1. INTRODUCTION
This study explores the effects of land composition and land fragmentation on bird biodiversity in the Phoenix metropolitan area, a rapidly growing urban region in the central Arizona.

2. METHOD
Land cover is grouped into five classes based on the 2001 National Land Cover Dataset (Open space, 2Low-Intensity, 3Mid-Intensity, 4High-Intensity, 5Desert and 6Water). “Developed area” is the sum of class 1-4. A suite of fragmentation indices are calculated, including Contrast Weighted Edge Density (CWED), which focuses on the edges between “Developed area” and “Desert”.

3. DATA FILTERING
Survey sites: Due to the extraordinary effect of riparian on birds (Table 1), 12 riparian sites are excluded from the study. Total there are 39 sites, inc. 18 Urban, 15 Desert, and 6 Agricultural sites. Site identification is based on CAP LTER land use code, NLCD2001 data, and visually view from Google Earth (Fig. 1).

Bird data: We use the maximum bird count among three surveys in the Spring 2001 (excluding the birds that flew through, observed > 40m, or monitored only in one site). Totally 39 species are grouped in three categories (Fig. 2).

4. ANALYSIS AND RESULTS
We identify monitoring sites as Urban, Desert and Agriculture, and group birds into urban exploiters, urban adaptors, and urban avoiders (Blair, 1996). We test the relationships among land composition, fragmentation, and bird biodiversity at five scales of buffering area (90m to 2470m side-length square areas (Hostetter and Knowles-Yanez, 2003.)

5. MAIN FINDINGS
• Low-Intensity has an essential role in land fragmentation (Fig. 3).
• Fragmentation and urbanization present non-linear relationship. With the increase of % developed area, fragmentation firstly rises and then falls (Fig. 4).
• Overall bird diversity (e.g. Simpson, Shannon index, and evenness indices) is the highest in desert, but the number of species and abundance are highest in urban. Agriculture has the lowest species and diversity (Fig. 6).
• “Urban Adaptable” birds are the largest group of birds (Fig. 2). While their abundance is positively correlated with %Low-Intensity area and land fragmentation level (e.g. Contagion index), the diversity (e.g. Evenness index) is negatively correlated with %Low-Intensity area and land fragmentation (Fig. 7 & 8).
• The abundance and species richness of “Urban Avoiders” are negatively correlated with all four types of developed area and land fragmentation level (Table 3 & 4).

Reference