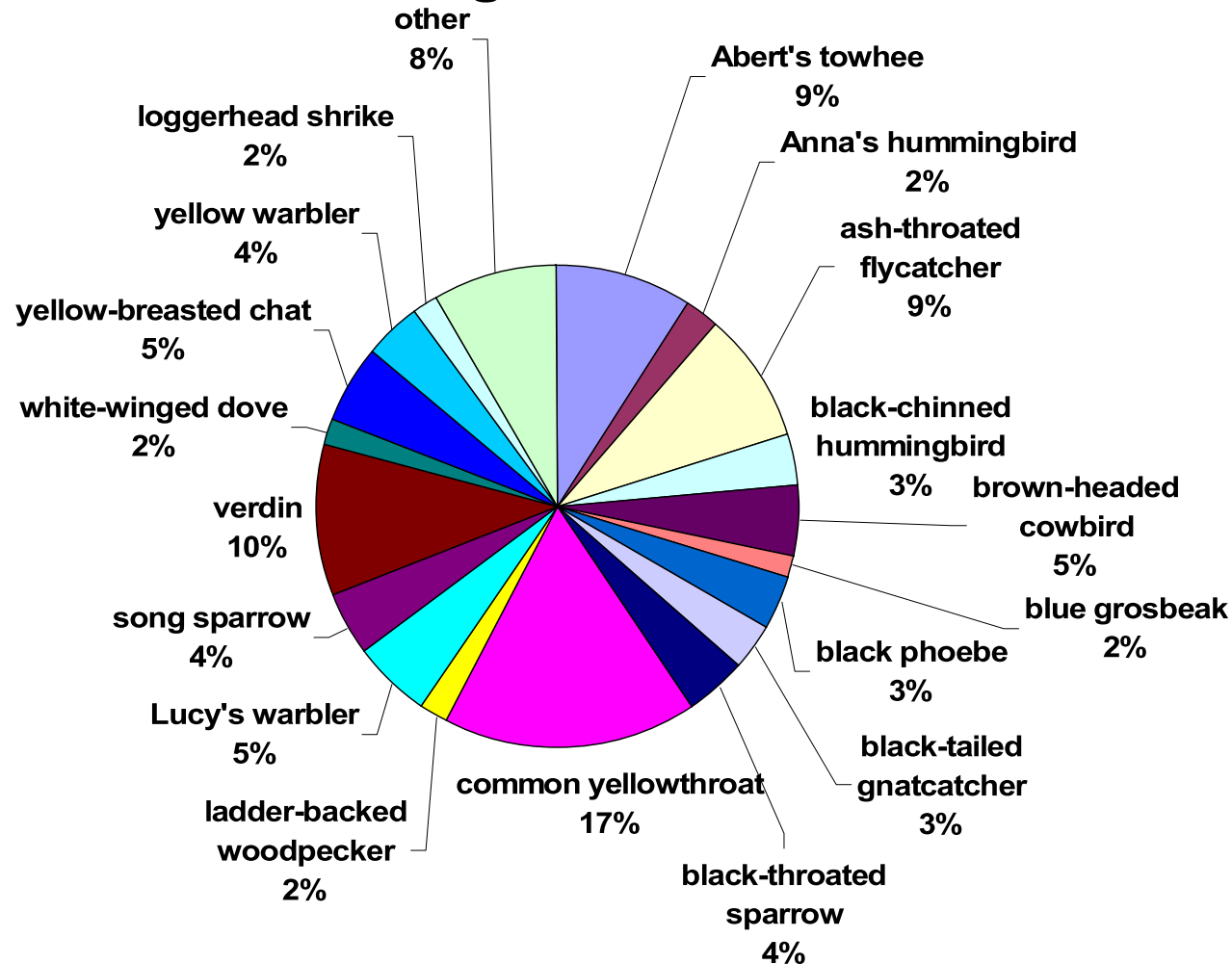


Non-breeding (winter) Cibola and Pratt

- No significant difference in total capture rate between years or sites.
- Species diversity significantly higher ($p < .05$) at the Cibola site than the Pratt site.
- Pratt site significantly higher capture rate ($p < .05$) of wood warblers than the Cibola site.
- Cibola site significantly higher capture rate ($p < .05$) of new world sparrows than the Pratt site.

Results breeding Headgate Rock Site

Species Composition at the Headgate Rock Dam Site, breeding season 2000-2004

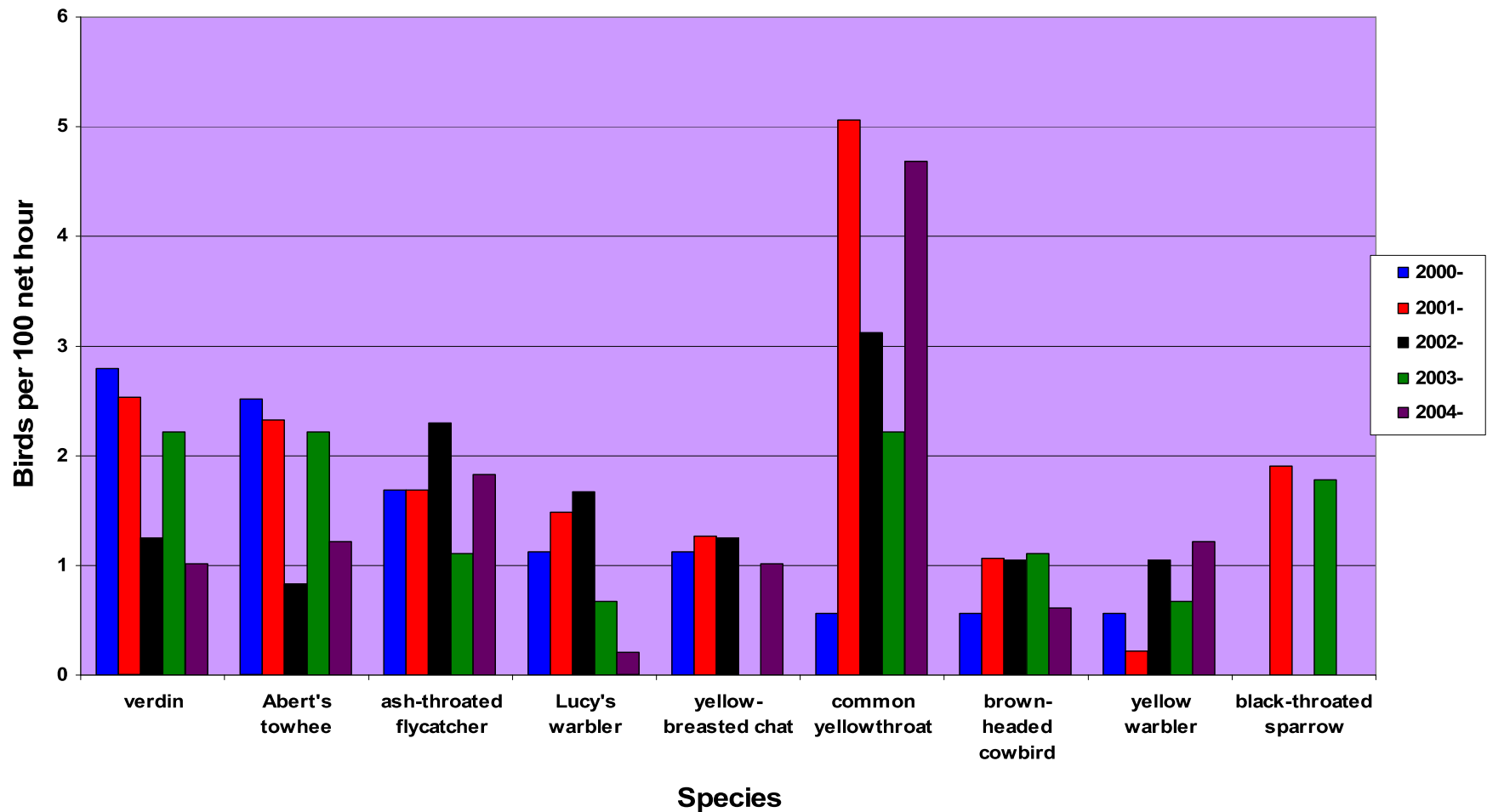


Total Capture Rate=20 birds per 100 net hours comprising 31 species

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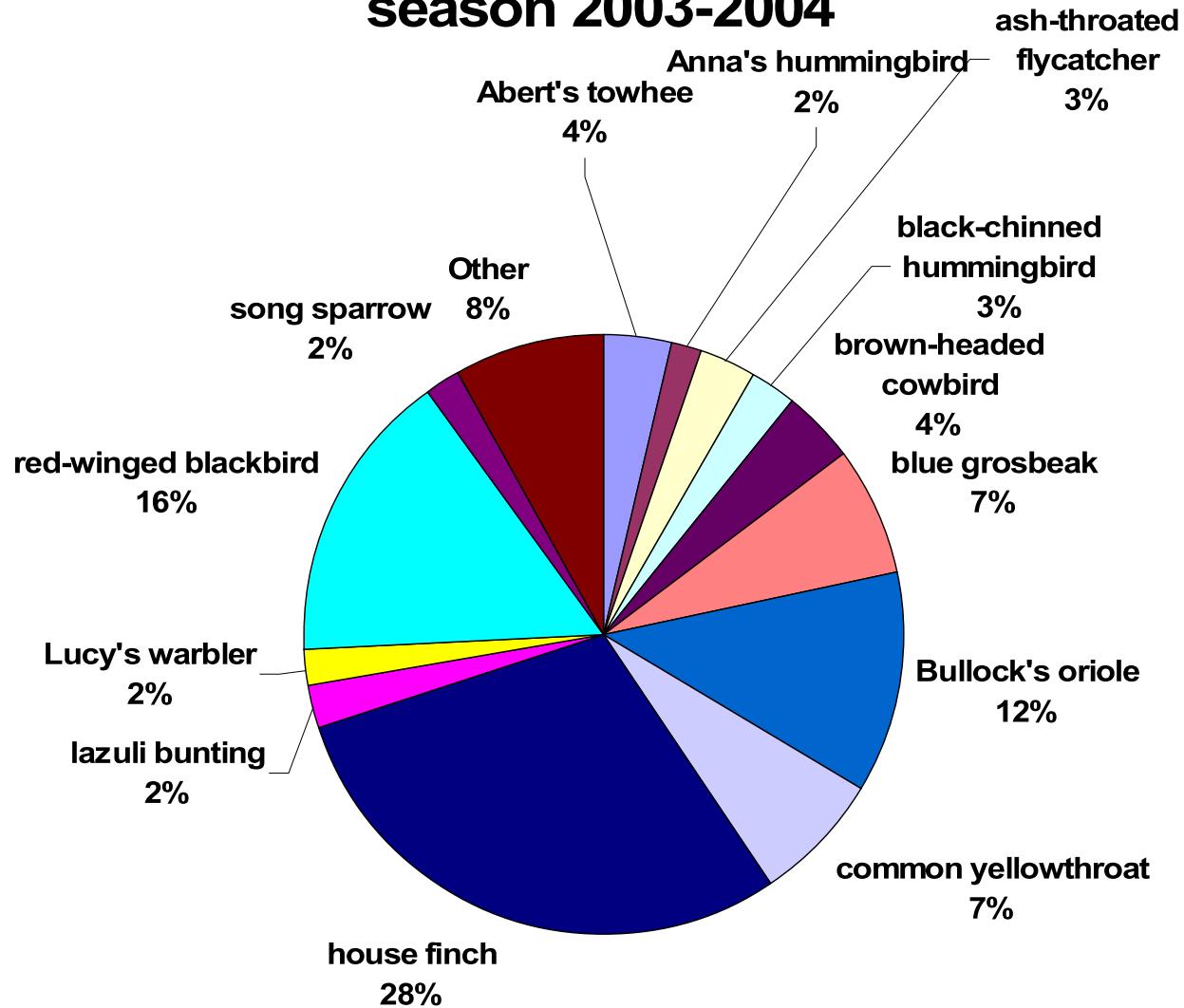
Results breeding Headgate Rock Site

Birds per 100 net hours, per year, of species that comprised nearly 70% of resident birds captured at the Headgate Rock Site, 2000-2004 breeding season



Results breeding Cibola

Species Composition at the Cibola site, breeding season 2003-2004

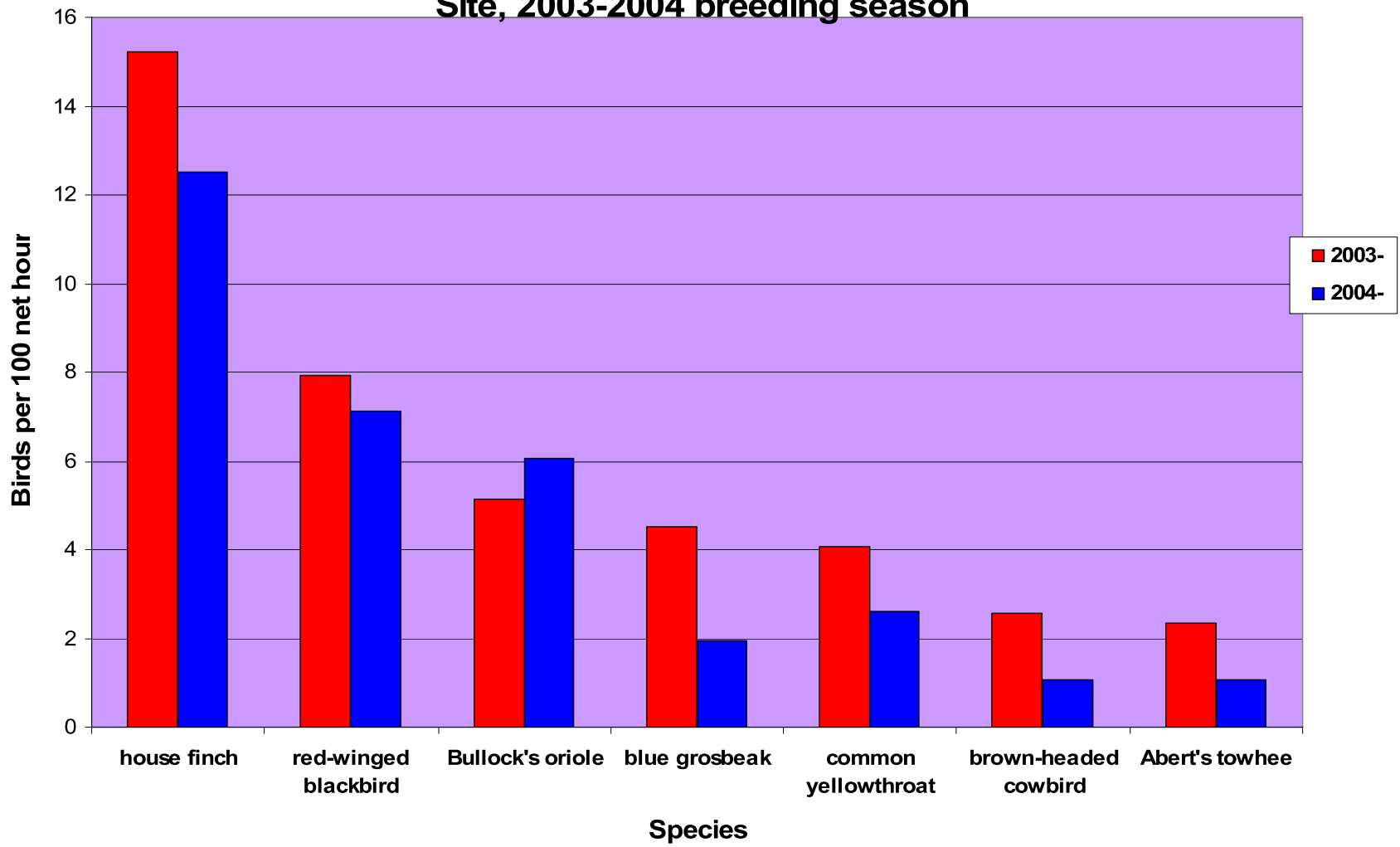


Total Capture Rate=48 birds per 100 net hours comprising 29 species

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Results breeding Cibola

Birds per 100 net hours, per year, of species that comprised over 80% of resident birds captured at the Cibola Nature Trail Restoration Site, 2003-2004 breeding season



Discussion Breeding season

- Significantly higher capture rate at the Cibola site.
- Species Composition of Cibola.
 - Riparian associated species (40%)
 - Habitat generalist (50%)
- More verdins and yellow-breasted chats at the Headgate Rock Dam site.
- More Bullock's oriole at the Cibola site.



Future

- MAPS station added to non-restored site on Havasu NWR by the south dike.
- Continue to conduct constant effort mist netting on restored areas and non restored areas.



Migrating Willow Flycatchers

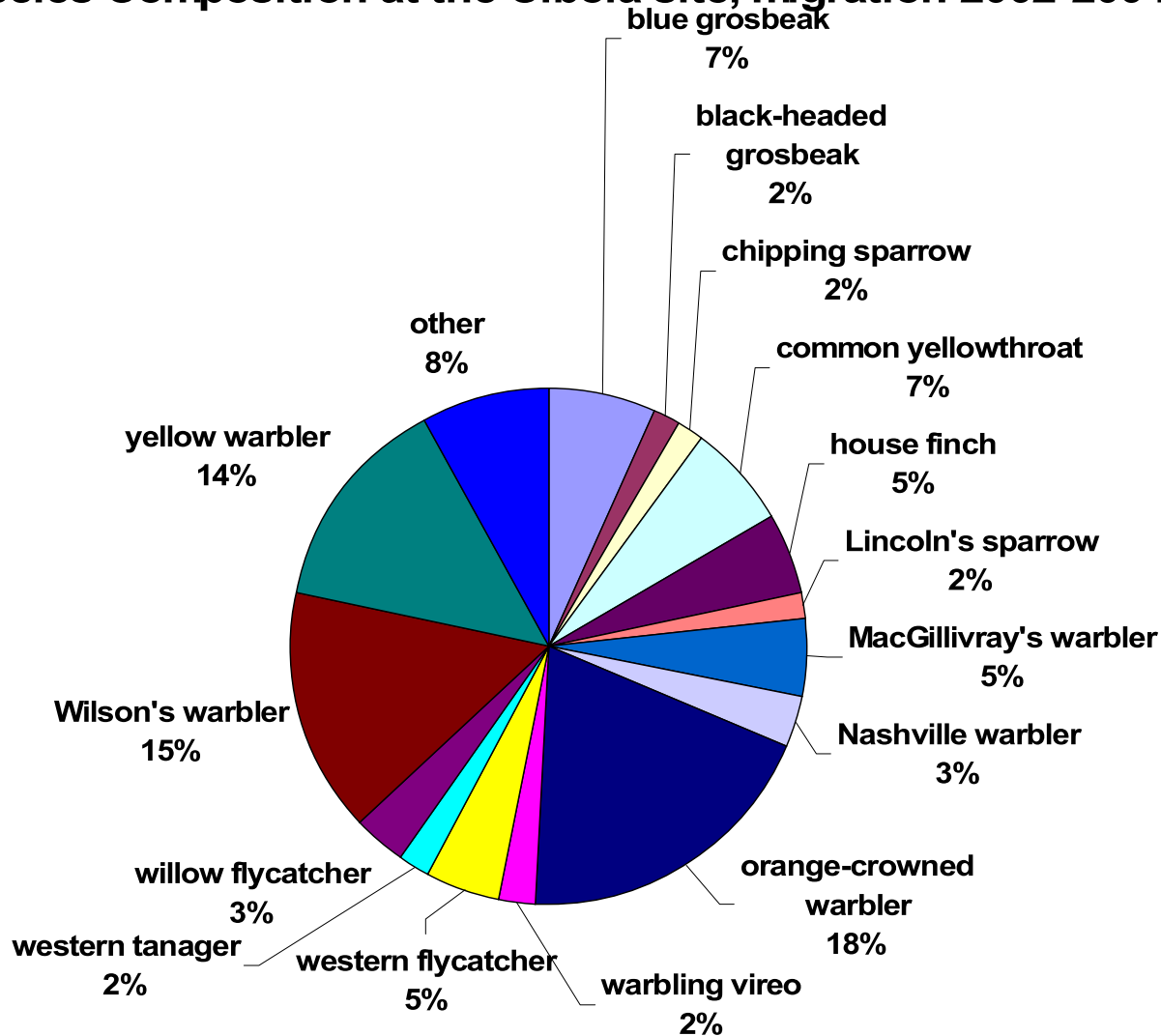
- 21 willow flycatchers captured during fall migration at the Cibola Site.
- 9 willow flycatchers captured during fall migration at the Pratt Site.
- 15 willow flycatchers captured during spring migration at the Cibola Site.



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Non-breeding (migration) Cibola

Species Composition at the Cibola site, migration 2002-2004



104 birds per 100 net hours captured

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Literature Cited

- Desante, D.F, K.M Burton, P. Vilez and D. Froelich. 2002. **MAPS Manual 2002 Protocol Instructions for the establishment and operation of constant-effort bird-banding stations as part of the monitoring and avian productivity and survivorship (MAPS) program.** Institute of Bird populations, Point Reyes Station, CA 94956-1346
- Latta, Steven C. and John Faaborg. 2001. Winter site fidelity of prairie warblers in the Dominican Republic. **The Condor** 102 (3): 455-468
- Latta, Steven C. and John Faaborg. 2002. Demographic and population response of Cape may warblers wintering in multiple habitats. **Ecology** 83 (9): 2502-2515
- Rosenberg, K.V., R.D Ohmart, W.C and B.W Anderson. 1991. **Birds of Lower Colorado River Valley.** Univ. of Arizona Press (Arizona).