THE CALIFORNIA BLACK RAIL REPORT

A NEWSLETTER FOR LANDOWNERS COOPERATING WITH THE CALIFORNIA BLACK RAIL STUDY PROJECT

http://nature.berkeley.edu/~beis/rail/

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It's hard to believe that this is the sixth year of **The Black Rail Project**! We started surveying wetlands on public and private land in the foothills of Butte, Nevada, and Yuba Counties in 2002. Every summer since then we've been out in the field with our tape recorders, playing Black Rail songs to try and detect the presence of these extremely elusive tiny birds. Almost never seen, even by bird experts, the smallest rail in the world— size of a sparrow—lives right in our backyards and pastures, wherever there's a persistent small, densely vegetated, shallow watery spot. Without the cooperation of private landowners we would never be able to carry out our research. So we would like to use this year's newsletter to summarize for you what we're finding out.

The table below shows how we've grown over the last five years. Every year we've been adding new Black Rail sites. By returning year after year to the same locations we're beginning to piece together an understanding of how this tiny bird is managing to exist on its little wetland islands, fragments of habitat in a sea of dry grassland, oak woodland, pastures, roads, and houses. We're coming up with methods for studying wild animal populations as they co-exist with humans in the real world. Note that our simple methods continue to give us a high probability of detecting the birds. We're encouraged to notice that "Local Extinctions" continue to be balanced by "Local Colonizations", and that there have been no drastic changes in the total proportion of wetlands occupied by the rails.

Table Summarizing Black Rail Sites for 2002-2006

	2002	*2003*	*2004*	*2005*	*2006*
No. of Sites Surveyed	109	126	131	169	195
No. of Sites with Black Rails (% of sites)	69 (63%)	70 (56%)	69 (53%)	90 (53%)	115 (59%)
Survey-specific probability of detection *(p)*	0.77	0.87	0.89	0.86	0.81
Estimated percentage of sites occupied (accounting for imperfect detection)	66%	56%	53%	54%	59%
No. Sites with Local Extinctions (% of sites)	-	18 (14%)	10 (8%)	9 (5%)	11 (6%)
No. Sites with Local Colonizations (% of sites)	-	5 (4%)	8 (6%)	11 (7%)	18 (9%)
No. of Sites on Public Land (% of sites)	46 (42%)	49 (39%)	48 (37%)	74 (44%)	82 (42%)
No. of Sites on Private Land (% of sites)	63 (58%)	77 (61%)	83 (63%)	95 (56%)	113 (58%)

What makes this study so interesting is the existence and apparently successful persistence of this rare bird in a landscape that is predominantly private land rather than specially set aside wild reserves or parks. **It's the reason that we come to you year after year to seek permission to come onto your property to try and detect the rails, and the reason we'd like to express our gratitude to all our loyal cooperators. We hope we can continue this very fruitful relationship**.

The Curious History of the California Black Rail

Despite being known to science for almost 150 years, new information on the distribution of the highly secretive California Black Rail continues to accumulate as previously unknown populations are discovered. Black Rails were first collected in 1859 on the Farallon Islands, a barren, rocky group of islands located twenty-seven miles west of the Golden Gate. This was probably an occurrence of extreme vagrancy, but really characteristic of rails in general who are known to take long, erratic flights and to settle often on Pacific Islands where they evolve in isolation into new and often bizarre species.

In the early 1900's Black Rails were irregularly reported in salt and freshwater marshes along the Pacific Coast from Puget Sound to northern Baja California and at a few scattered inland locations. Until the mid-1940's people thought that the main breeding area was at San Diego Bay until a juvenile Black Rail turned up walking around somewhat dazed in a suburb of San Francisco. This stoked long-held suspicions that Black Rails bred in saltwater marshes bordering San Francisco Bay. Systematic surveys from the mid-1970's to the present have confirmed the presence of breeding populations of California Black Rails in locations in the San Francisco Bay estuary and in several other coastal marshes to the north.

In 1969 a new inland breeding population was discovered along the lower Colorado River near Yuma, Arizona in freshwater wetlands, some of them artificially created. This followed the mysterious occurrence in 1962 of a single dead bird found at the Gray Lodge Wildlife Area in Butte County, California. We began to wonder if there might be populations of Black Rails in other fresh water marshlands far from their expected coastal habitats. Then in 1994 researchers at the Sierra Foothill Research and Extension Center near Browns Valley (The "Field Station", as it is locally known) discovered a breeding population right here in the foothills of Yuba County. It wasn't long before further searches turned up numerous occurrences of the rails throughout the lower foothills of Butte, Nevada, and Yuba Counties, and with sporadic occurrences elsewhere. This led to the creation of our Black Rail Project to study this very unusual distribution.

The discovery of new populations raises lots of interesting questions. Were Black Rails present in the foothills in the past and just overlooked, or have they recently colonized? Are there other populations of Black Rails out there, just waiting to be uncovered? We aren't ready to answer any big questions, but it's clear there are more rails out there in more places than anyone ever imagined.

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We've been trying to see if Virginia Rails, much larger than Black Rails and very common, live in the same wetlands as Black Rails. This might not be such a good thing for Black Rails. So far it seems the two live in close proximity at about 25% to 38% of our sites. We don't think there's a negative relationship. It's a great excuse to show off some of Orien Richmond's (see last page for info on Orien) unusually fine photos of rails. He took this one laying on his belly in a wetland at the Spenceville Wildlife Area. He also took the picture of the Black Rail peeking out of the vegetation that we've used for the logo at the top of the first page of this newsletter.

Fitting the Black Rail Project into the "Big Picture"

For a long time biologists have studied patterns of biodiversity on islands. The famous theory of **island biogeography** developed by world famous biologists MacArthur and Wilson asked a very simple question: Why do we find an animal on one island but not another? They based their theory on two very simple ideas. First, larger islands should have a lower extinction rate because larger islands are more likely to have bigger populations. Bigger populations should be better at resisting environmental or other fluctuations than smaller populations. The second idea is that more remote or isolated islands should have a lower colonization rate, because more isolated islands are less likely to be reached by dispersing individuals. To sum up, large islands that are close to other islands should have more species (less extinction, more colonization), while small islands that are far from other islands should have fewer species (more extinction, less colonization).

In the last few decades scientists wondered if these basic "rules" should work not only for real islands surrounded by water, but also for "pseudo-islands" created as a result of habitat fragmentation. For example, small patches of forest surrounded by rangeland or agriculture are effectively "islands" for those forest species that cannot use the in-between space. The Black Rails in the Sierra foothills represent a naturally "patchy" population because they occupy small freshwater marshes that are surrounded by a matrix of un-useable habitats (annual grassland, oak woodland, pasture, etc.). By recording the presence or absence of Black Rails in numerous wetlands with different sizes and degrees of isolation, we are trying to test some of the basic predictions that come from island biogeography.

So what have we found? Well, it turns out that marsh area is related to the chance that a patch goes locally "extinct" (unoccupied). Larger marshes are more likely to stay occupied and smaller marshes are more likely to go locally extinct. As expected, marsh isolation is related to the chance that a patch becomes colonized. More isolated marshes are less likely to be colonized and marshes with greater connectivity are more likely to be colonized. Somewhat surprisingly, isolation also seems to be important for local extinction. More isolated marshes are more likely to go extinct from one year to the next compared to less isolated marshes. We think this may be due to the so-called "rescue effect," where patches that are on their way to local extinction get rescued by colonists from a nearby patch. While area and isolation are two very important factors that determine how occupancy changes over time, we are also investigating the effects of habitat quality on local extinction and colonization. You might predict that a large, well-connected site should remain occupied, but what if habitat quality is poor? We are also trying to identify what measures of habitat quality are most important (for example, water conditions, vegetation composition or structure, etc.).

The world's habitats are becoming increasingly fragmented by human alteration of the landscape. With its scattered distribution, the Black Rail is an ideal study species for investigating the effects of area, isolation and habitat quality on local colonization and extinction. By better understanding these relationships in Black Rails, we hope to develop new knowledge that may help to manage other fragmented populations.

HOW YOU CAN HELP

Please fill out the enclosed postcard and mail it as soon as you can. This can save us a lot of time in trying to reach you by phone to get permission to survey for Black Rails. We appreciate your cooperation, and as always pledge to respect your privacy, close all gates, and be speedy and quiet as we go about our business. A hearty **Thank You!**

Ah, Science!!: More Results = More Questions

Our observations over the past five years (2002 – 2006) have documented over 48 cases where sites occupied in one year were subsequently unoccupied in the following year (termed "**local extinctions**") and 42 cases where initially empty sites were subsequently occupied in a following year (termed "**local colonizations**"). These local extinctions and colonizations likely reflect larger processes occurring in this distribution of sub-populations that form the whole population (which we call a "metapopulation").

Key questions include:

1. ***What causes local extinctions?***
    a. Are patch size and local habitat variables important?
    b. Is the surrounding landscape important?
    c. Does heavy grazing contribute to local extinctions?
    d. Does proximity to development contribute to local extinctions?
    e. What are the characteristics of sites that are resistant to local extinction?
2. ***What causes local colonizations?***
    a. Are site isolation and local vegetation characteristics important?
    b. Is the surrounding landscape important?
    c. Do different grazing practices contribute to local colonizations?
    d. What are the characteristics of sites that experience local colonization?

We have begun to answer some of these questions by building models (sophisticated statistical tests) that relate environmental variables to observed events. While our results are still preliminary, it appears that local colonization and local extinction depend strongly on the two classic variables from island biogeography: area and isolation. Local colonization happens less at more isolated sites (as expected) and sites that are fed by irrigation water. The fact that local colonization is associated with irrigation water suggests that habitat restoration or creation may be an effective conservation strategy for this species. Local extinction happens more often at fringe wetlands (for instance, thin strips of vegetation around ponds), more isolated wetlands, and smaller wetlands. The fact that extinction is more likely at more isolated sites again suggests that sites close to other occupied wetlands may get "rescued" from local extinction by timely colonization events. Perhaps more interesting are the factors that *did not* appear to explain these transitions. We examined the effects of surrounding habitat (grassland, oak woodland, urban, distance to roads, etc.) and found no strong relationship with either local colonization or local extinction. We examined livestock grazing and found no strong relationships, except a positive association between grazing and local extinction in the transition from 2002 to 2003. We are building additional models to examine these relationships in greater depth, and look forward to reporting further results in next year's newsletter.

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A Bird in the Hand

In last year's newsletter we told the story of Julie Jones on Sicard Flat Road who rescued a Black Rail from both her dog and cat, rushed it to a rehab center, and then released it to the wild once it had recovered. Once again Julie makes headlines: This time the rail walked onto her back porch the evening of May 16 last year, confused and perhaps injured. Again Julie took it to rehab to check it out, and then released it to the marsh behind her house. But not before getting this fantastic photo, showing the Black Rail's characteristic flaming scarlet eye (this isn't camera "red-eye") and unusually big feet. Julie has seen and handled more Black Rails than have most living ornithologists!! What's going on over there at Sicard Flat Road, anyway?

WHO WE ARE. This research was begun in the late 1990's by **Jerry Tecklin**, a Research Associate at the University of California Field Station where he was stationed for sixteen years. For several years the California Department of Fish and Game contracted him to look for Black Rails in the foothills. He knows Yuba, Nevada, and Butte Counties as if they were his own backyard, which in a way they are! Over the years, many of you have been contacted by Jerry for permission to enter your property.

Five years ago **Dr. Steve Beissinger** began to work with Jerry to found **the Black Rail Study Project**, the current long-term study we are now doing. He is a distinguished professor in the Department of Environmental Science, Policy, and Management at the University of California Berkeley, and a nationally recognized leader in studying rare birds and their conservation: our Chief Cruncher of Numbers. **Orien Richmond** is a Ph.D. student of Steve's. This is his third year in the field, as he works on his dissertation on Black Rails. The whole project is mainly his responsibility for the next couple of years. We are pleased to have **Caitlin Bell,** a Cornell University grad with us this year to do the greatest part of our field surveys. You'll most likely run into her more than any of us; or else you'll be seeing our other newcomer to the project **Stephanie Chen,** a Berkeley undergrad we are happy to have as an intern.

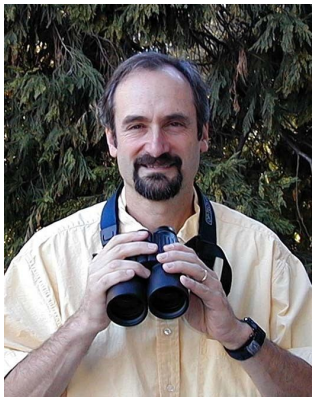
You can always contact us by calling the Field Station, 530-639-8804; or emailing us at jetecklin@ucdavis.edu, orien@nature.berkeley.edu, or Dr. Beissinger at beis@nature.berkeley.edu. Consider visiting our website: http://nature.berkeley.edu/~beis/rail/. There you will find pictures as well as sound recordings of these birds (look under "Links"), and lots of other information.

So, here's the June-September 2007 Team

Caitlin

Orien

We plan to invite you to our first annual **Black Rail Bar-BQ** as our field season comes to an end in August. No Black Rails will be served but we hope you will attend to share a meal with us and let us present our findings for the year. Look for an announcement in the mail.



Steve

Jerry

Stephanie