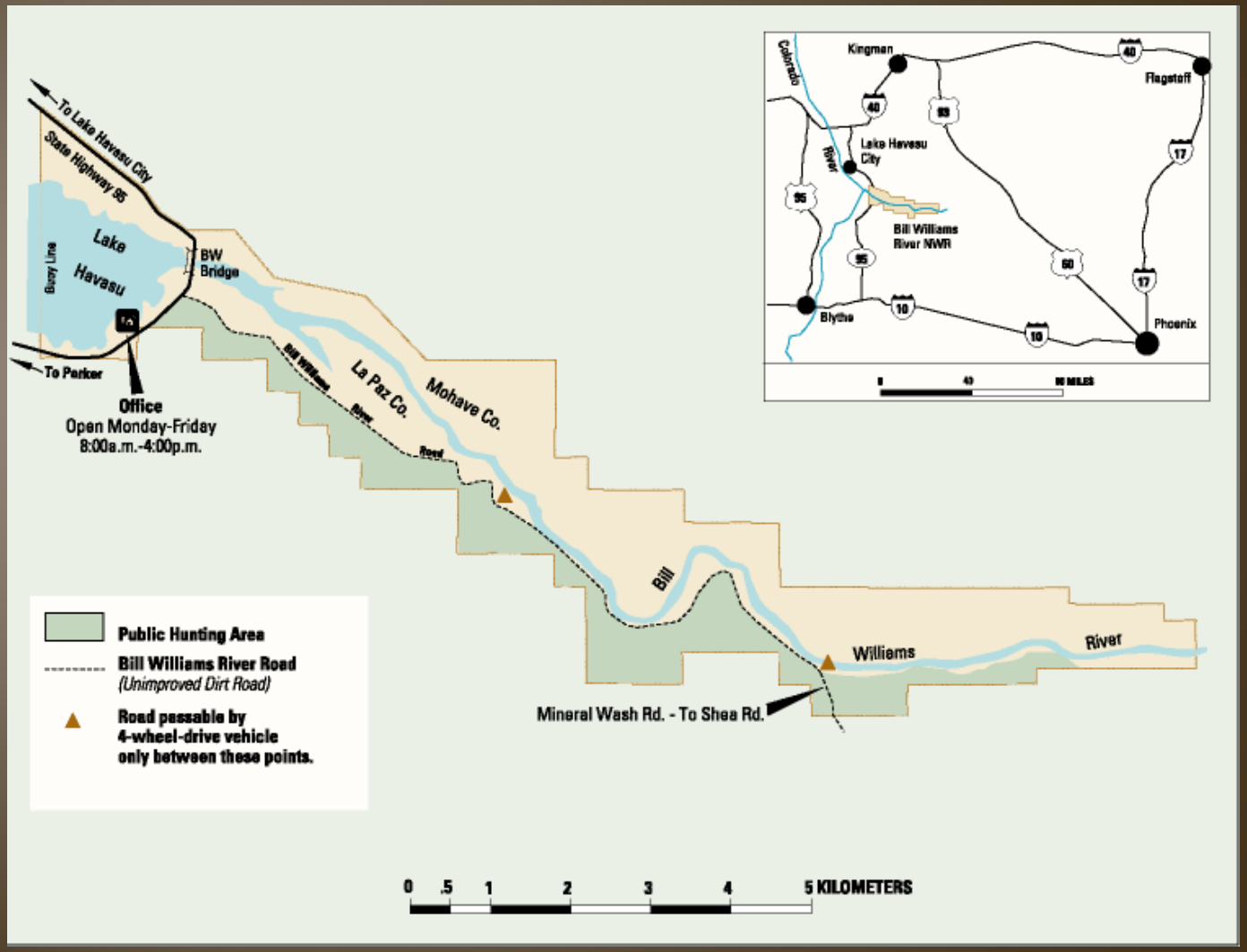
The Long and Short of it (data, that is)…

Changes in Avian Communities on the Bill Williams River National Wildlife Refuge Over Time

Bill Williams RIVER!!! NWR

- 6,105 acre national wildlife refuge on the Bill Williams River from the confluence with the Lower Colorado and 10 miles upstream.
- Created Jan 22, 1941. HAPPY BIRTHDAY!!!!! (Great Party!)
- Joined with Havasu NWR in 2010 to form the Havasu NWR Complex.
- Largest remaining stand of native dominated riparian forest on the LCR and the only one still flood regenerated but includes marsh, desert and riparian habitats.
- BWR flows controlled in amplitude and timing by Alamo Dam and local weather conditions.

Bill Williams River National Wildlife Refuge



The refuge has a complex mosaic of dynamic habitats which creates high species diversity.

Several long-term survey data are available for the BWRNWR following some 354 avian species creating remarkable data bases for comparisons and perspective.

- Yuma Clapper Rail go back to 1970s, but (North American Marshbird survey since 2005). Same points and surveyor since 1999.
- Christmas Bird Counts
- Delta Waterbird Counts
- Refuge Long-term Monitoring Surveys
- Many researches and contractors

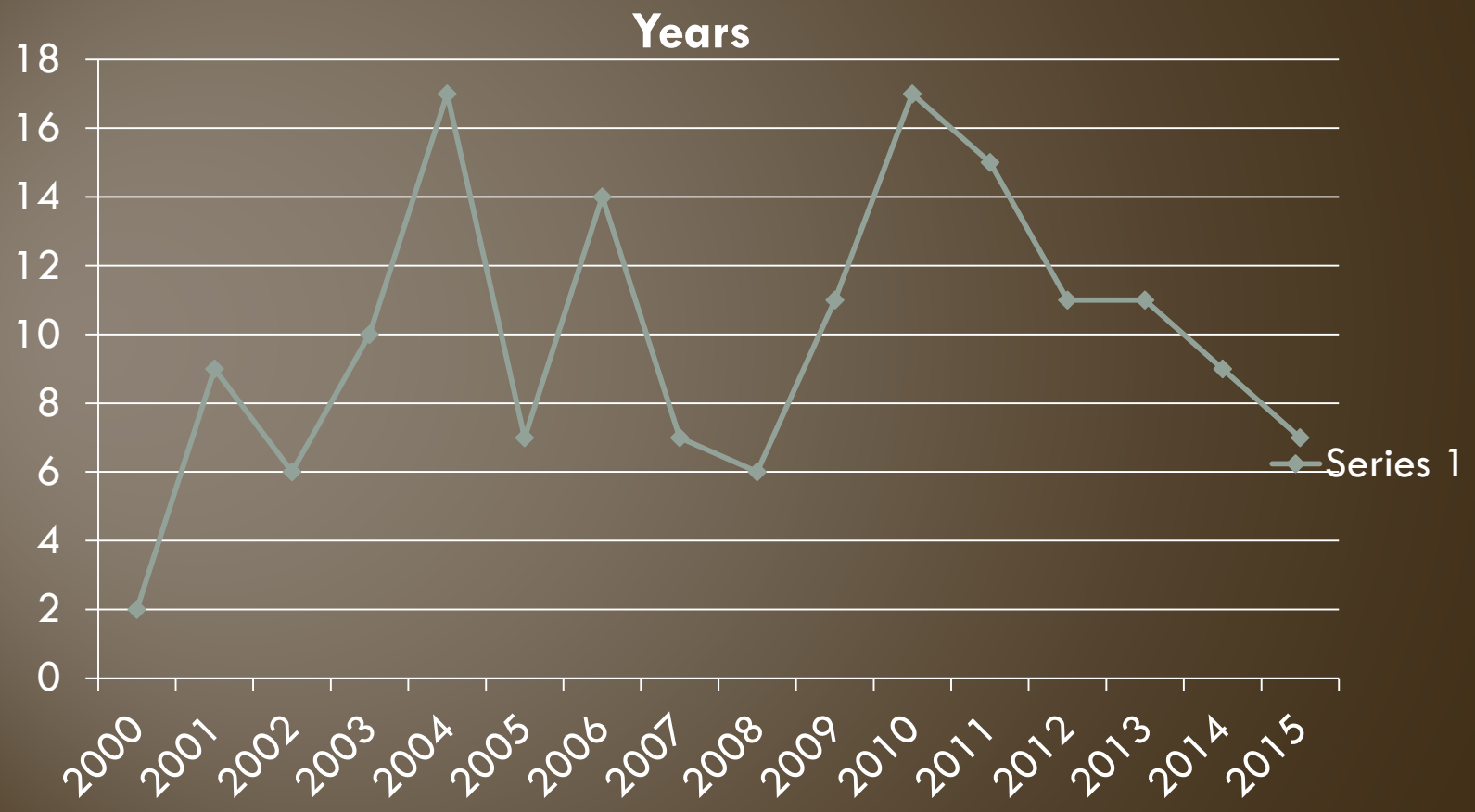
Biological populations vary over time for many reasons. Detecting those reasons can be tough.

- Habitat quality impacting an overall or local population's breeding, migration or wintering success
- Short-term weather or long-term climate change impacts altering habitat selection or quality.
- Natural (or man-made) disasters.
- Interactions with other species such as range expansions, competition, competitive release or other changes in the overlap between the fundamental and realized niches.
- Long-term data sets with consistent protocols can help document these changes and define the "normal" background variation for a species and habitat. They provide the observations needed to formulate testable hypotheses and suggest experimental designs to help determine when change is "real".

Many federal lands, such as NWRs, provide rare opportunities for long-term monitoring of species and the ecological process which affect them.

Several local factors may influence rail numbers or responses in the BWR Delta: high water (floods or lake level), fires, or survey variables, but in this case, same surveyor, same points, same weeks, same boat motor.

Ridgeway' Rail high count on the Bill William's River Delta 2000-2015. Mean = 9.9375. Concern over LCR wide downward trend in survey responses.



In the winter of 1998-1999 long-term monitoring surveys began…

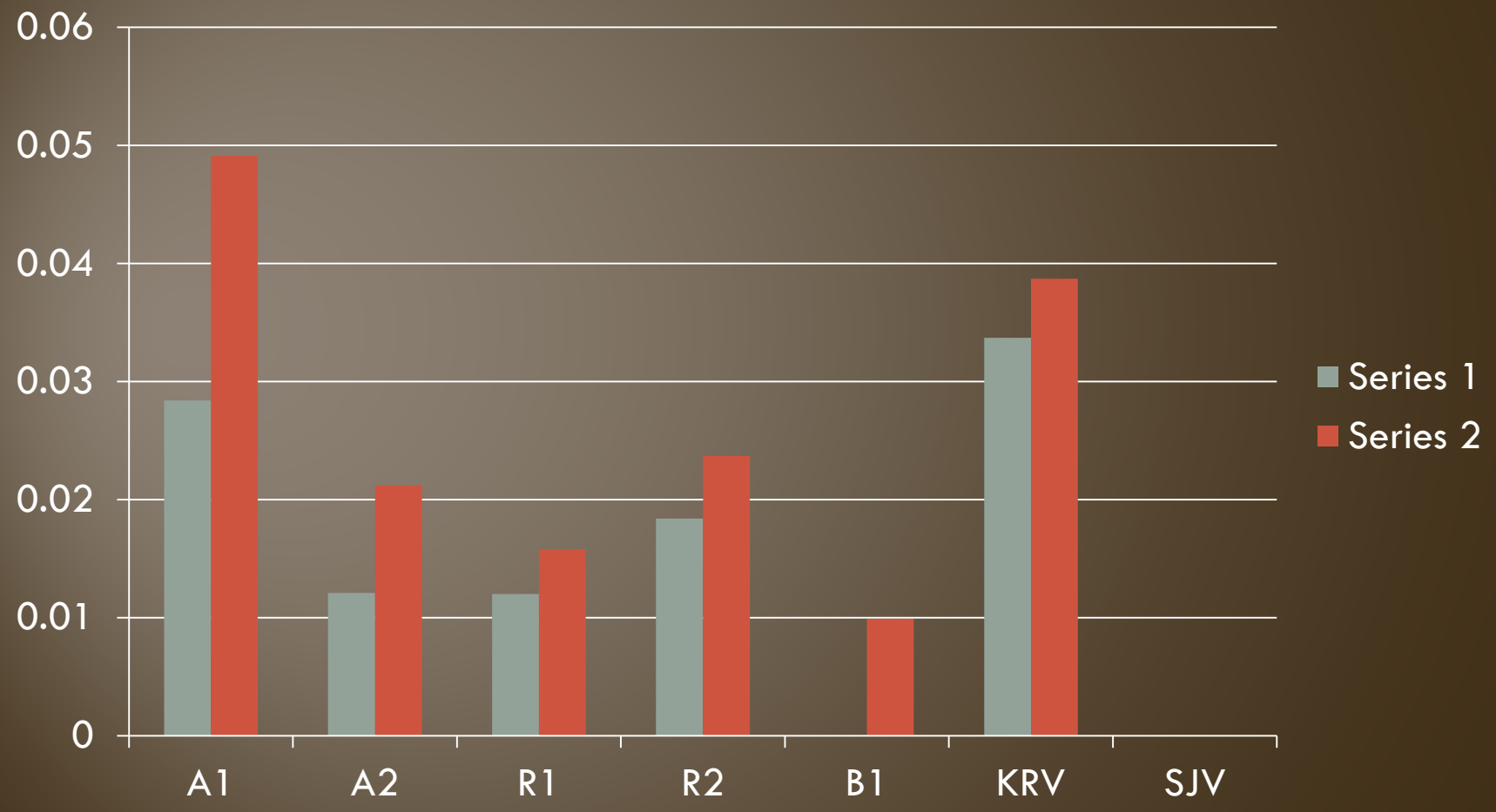
- Baseline Inventory for refuge by habitat type and seasons:
  - Species across many taxa (plants, herps, birds, mammals)
  - Relative Abundances as effort controlled (area and time)
  - Community Parameters (diversity, trophic levels, guilds, interactions as well as individual species)s
- Change over time comparisons
  - Responses to specific events - weather, floods, fires, management actions, other impacts not foreseen at time
  - Longer term processes - trends, succession, climate change, changing species distributions
- Guide management decisions and plans
- Contribute to other refuges and agencies baseline data and ecological targets

Survey Protocol

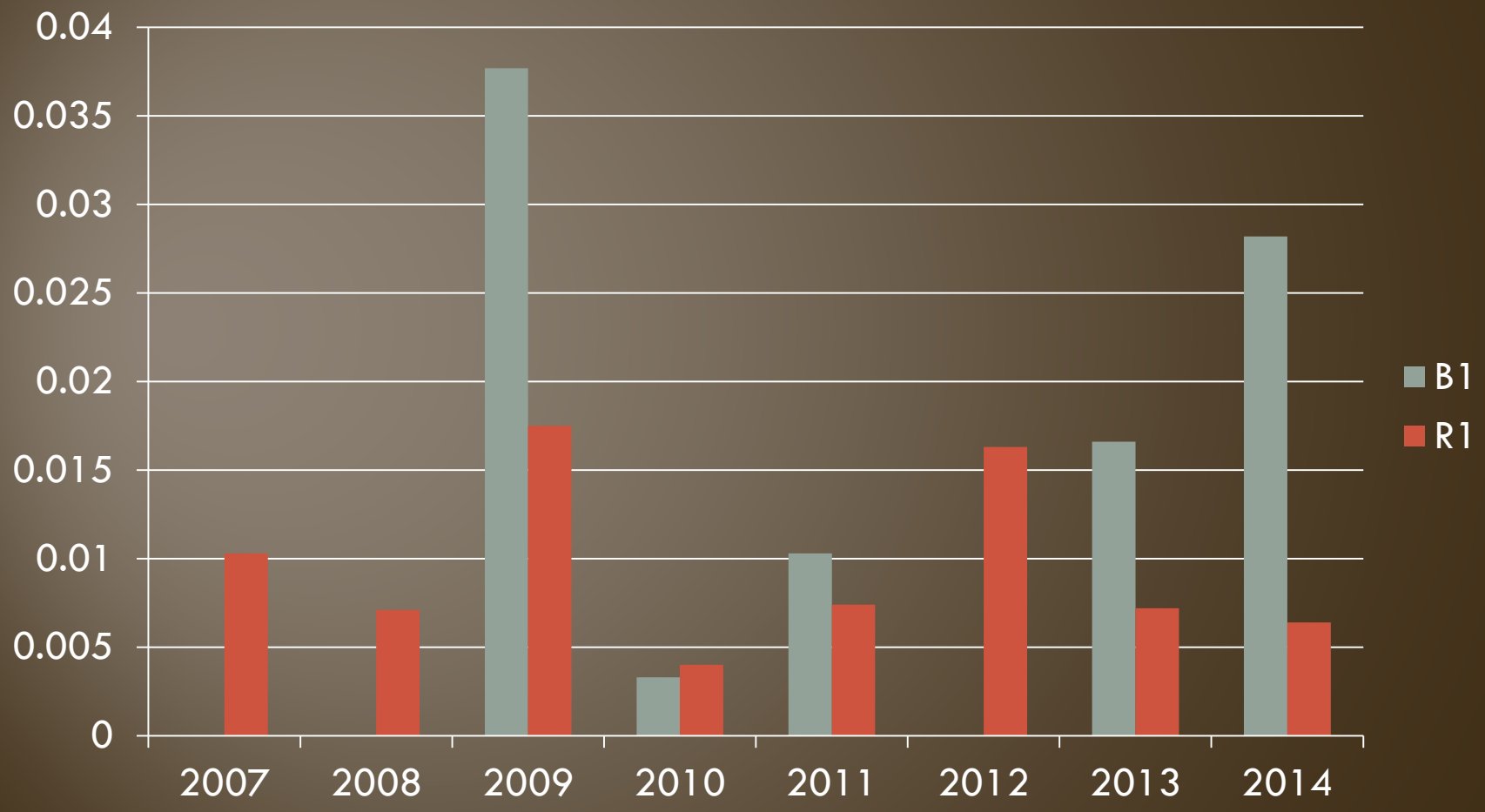
- Strip transects 400m X 20m with 20 contiguous plots. Most constrained habitat dictated size. Woody vegetation % upper canopy cover and % plot cover at 1 m.
- Each habitat surveyed for 3 consecutive days each of 4 seasons, 3 minutes per plot or 1 ½ hrs per transect run for birds; 2 traps per station 2-3 nights for small mammals in spring and fall with mark-recapture.
- All birds within plot including flyovers (irrelevant species later removed from analysis) are On Transect, those outside plot but within habitat are Off Transect (data used differently).
- Due to limited area, detectability and identification high, and double counting low for birds, Mark-recap controlled for double counting small mammals.

Have had questions about specific species over the long term, too. First this little guy

Riparian migratory spring and summer breeder – Bell's Vireos birds/minute.82 ha/transect in 7 habitats 1999-2015.

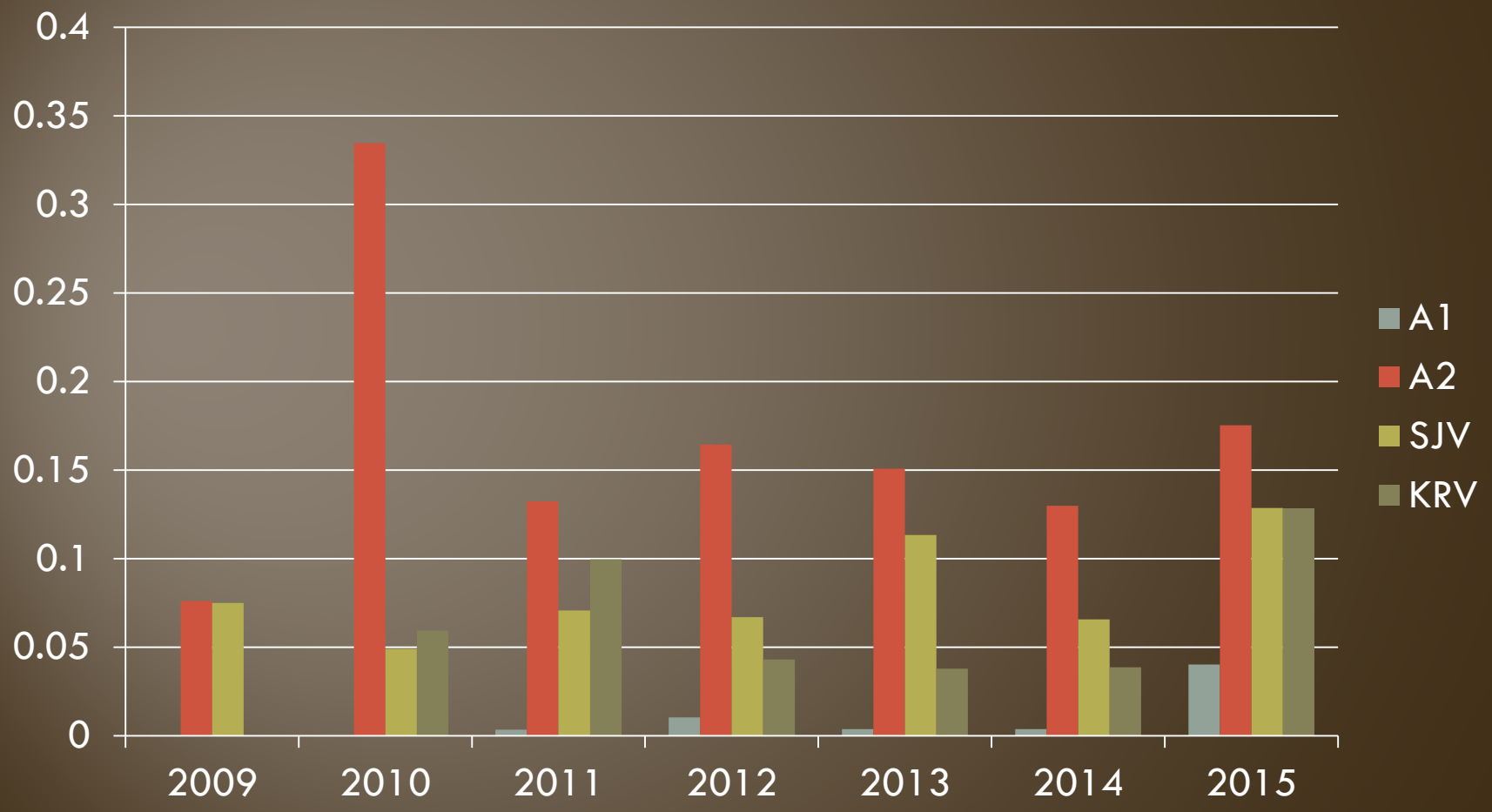


BEVIs/minute/transect comparison of burned to unburned riparian habitats in summer.



And someone who shares a habitat…but not a season with him!

Riparian migratory winter breeder – Phainopeplas birds/minute/transect in 4 habitats 2009-2015



In short, long data sets can help

- 1) Better understand the intrinsic variability in species populations so research, monitoring, and habitat design can account for variation over time and space.

- 2) Increase the probability of detecting significant changes and consistent trends from background variation.

- 3) Suggest future, more intense or refined research needs.

Many thanks to my volunteer field folks, you have helped us better understand the ways of the wildlings…

- Jan Richmond
- Bobby Paintner
- Wayne Paintner
- John West

- And all the others who follow me around out there!

Questions?