

Santa Cruz River MAPS Network

Quick History:

- MAPS (Monitoring Avian Productivity and Survivorship) is a nation wide bird banding effort designed to measure vital rates and monitor bird populations
- BirdWorks was established to hire and train aspiring biologists in field ornithology through small contracts for inventory and monitoring.
- Most work has involved single MAPS stations operated on Federal Land.
- Gradual shift in focus from site oriented management reports to regional understanding of bird populations as project has matured
- Currently have 5 stations
 - 3 in Santa Cruz River Network (NPS)
 - 1 on San Pedro River (BOR)
 - 1 in Ramsey Canyon (Training Site)



This work funded by:

**The National Park Service,
Desert Southwest Cooperative Ecosystem Studies Unit**

Key Points

A network of banding stations was established in 2010 to find out

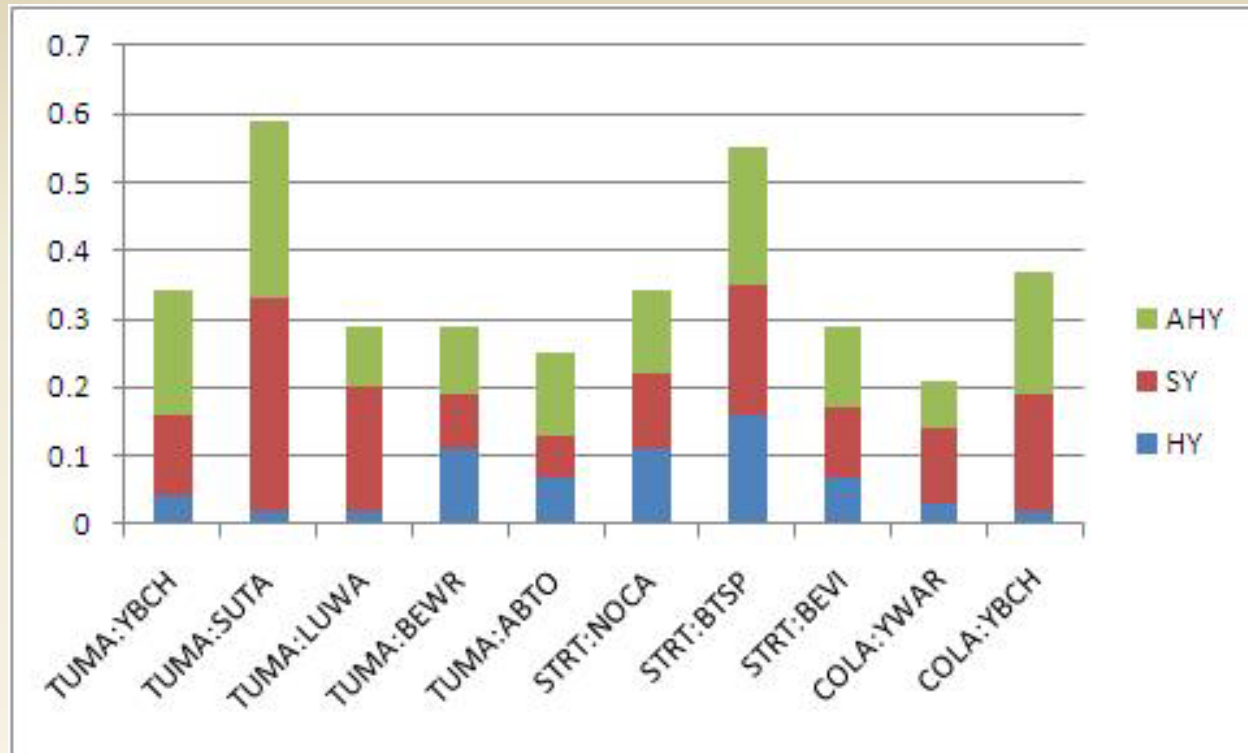
1. What is the spatial scale for natal site fidelity – *i.e.* how big is the neighborhood for a one year old returning after it's first winter away from home?
2. What is the spatial extent of the breeding populations on the Santa Cruz River – are there several small, weakly connected populations within the Santa Cruz, a larger connected population for the Santa Cruz Watershed or do the populations extend both within and between watersheds
3. Can dispersal distance, site fidelity and home range size be used to figure out population structure for a range of resident and migratory species?

Motivation

1. After 10 years of banding at Tumacacori National Historical Monument (TUMA:TUMA) and at the Santa Rita Experimental Range (STRT:FLAC)
 1. Very few birds banded as fledglings have been subsequently recaptured
 2. The few birds trapped between TUMA:TUMA and STRT:FLAC have been birds in migration (i.e. birds using the Santa Cruz as a corridor)
2. Second Year birds (birds in their first breeding season) get re-captured multiple times across multiple years
 1. Did these birds fledge at TUMA:TUMA and just escape capture?
 2. Is the “population” at TUMA:TUMA recruiting breeders from other sites (i.e. is TUMA:TUMA a sink)?
 3. Birds cover larger areas, even after fledging. Does natal site means an area much larger than the study site?

Return Rates Within Stations

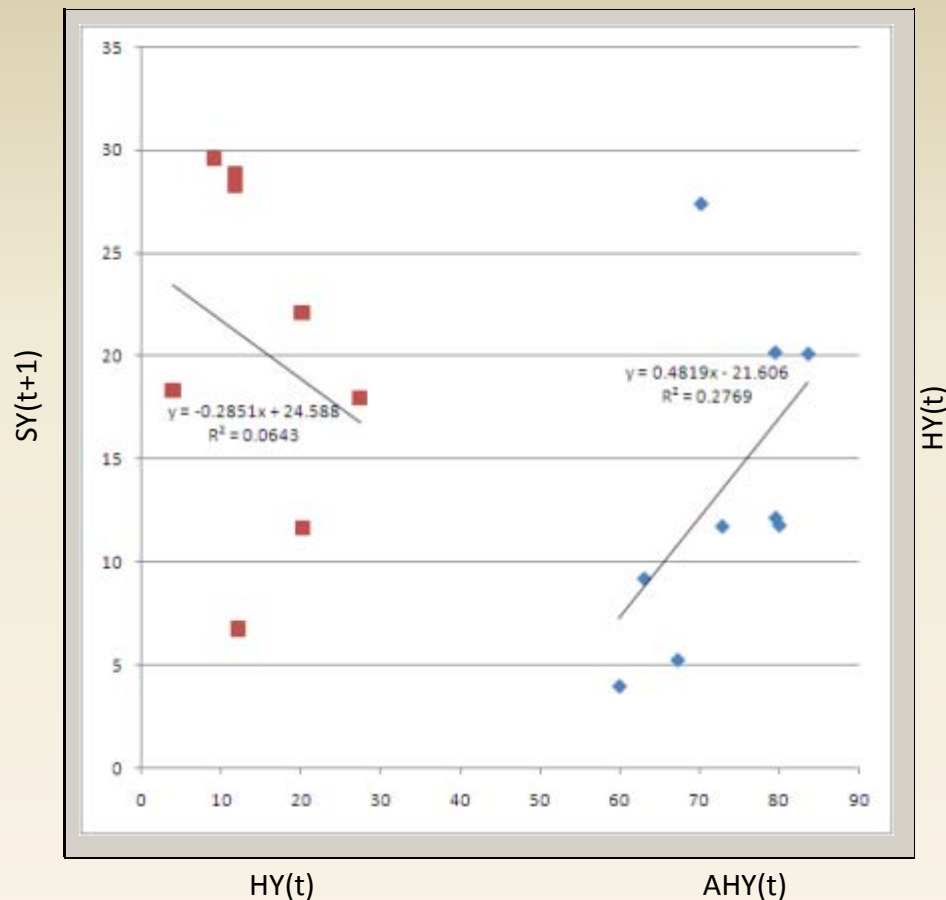
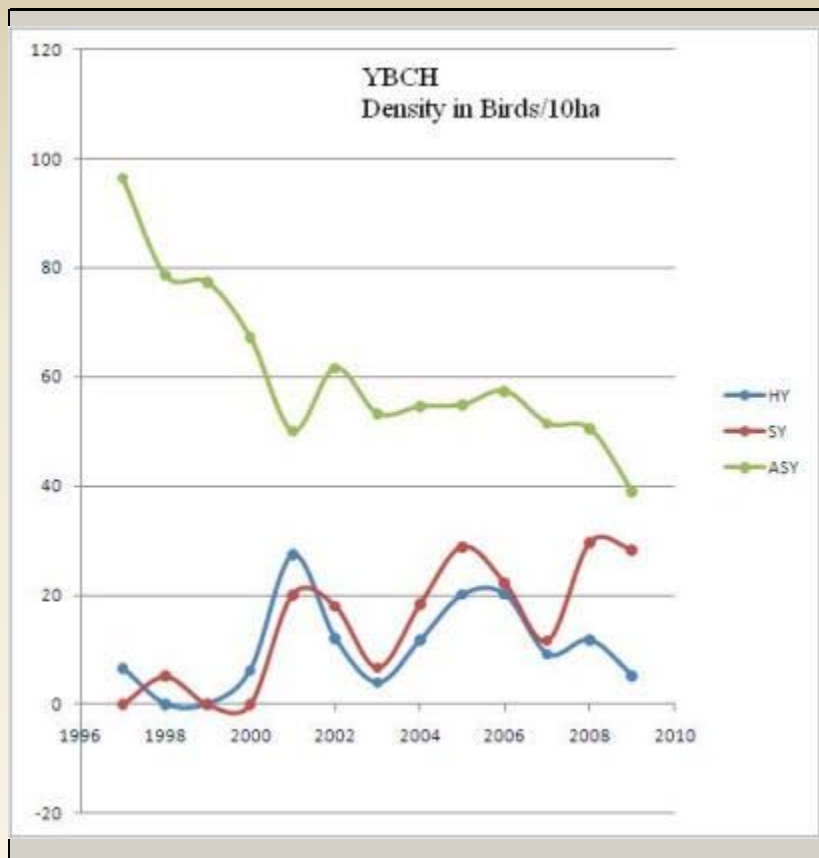
OK..what is the probability that a bird of a given age gets re-trapped a year or more later?



Yellow-breasted Chat (*Icteria virens*)



YBCH – Time Series/Correlations



If all second year birds are produced locally, then there should be 1 year lag between peaks of HY and SY – note that HY and SY birds peak in the same years!

Plot SY(t+1) against HY(t) and we'd expect a positive correlation – we don't see it. Why not?

TIME SHIFT

So....

Did these birds fledge at TUMA:TUMA and just escape capture?

Probably not....

the number of HY birds is much lower at time t than the SY birds at $t+1$

if so, then SY's get a lot easier to capture in the following year

Is the “population” at TUMA:TUMA recruiting breeders from other sites (i.e. is TUMA:TUMA a sink)?

Maybe....

ASY numbers appear to be declining ... but HY and SY numbers peak in the same year. Conditions may favor a support an influx of floating SY birds **and** favor high fledgling rates (TUMA is a source) and/or the SY's may add to the breeding population (TUMA is a sink).

Do nearby sites show similar patterns?

Birds cover larger areas, even after fledging. Does natal site means an area much larger than the study site?

Are the HY birds produced at TUMA showing up as SY birds at other sites? If so, what determines how far do birds move from their nesting site?

Station Locations



First 10 years:

- TUMA & FLAC
- 15 miles, 1000ft
- TUMA – 6772 indivs
- FLAC – 4818 indivs
- Only 4 birds banded at one site captured at the other.

CONCLUSION:

Spatial scale too large to look at recruitment. Need stations close enough to get interchange and far enough to measure dispersal

TUMA MAPS Station



- NPS funded work since 1997
- Initial 13 years focused on single station operation
- 2 primary habitat types:
 - Cottonwood/Willow Gallery
 - Hackberry/Mesquite Bosque
- Station size ~ 40 acres
- 15 nets/4 hours per session

TUMA & STGR



TUBA



Between Station Retraps – Preliminary Data

BAND	FROM	TO	SPEC	LAST RECORD	FIRST RECORD	DISPERSAL TIME		FIRST AGE
						Years	Days	
122236840	TUMA	STGR	ABTO	8/25/2007	5/28/2010	2.8	1007	HY
160141692	STGR	TUMA	BEWR	7/11/2010	7/23/2010	0.0	12	HY
181154449	FLAC	TUMA	BLGR	6/15/2003	6/5/2004	1.0	356	AHY
181154449	TUMA	FLAC	BLGR	6/5/2004	6/13/2004	0.0	8	AHY
190197618	TUMA	FLAC	ATFL	4/18/2004	5/23/2004	0.1	35	ASY
191131192	TUMA	STGR	BEWR	10/14/2006	7/11/2010	3.8	1366	HY
191131397	FLAC	TUMA	MGWA	8/26/2007	2/9/2008	0.5	167	HY
195132039	TUMA	STGR	SUTA	6/4/2010	7/25/2010	0.1	51	ASY
195132067	TUMA	FLAC	NOCA	4/14/2007	7/22/2007	0.3	99	SY
195132094	TUMA	STGR	SUTA	5/19/2007	5/28/2010	3.1	1105	SY
195132277	TUMA	STGR	SUTA	5/30/2009	6/4/2010	1.0	370	ASY
195132343	TUMA	STGR	BCFL	5/6/2006	5/7/2010	4.1	1462	AHY
195132398	TUMA	STGR	SUTA	7/8/2006	8/6/2010	4.1	1490	AHY
223044323	TUMA	STGR	YWAR	7/26/2003	6/25/2010	7.0	2526	ASY
225179317	TUMA	STGR	YBCH	7/21/2007	5/7/2010	2.8	1021	ASY
226108201	TUMA	STGR	YBCH	7/3/2010	7/11/2010	0.0	8	ASY
226108201	STGR	TUMA	YBCH	7/11/2010	7/16/2010	0.0	5	ASY
228163330	TUMA	STGR	YBCH	6/11/2010	7/2/2010	0.1	21	SY
230147565	TUMA	STGR	NOCA	10/13/2007	6/25/2010	2.7	986	HY
230147615	TUMA	STGR	BCFL	5/3/2008	7/25/2010	2.3	813	ASY
231152128	STGR	TUMA	BEWR	7/25/2010	8/6/2010	0.0	12	HY
233137904	TUMA	STGR	ABTO	6/28/2008	5/28/2010	1.9	699	HY
233137999	TUMA	STGR	BHCO	7/18/2009	5/7/2010	0.8	293	SY
233138091	TUMA	STGR	SUTA	7/7/2009	5/7/2010	0.8	304	ASY
233138110	TUMA	STGR	SUTA	6/4/2010	7/25/2010	0.1	51	ASY
233138129	TUMA	STGR	SUTA	8/9/2009	6/4/2010	0.8	299	SY
233138129	STGR	TUMA	SUTA	6/4/2010	6/11/2010	0.0	7	SY
233138292	STGR	TUMA	SUTA	6/11/2010	7/23/2010	0.1	42	ASY
234128319	TUMA	STGR	DCFL	8/9/2009	7/25/2010	1.0	350	HY
234128342	TUMA	STGR	GTTO	4/30/2010	5/7/2010	0.0	7	ASY
235040948	TUMA	FLAC	BEVI	8/6/2005	3/22/2009	3.7	1324	HY
244119205	STGR	TUMA	YBCH	6/11/2010	8/6/2010	0.2	56	ASY
246031131	TUMA	STGR	YWAR	8/12/2006	6/4/2010	3.9	1392	AHY
252073773	TUMA	STGR	LUWA	6/7/2008	6/4/2010	2.0	727	AHY
254061854	TUMA	STGR	BEVI	8/9/2009	7/2/2010	0.9	327	AHY
254135196	STGR	TUMA	BLGR	7/2/2010	7/23/2010	0.1	21	ASY

Summary

Maybe...the best place to raise young is the place a bird was fledged. But...

If it is a good place, it's probably still occupied by mom & dad. So...

Natural Selection may balance the benefits of returning to a good nest site against the probability that it is still occupied.

Questions for the Santa Cruz MAPS network:

- How is home range related to dispersal distance?
 - Within years
 - Between years
 - Natal Dispersal
- How should stations be arranged to estimate
 - Density
 - Recruitment
 - Survivorship
- How to apply source/sink concepts to poorly defined population boundaries?