

7 January 2016

Dear Friends and Family,

Eileen and I hope that you are doing well. We've had a good year with some notable milestones, interesting travel, and positive developments towards retirement.

Starting with the latter topic, in August we had a review with our financial advisor, as we do each year. Based on the results of the analysis, we decided that I could retire after receiving a stock grant early in September, 2016, which now is just 8 months away! For a long time it seemed that retirement was always a decade in the future, but now it is finally happening. This will occur a bit before my 59th birthday, after almost exactly 30 years in the workforce since obtaining my Ph.D. Our criterion for retirement is to have and subsequently maintain an 85% probability of not running out of money, given our anticipated budget and an allowance for some international birding. This probability will be reevaluated yearly using Monte Carlo simulations, with partial adjustment if we get ahead (freeing up some extra funds) or behind (leading to a reduction in international travel).

As we decided more than a decade ago, we are planning to divest ourselves of most of our belongings, sell our house, and live nearly full-time on the road. We will have a new Alaskan camper built; we love our current one, but could use some more storage space and some upgrades. The new camper will mount on a flatbed (creating a lot of extra storage area where the side walls of the pickup bed would normally be), and will have a number of improvements, including a more convenient 12-volt refrigerator, a hot water heater (nice for our external shower), and a mounting system making it easier to get the canoe on and off the roof.

We plan to spend about ten months a year on the road, in the camper, and two months a year in El Paso, where Eileen's parents and her brothers Paul and Rob live. We'll likely live in an extended stay facility. By changing our domicile to Texas, we'll eliminate state income tax and save on other costs such as medical insurance and vehicle registration. The mid-winter break will give us a chance to catch up on medical appointments, see family, and carry out more intensive research with reliable broadband signal. We've drawn up a detailed plan of attack, which would have us driving off from our house for the last time early in October, giving us about two months of wandering before reaching El Paso.

There's a lot more I could say about our plans, but that seems like enough for this year's letter. Moving on to work, my first full calendar year with ON Semiconductor went pretty well. It is somewhat less fun working for a large company (ON has 24,000 employees) than a small one (Aptina had about 650), but it has been more lucrative because of good stock grants, bonuses, etc., which, with recovery of the housing market, have helped enable retirement in 2016. I again

expended a lot of energy on strengthening our patent portfolio, running half a dozen inventing sessions, and beating the stretch goal for number of disclosures generated by our business unit. I also worked hard on improving our technology roadmaps (long-term research and development project plans) and using them to greater advantage.

Eileen still volunteers at the UC Santa Cruz Arboretum, and an increasing amount of her time has been devoted to projects related to preparation for retirement. There is a lot to do when you are downsizing by more than one order of magnitude (the camper plus the pickup cab is around 140 square feet). For example, we've nearly finished sorting through four packed drawers of file folders, primarily containing travel information, tossing most of it (now available on the internet), and scanning as much of what we keep as possible (paper maps being the most common exception). It's actually been fun to work through our travel info and remember all the great places we have been and can hope to visit again before too long. But the scanning is quite a chore and Eileen is thankful for Pandora.

Eileen continues to enjoy gardening, drawing, crocheting, and country music (Miranda Lambert is a current favorite). Eileen also likes watching television while racking up steps on the treadmill; good finds this year on Amazon Prime were the mini-series "John Adams" and the British "Doc Martin". She reads voraciously, still visiting the library frequently but also downloading a lot of books to our Kindles. Some of her favorite books this year were: "Mad, Bad, and Dangerous To Know", an autobiography by Ranulph Fiennes; "Wildlife Wars: The Life and Times of a Fish and Game Warden" by Terry Grosz; "Snow in the Kingdom: My Storm Years on Mt. Everest" by Ed Webster; "101 Kruger Tales: Extraordinary Stories from Ordinary Visitors to the Kruger National Park", edited by Jeff Gordon; and "Battles and Leaders of the Civil War". The latter is a four-volume set with accounts written by military leaders on both sides, who were directly involved in the battles described. The accounts were written and published about two decades after the war. Some works of fiction she enjoyed were the two most recent books in the Mitford series by Jan Karon, and the most recent Shopaholic book by Sophie Kinsella.

I also read a fair amount and from my selections this year would particularly recommend "Blind Descent: The Quest to Discover the Deepest Place on Earth" by James Tabor. We both read quite a few books on outdoor adventure including exploration, mountaineering, and journeys by foot, canoe, kayak, boat, bicycle, etc. But this book opened up a whole new area for us, the exploration of deep caves, which was fascinating. I also follow two forums on the internet; one is on truck camping, and the other is mammalwatching.com, which I discovered early in the year. I had been looking for a site like the latter for years; the website has lots of information on places to look for interesting mammal species, and the forum is a great place to ask questions about particular species or places and read trip reports from around the world.

Our property did suffer some setbacks this year. We had to have two formerly beautiful tanbark oaks removed, which had died from sudden oak death. These trees dominated the view from our loft windows, and they were one of the things I loved about the house when we first saw it, so this was a very sad event. However, the removal of the trees did open up the view quite a bit, which is now dominated by redwoods, so it is still very pretty. Even worse, though, the drought (quite the worst in history in California) claimed the knobcone pine over our corner deck, which is our most important tree for wildlife, as essentially all birds visiting our feeders and bird baths perch in it as they approach. We've taken off the most dangerous branches and will leave it standing until shortly before we put the house on the market. Seeing a drought-adaptive native species like this succumb really brings home how serious the drought is. There are many other reports of similar situations elsewhere in the region.

We only added one new species in the yard this year, a flyby Osprey, #76. We also heard one flock of Red Crossbills go over in December; we had this species only one winter in the preceding eight. In other yard news, when a family of Striped Skunks started visiting at dusk during the summer, to eat bird seed on the ground, Eileen decided to work on habituating them. She sat outside each evening with coffee and a book, and put seed on the deck around her chair. Eventually the skunks learned that when they finished that seed they could pull on her blanket and she'd put some more seed down. There were two that would allow her to pet them by the end of the summer. They are beautiful animals and she really enjoyed feeding them and watching their behavior up close.

In my spare time late in 2014 and early in 2015, I completed a pretty detailed analysis of the options our homeowners' association (HOA) had with regard to water supply. We currently have our own water treatment facility, but it requires water tank replacement, is a hassle to maintain, does not provide adequate water pressure nor volume for fire-fighting (quite a concern with the drought), and is not cost-competitive with only 25 homes in the HOA. I concluded that the best solution was to hook up to a private water company with a good supply point nearby, and the Board was convinced and set up a secret ballot (required by Calif. law) to decide the matter. There was strident debate on the matter, but the measure was approved with one vote to spare.

We started gearing up for the \$80K construction project when the minority sent a letter of demand to cease the work, claiming that the process leading to the vote was not legal. The arguments were debatable but there were threats of lawsuits, and in the end 5 of 6 Board members resigned or had terms lapse. In the intervening 8 months, the issue has continued to be investigated and debated at a glacial pace. A firm was retained to repeat and expand my analysis, and they are close to finishing, so discussions will begin anew pretty soon. The most likely option looks to be keeping the existing system and installing a new tank next to an existing tank – which is right on our property line, with access only via our “driveway”. If this were

constructed this fall, it could interfere with our ability to sell our house at retirement. I guess this all provides further proof that no good deed goes unpunished.

In the fall, my attention turned to solving the problem of our personal database of natural history records. Although we use commercial software (Avisys) to keep track of our bird lists, everything else is tracked with applications I wrote myself, which run on a personal data assistant (PDA). When I created these apps in 2007, the only viable platform was VisualCE running on the WindowsCE operating system. With the development of smartphones, PDAs and WindowsCE are approaching extinction, and so I needed to develop new applications before our current PDA dies (expected soon, based on the lifetime of our first one). Fortunately VisualCE now has an Android version (DroidDB), so I purchased that and bought an inexpensive smartphone with a fairly large screen for data entry. By disabling the cellular signal (it won't be used as a phone at all), battery life is sufficient for several days of use without recharging.

It has been a lot of work, but initial trials in the field have gone well. All our 18,000 personal records are now in a single database (used to be three separate ones because of size), and can be searched in seconds. The ca. 25,000 vascular plants and ca. 450 mammals of the continental US + Canada are predefined so they can be entered by just typing a few letters and then picking from a menu. A major improvement over my previous version is that the latitude, longitude, and elevation can be read in from the phone's GPS at the push of a button, rather than having to be transcribed from a separate GPS. It's sweet! One side benefit of incorporating the predefined databases is that when I created them, I was able to update about 9,000 botanical records that were 10 – 40 years old to current taxonomy. It was a major effort but now, for the first time ever, I actually have some idea how many species of native plants I've seen in North America (over 4500).

As for the past several years, much of our field work in the first half of the year was targeted at finding new native genera of plants to try to reach our goal of seeing 95% of the 993 or so in the state. This would require finding 20 new genera, a very challenging proposition given the difficulty of our remaining genera. I put together a tentative, rather difficult travel schedule for the year that would give us a chance at 35 new genera, but some trips dropped off because the destinations received inadequate rainfall, and others because we decided they involved too much driving for too little time in the field and too little potential. Ultimately, we looked for 25 new genera. A three-day weekend in March in the Tejon Ranch and Carrizo Plain netted three new genera, *Stutzia*, *Tetrapteron*, and *Hollisteria*, only the first at a location known in advance.

Another trip to the Carrizo Plain late in the month yielded Western Spadefoot Toad (an overdue new family for us). In our remote campsite early the next morning, we saw a dead Heermann's Kangaroo Rat, and commented that it was not there the previous evening, and wondered what had happened to it. Shortly after, Eileen saw a large Mojave Green Rattlesnake approaching her

chair; when she moved, it retreated under a shrub. A little later we spotted the snake eating the dead kangaroo rat, which took about 5 minutes, after which it slithered away directly to a hole where it went underground. It seems likely the snake had attacked the kangaroo rat the night before but had been disturbed before it could consume it, perhaps by us returning from a nocturnal walk. It was quite a sequence of events to see!



Heermann's Kangaroo Rat being eaten by Mojave Green Rattlesnake, Carrizo Plain NM, Calif.

On April 10 we left on a 9.5-day trip to the east Mojave Desert, the only area of the state with any concentration of native genera we had not seen. The challenge was that all of them were genera we had searched for unsuccessfully before, and most were annuals that would not even have germinated unless an area had received decent rain over the winter. But the majority of the key areas had gotten approximately average rainfall, which we hoped would be good enough. We had truly remarkable success, finding ten new genera: *Canbya*, *Glyptopleura*, *Oxystylis*, *Androstephium*, *Chaetadelpa*, *Peteria* (very rare in Calif.), *Prenanthea*, *Streptanthea*, *Sibara*, and *Schoenus* (our last sedge genus in the state). We missed only four genera for which we searched, an excellent success rate. If there had been less rain, we probably would have found four and missed ten instead. The scenery and camping were great on this trip, but mammal populations were low from the drought and birds were unremarkable.

Our big trip of the year was a road trip from home to west Texas; there is an account of it at the end of this letter. For purposes of the genus quest, I'll just note here that the California segment yielded three new genera, bringing us within four of our goal.

Traffic in the Bay Area and adjacent Central Valley has become worse each year we have lived here, and it really has started to negatively affect our trips. If we have to head north or east from

home on Friday (historically true for maybe 2/3 of our trips), we have to allow an extra 1½ to 2½ hours, compared to 9 years ago, because of traffic delays. As an example, in late June, a drive to Mono County, which would have taken a barely tolerable 6¼ hours in 2009, instead took 8 ¼ hours, even though we left at lunch time. Here we searched for five new genera, of which we found two, *Ionactis* and *Polyctenium*. The *Polyctenium* involved a nice 6-mile hike to a dry lake (wet in winter), where we counted almost 200 of these rare plants, and also saw Pronghorns close to their southernmost occurrence in California.



Lilac Sunbonnet, *Langloisia setosissima*, Pahrump Valley, Inyo Co., Calif.

I was running a patent session at the ON Semi site in Boise on the day after the 4th of July weekend, so we turned it into a short trip, and with help from people on the mammalwatching forum, looked for several new mammals. At The Nature Conservancy's Silver Creek Preserve, we spent a morning working on Montane Vole and finally got good looks, when one froze above-ground instead of diving into a burrow. The high point of the trip was the high point on the Owhyhee Scenic Byway, a 6075 foot elevation height-of-land with high-quality sagebrush. We quickly found Merriam's Ground Squirrel here, and then started slowly walking back and forth through the sagebrush, searching for Pygmy Rabbit, one of the cutest North American

mammals, and a difficult one to see. After about an hour, I finally caught a glimpse of one, which we then trailed for the better part of another hour, slowly and quietly following it until we finally got good views of it foraging. This has been one of our most wanted mammals for a long time and it was wonderful to finally see it!

In mid-July we spent a four-day weekend in northern California trying to finish our genus quest. We left early Thursday morning instead of Wednesday afternoon to try to avoid traffic and this was successful, though it cost us half a day because of the later start. We had four possible genera and needed two to reach 95%. Our first two searches were unsuccessful, one presumably because of drought, and the other potentially because the original record was a misidentification.



Sunset view from our campsite, Cinnabar Canyon, Bodie Road, Mono Co., Calif.

Our third target, *Lactuca*, was a longshot, the record being 45 years old, but to our surprise we found a few plants in a tiny piece of suitable habitat. So it all came down to *Howellanthus*, a genus recently segregated from *Phacelia*, and containing a single species with a small range. We camped at Scott Mountain Summit, the location from which the species was first described, and where we were confident of finding it. But in the morning we could not locate any plants, so we crossed the mountains and tried Gumboot Lake, another known area southwest of Shasta Lake.

Here we spent an hour examining every plant until we found a few *Howellanthus* leaves that were turning yellow, the plants already wilting on a date when they should just be starting to flower. Once we had the search image of the yellowing leaves, we found a number of additional plants in an hour and a half of careful scrutiny. Ultimately we found a couple of fruits on plants, one of which we dissected to count the seeds, which mercifully clinched the identification, and completed the genus quest! We started this project after five years in the state, at which point we had seen about 75% of the genera; it has been our primary focus for the last four years, during which we have tracked down almost 200 new genera to reach 95%. Whew!

We turned our attention back to mammals for a while, building up for our third mammal big day on August 9. It was quite a remarkable day, and a separate account is included at the end of the letter. A few days later Jon Hall, who started the mammalwatching.com site and forum, was passing through the Bay Area, so we took him to Pinnacles NP for Western Mastiff Bat, and live-trapped California Mouse for him around our home. It was great fun to meet him and spend some time together. Soon thereafter I was running another patent session, this one in Rochester, NY, where an imaging company that split off from Kodak (Truesense), was acquired by ON Semi. This gave us a great opportunity to catch up with many friends from the Kodak years in Rochester, and we had a wonderful 5-day visit.

In early September we headed off on a 20-day trip to Europe. This trip was organized around business travel to Slovakia, Belgium, and Germany. Birding began the afternoon of Sept. 6, which was spent at the Waghausel wetlands south of Frankfurt. This area had a nice selection of birds including Eurasian Hobby, 11 species of waterfowl, and 6 species of shorebirds (waders). On Sept. 7 we birded along the Black Forest High Road, finding 4 lifers: Citril Finch, Spotted Nutcracker, Black Redstart, and Common Magpie. We enjoyed the boreal habitat here and noted a number of plants that were new or that we had only seen as non-native species in North America. The next day we visited a pass that concentrates migrants, near Wolschwiller, France. Unfortunately, there were only a small number of birds passing through when we were there, but this included the only Red Kites of our trip. On Sept. 9, we spent the day at Haff Remich in Luxembourg, a very nice area of wetlands. Long-tailed Tit was a highlight here, and by now we had the call of Chiffchaff down pat; this was the most commonly encountered migrating songbird throughout our trip.

The next day was spent in transit to Vienna, with a small amount of birding there in Donau Auen NP, where Yellow-legged Gull was a lifer. We spent Sept. 11 at Nuesiedler See NP, where White-tailed Eagle, Temminck's Stint, and European Hare were new species for us. The next day we returned to Donau Auen NP for a full day, finding two lifers, Song Thrush and Grey-headed Woodpecker. The riparian woodlands growing in sandy deposits from the Danube River were a very interesting habitat. Sept. 13 was our last day in Austria, and we spent it in the foothills an hour southwest of Vienna, where we saw one life bird, White-throated Dipper, and enjoyed the scenery and several fern species rare in North America.

The next week was spent in Bratislava, Slovakia, where I had a conference and Eileen extensively toured the area with several other spouses of attendees. We arrived in Brussels mid-day on Sept. 19, where Stephen Boddington met us at the airport and guided us to Nieuwpoort, Belgium, a nice estuary. Lifers here were Eurasian Spoonbill, Firecrest, Linnet, and a flyby European Turtle Dove. On Sept. 20, we birded with Bram Vogels for the day. Early morning was spent counting migrants from a hilltop over a lake north of Antwerp. We had hundreds of songbirds, including numerous flocks of Coal and Blue Tits; in October, they record thousands of songbirds per day. The rest of the day Bram showed us around the Dutch coast, where the numbers of birds were staggering; we saw several flocks of Eurasian Golden Plover each containing on the order of a thousand individuals. The final list for the trip was 124 species of birds, with 14 lifers. We also identified 45 species of plants, of which about 2/3 were new for us.



Eurasian Spoonbill, the Netherlands.

Back in California, we took one pelagic trip in October, out of Half Moon Bay, hoping for Black Storm-Petrel, which Eileen has not seen. But the trip was a bit of a dud, with a crowded, small boat, and it was somewhat rough. We did, however, see remarkable numbers of Black-vented Shearwaters, which was nice. We did our annual pilgrimage to the Sacramento Valley refuges

over Thanksgiving, which was fun as always. The most unusual bird was a hybrid Eurasian x American Wigeon.



Yellow-rumped Warbler, Colusa National Wildlife Refuge, Sacramento Valley, Calif.

Finally, the reason this Christmas letter is late is that ON Semi shut down for 2 weeks over Christmas and New Year's weeks, so we took a 17-day camping trip to the Baja peninsula in Mexico. I did one trip there in the summer of 1983, and then Eileen and I did a trip together in December 1990. Baja is still safe, though we avoided being near the border cities when it was dark. We had dinner with our nephew Thomas in San Diego Co. and crossed the border the next morning, Dec. 19. Although our primary goal was to explore the isolated Sierra de la Laguna mountain range in the Cape District (the southern tip), we allowed ourselves 6 days to drive down the peninsula, so that we could sample the flora along the way. It is not practical to drive in Baja in the dark because of the number of cattle in the road, and we had only 10 hours of daylight at this time of year, so our days were well circumscribed. Camping along secondary roads and dirt tracks was more difficult than when we were there previously because a lot more barbed wire has been put up – though, oddly, there also seemed to be even more cattle in the road!

In my two previous trips combined, I had only identified about 25 plant species, mostly the spectacular large plants of the Great Central Desert such as Cardon (related to Saguaro but

larger, with more branches) and Cirio (related to Ocotillo). This time we were armed with a lot more knowledge, a complete flora of the peninsula for keying, and a good photographic guide. On this trip we noted somewhat over 150 species and we were not even entering into our database species common in California. Around 100 of these were new for us. We enjoyed stops at several locations that we knew well from the previous trips, including Catavina (arroyos with elegant Blue Fan Palms), San Ignacio (reed-bordered lagoon with good birding), and Guerrero Negro (excellent waterbirding and photography on the way to the old salt loading wharf).



Cardon (left) and Cirio (right), Great Central Desert, Baja Calif. Norte, Mexico.

The big day of the trip was the hike into the northern Sierra de le Laguna. This trek was 12 miles round trip with 2900 feet of elevation gain, reaching 5300 feet elevation. We started shortly after sunrise and got back a bit after sunset. The downhill hike was grueling because the surface was so hard and steep; it was tough on knees, calves, and feet, and we could still feel the effects the next day, which is rare for us. The birding was very good. We found three individuals of our principal target, Xantus' Hummingbird, which occurs only in the Cape District of Baja, and which I had missed on previous trips. Wintering songbirds were in large flocks, including numbers of Lark and Clay-colored Sparrows, and Hooded Orioles everywhere. The local population of Acorn Woodpecker has dark red eyes (rather than golden-colored), which is

interesting, and the local Cassin's Vireo may be a distinct taxon. We camped for several nights near the wash called Arroyo de la Choya, where one evening we had six Zone-tailed Hawks circling low overhead at one time, by far the largest collection I have ever seen. The only problem with the roadside campsite was that cattle kept walking by during the night, with their cowbells ringing constantly.

We had cloudy weather in the Cape District, and some campsites with unfavorable visibility, and so did not get to see the Southern Cross, as we did on our last trip. We did not visit the very tip of the peninsula given what a tourist destination Cabo San Lucas and San Jose del Cabo have become, but the adjacent mountains remain rural and largely unspoiled. On the drive home we allowed fewer days, covering about 250 miles per day. We saw a number of flocks of Lark Buntings, got some excellent views of the endemic Gray Thrasher, and had a flock of about 200 seabirds in Bahia de la Concepcion, mostly Blue-footed Boobies but also a few Brown Boobies and Magnificent Frigatebirds. I saw a green flash while standing outside the camper at a military checkpoint, as the soldier searched the camper; we have seen only one before (this is a phenomenon in which the light at the last instant before sunset is refracted by passing through the atmosphere at grazing incidence, separating the colors like a prism, and making the green color visible for a moment). The low point of the trip was the day spent crossing back into the U.S.; we had a 3-hour delay at the border (even though we went to the less crowded Otay Mesa station) and ended up having a 13-hour day in the truck. We got back mid-day on Jan. 3 and I was back in work the next day. It would be nice to visit again in spring when the numerous endemic cacti are flowering and thus potentially identifiable.

Eileen and I hope that you and your families are doing well. We always like to hear from people or have them visit if in the area; our contact info is given below. Happy holidays!

Brian and Eileen Keelan

keelan@warpmail.net

[Home Page](#) [Photos](#)

831-331-1507 (Brian's cell)

831-331-9590 (Eileen's cell)

580 Burnside Bend

Boulder Creek, CA 95006

California to Texas Road Trip, Spring, 2015

Our big trip for the year ran from May 12 – June 6 and was our first really significant road trip going outside the state since we moved here in 2006. The trip was inspired by a week-long course on bat acoustics in southeast Arizona, which we extended as far as Big Bend NP in west Texas to give us chances at almost all the remaining bat species we had not seen in the western U.S., as well as chances at a few birds Eileen had not yet seen, plus a few plants. Our first stop

was about 4 hours away, west of the Carrizo Plain. Here we searched, for the umpteenth time, for *Aristocapsa*, a tiny plant known from only two places in the world. This year we had gone as far as pouring water over about ten square feet of likely looking habitat earlier in the year, to see if we could get this mythical annual to germinate. We arrived to find no plants in the watered area, but continued to search. Eileen called me over to look at something about 20 feet away and we had been looking for this species for so long that it literally did not even occur to me that she might have found it, but she did!! It was a thrilling moment and an adorable plant.



Aristocapsa insignis, Rte 58, west of Carrizo Plain, San Luis Obispo Co., Calif.

The next day in the Antelope Valley and San Gabriel Mountain foothills we tracked down two more new genera, *Goodmania* (on about our 5th try) and *Sidotheca*. After detouring to Phoenix so I could give a presentation to ON's CEO at corporate headquarters, we backtracked to the Colorado River, where we recorded a few Cave Myotis and heard several Ridgway's Rails, a recently split off species that we had no record of Eileen having encountered, though she almost certainly had. Our next stop was Organ Pipe NM. This park has had a difficult time in this millennium, having to close off most of the park because of security concerns with illegal aliens crossing the border from Mexico. We wanted to visit remote Quitobaquito Spring, just a hundred yards from the border, to try to record Underwood's Mastiff Bat. This species in the U.S. has only been found in one county, and this spring was the only known location on public land. But nobody had been there to monitor them in over a decade because of the closure.

When I saw that the monument was reopened in September of 2014, I called to see if we could try recording at the spring. The Park was interested in learning if this rare species were still present, so they encouraged me to apply for a research permit, which I did, and it was approved. They sent two rangers with us and the visit was coordinated with the Border Patrol, with whom the rangers maintained radio contact. In the past, one challenge with detecting this bat was that they were outnumbered by about two orders of magnitude by Pocketed Free-tailed Bats. I was worried about this because once our detector is triggered by a bat, there is a long dead time because it has to play it back out 10x time-expanded, so less than 10% of the time can actually be spent recording. With the free-tails triggering the detector, would there be any chance of getting a mastiff?

After a tour of the spring complex, which we had last visited in 1999, we set up and waited for bats to appear. Finally, about half an hour after sunset, having recorded only a couple of pipistrelles (common, tiny bats), suddenly we were inundated with mastiff bats. They are so large that their echolocation call is marginally audible to humans. I could barely detect them with my hearing loss, but could hear the real-time frequency-shifted output of the heterodyne detector, and then the beautiful time-expanded version. For 20 minutes there was acoustic pandemonium as the detector triggered continuously and we obtained many high-quality recordings. Then, as abruptly as they arrived, they departed, leaving us in a resounding silence, like that in Barber's *Adagio for Strings* – a remarkable moment. The free-tails showed up 20 minutes later and then monopolized the recorder for the rest of the evening. It seems we were lucky, with either the mastiff roost sites moving closer, or the free-tails' moving farther away, so they were so nicely separated in time. This whole experience – the rarity of the species, the challenge of visiting the location, the beautiful evening and setting, the fine company, and the amazing appearance by the bats – ranks this as one of the high points of the year for me.

The next evening found us camped in the Pajarito Mountains to try for Buff-collared Nightjar. This nocturnal bird, in the same genus as Whip-poor-will, is a rare breeder in southeast Arizona; I flushed one in daylight in Chino Canyon in 1986, but had never heard one, and it would be a life bird for Eileen. We were able to camp right in a breeding territory, and so heard the birds well many times during the night! The next morning we hiked into California Gulch, and had great scope views of Five-striped Sparrow, another life bird for Eileen. We ultimately saw five birds, including two doing a dramatic display involving trilling and raised tails. Montezuma Quail and Varied Buntings were nice bonuses.

Our next stop was Madera Canyon for Botteri's Sparrow. These grassland inhabitants are not common but are pretty reliable in August after monsoonal summer rains, but Eileen had not been to the region in that season and so had never seen one. They are also present in spring but rarely sing and I have never found them then. We hiked for about 40 minutes in a strong wind that I felt

reduced our chances from low to near-zero, but then I heard a faint song fragment that possibly could be one. We spent another 10 minutes listening and scanning. Finally I spotted the bird at close range and got a scope on it, giving us great views for about five minutes! It sang so softly that it was hard to hear even though it was only 30 feet away.

That evening we recorded bats at Agua Caliente County Park outside Tucson. I had called ahead for permission and we were met there by four biologists, two of whom, it turned out, would also be at our bat class as field assistants. Our target here was Western Yellow Bat, and we obtained a number of good recordings of this species, which particularly likes to roost in the dead fronds that hang along the trunks of fan palms. The next evening found us in Cave Creek Canyon in the Chiricahua Mountains, where our bat workshop would begin the following day. We recorded in the evening at Ash Spring and there added Southwestern *Myotis* to our life list.

The bat workshop was truly excellent –the instructors worked incredibly hard (did they ever sleep?), the group was very friendly, we learned a great deal, and the location is one of our favorite areas. One highlight was obtaining ultrasonic recordings and infrared video footage of bats visiting hummingbird feeders, which allowed us to conclusively identify the species (Mexican Long-tongued Bat), a lifer for us. We also caught and recorded Lappet-browed Bat, a spectacular species that was new for Eileen. She especially enjoyed “processing” the bats we caught in mist nets, which involved identifying, weighing, measuring, recording data, and releasing. Some of the bats were pregnant and you could feel the unborn young. A rigorous protocol was followed to avoid transmission of white nose disease, even though it has not been detected this far west.

I supplied many recordings we had made of several rare species to Joe Szewczak, the instructor who wrote the bat identification software we use, SonoBat. He will use these to augment reference files and train algorithms to recognize these species. He kindly gave me a copy of his professional software package, worth \$1500, in appreciation for the recordings. This package does automatic classification of calls, identifying them by mathematical analysis. The algorithms are hardly infallible but they provide a great second opinion. I have since analyzed all our past recordings using the classifiers and have found a number of misidentifications in this way, mostly early recordings we did. The workshop and the professional software have really taken me to the next level of expertise in acoustic identification, which is very satisfying.

After the workshop ended, we continued driving east to El Paso, where we spent a couple days visiting Eileen’s family, before continuing to Big Bend NP. We camped at five different locations, each chosen to give us a chance of recording one of three target species of bats. Thunderstorms interfered with two nights of recording and insects making sounds at bat-like frequencies were an issue on two of the nights, but overall we did very well. We were successful in recording two range-restricted species, Big Free-tailed Bat (at three of the locations), and Ghost-faced Bat (Rio

Grande Nature Trail). The latter species has a very unusual acoustic signature and hearing it on the heterodyne I figured there was nothing else it could be – this was one of the most exciting moments of the trip. We never detected the third species, which was not unexpected, as it usually does not arrive in Big Bend from its wintering grounds in Mexico until later in the summer.



Young Greater Roadrunner, Rio Grande Campground, Big Bend NP, TX.

On our last full day, we hiked the Lost Mine Trail, a favorite, looking for Robust Cottontail, a species of limited distribution that has recently been split off from Eastern Cottontail. We had no luck on the rabbit but there was a fine selection of plants and beautiful scenery. Fortunately, early the next morning, I saw the cottontail in the Basin Campground as I left the restroom. I quickly got Eileen, who ran barefoot to get a look. There were a few tense minutes until it reappeared and she saw it well. This was her 200th native mammal species in the continental U.S. and Canada, a huge milestone! We did one more night of bat recording, at Washington Ranch near Carlsbad Cavern NP in New Mexico, and also spent one unsuccessful evening trolling for White-sided Jackrabbit in southwest New Mexico. There are only about 60 left in the U.S., all in the Animas Valley, and it also is believed to have largely disappeared from its limited range in Mexico – this is a species in serious trouble.

Our last natural history stop on the trip was in Joshua Tree NP on our way home. We have worked hard to see all the species of cacti in California, but a recent taxonomic split created a new species we had not seen, Chuckwalla Cholla, and we duly tracked this down. In total, on this trip, we found all 4 of our target plants in California; all four of our target birds in Arizona; and 7

of 9 target mammals – one of our most successful trips ever, especially considering the difficulty of many of the species.

Mammal Big Day 2015

Three mammal big days run in central California in the last few years have yielded significantly higher totals than the few other attempts in the U.S. of which I know. These included 31 and 30 native species in August of 2014 and 2013, respectively, from Peter Pyle, Floyd Hayes, and Sarah Allen, joined in 2014 by Gary Fellers and Pat Kleeman. They covered Point Reyes National Seashore from midnight to dawn, spent much of the daylight on a pelagic trip to the Farallon Islands, and covered other Marin Co. locations in the evening. My wife Eileen and I tallied 27 natives in August 2014. We covered Santa Cruz Co. from midnight to early morning, took a half-day whale-watching trip on Monterey Bay, briefly sampled the west edge of the Great Valley, and spent the last 5.5 hours of the 24-hour period at Pinnacles National Park.

When I read about the two big days in the North Bay area, I was very impressed by their midnight to dawn segment, which was well scouted and delivered outstanding variety. Their Farallons pelagic leg produced just under one new species per hour, a fair result, but their evening route had a relatively low yield. In comparison, our midnight to early morning segment was decent but nothing special; and our daytime whale-watching and Great Valley foray yielded under 0.5 species per hour, which was dismal. But the evening at Pinnacles was excellent, adding 2 species per hour, a very high yield for the last quarter of a big day. So I wondered if the first 2/3 of their route could be combined with our evening segment to yield a higher total than likely on either route alone. This involved an extra drive of over 2.5 hours with no expected new mammals, but it appeared feasible. So Eileen and I proposed the idea to Peter and Floyd, and it was agreed, leading the four of us to attempt the route on August 9, 2015, the date of Debi Shearwater's summer Farallons trip (Sarah, Gary, and Pat were unfortunately unable to join us).

The pre-dawn segment at Pt. Reyes was indeed excellent, with 21 species by 5:36, including Aplodontia (heard only) and Badger. We found three species not recorded in this area on either of the two previous big days. Hairy-winged (Long-legged) Myotis was flying over the bridge on the Abbott's Lagoon Trail; the ID was based on full-spectrum recordings, analyzed nearly in real time on a laptop. Nearby, Floyd conscientiously flipped each of a set of canoes that had flattened the vegetation under them, and the last one produced a tiny dark mammal scurrying away. "Look -- a mole!" "No, it's a shrew!!" "NO, IT'S A SHREW-MOLE!!!"

The final surprise was seen as we peeked over the bank above White House Pool, when an adorable Western Harvest Mouse emerged from the sedges at the water's edge, sat in the open just ten feet away for perhaps 15 seconds, and then hopped along the bank, allowing us to follow it briefly. This was a lifer for everyone! But somehow, that morning, we missed Raccoon, a species that seemed to be everywhere on Pt. Reyes during the previous two years.

As Eileen and I did not see a California Vole under one of the canoes, Peter paddled us across an estuary branch to an island opposite his house, and flipped over many pieces of plywood until the situation was rectified. Thanks, Peter! One of the great nemeses of the previous big days, Sonoma Chipmunk, finally deigned to appear in Peter's yard shortly before the mandatory departure for the boat, instead of just after, as in past years.

The trip to the Farallons was pretty similar to those of the preceding two years -- outstanding for pinnipeds (all possible species), but somewhat disappointing for cetaceans (only Harbor Porpoise and Humpback Whale). The birding was unique, with Northern Gannet (only Pacific record), Brown Booby, and Blue-footed Booby all visible on the cliffs in a single binocular field, which also included Tufted Puffin as an outgroup! Thanks to Debi Shearwater for organizing this trip and allowing us to arrive at the last minute.

As our boat passed back under the Golden Gate Bridge, and we got a cell signal again, Eileen's traffic app indicated that we had our choice of routes with no major traffic delays, giving us perhaps 30 minutes to spare. So we took Route 101 south to look for a staked-out Bottlenose Dolphin at Oyster Point (within San Francisco Bay!), courtesy of Bill Keener, and then headed for Pinnacles. A scouted colony of California Ground Squirrels had the distinction of being our 32nd species, breaking the previous U.S. record.

After setting up the tents, we hiked up to Bear Gulch Reservoir for bats. We had recorded 5 bat species before dawn, and hoped to double that in Pinnacles. We added Western Pipistrelle along the trail, and at the reservoir, Eileen called out the first Western Mastiff (Greater Bonneted) Bat. This is the largest bat in the U.S. and has an echolocation call that is audible to the unaided ear. After recording Dark-nosed (Small-footed) Myotis and Silver-haired Bat, we started back down at 10:30 p.m. Once back inside the woodland canopy we added California and Long-eared Myotis, finishing the day with 11 bat species, of 16 possibilities in the region.

Back at our vehicle around 11:10 p.m., we trolled the few short roads of the park, finally locating Raccoon, which Eileen and I had managed to miss the year before. After seeing Desert Cottontail, we found the 42nd and final species, 8 minutes before midnight: a Heermann's Kangaroo Rat, in the same general area Eileen and I had seen it in two of the three preceding years. Pinnacles had added 10 species in 5.5 hours, impressive for our having arrived with 32 species! Our total of 42 native species ties what our team believes to be the world record set by Charles Foley in Tanzania (Birding 37:128-130, 2005).

American Birding Association big day rules require that 95% of all species be detected by all team members. This is a sensible rule, though I have always thought it a bit generous for birds (being largely diurnal and vocal). But it is a real challenge on a mammal big day. Between brief

glimpses, faint calls, little slip-ups, and exhaustion during batting, only 32 of our 42 species were detected by all, though 37 were detected by at least three of us.

We had rather good fortune most of the day, so I do not think it would be easy to top this list. The key would probably lie in finding a way to see more cetacean species with fewer hours on the water.

Thanks to Floyd for compiling the table below, listing the species in chronological order, with estimated numbers of individuals. An asterisk denotes a species not detected by everyone.

#	Time	Species (number)
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1)	00:08	Striped Skunk (2)
2)	00:11	Common Gray Fox (4)
3)	00:14	Mule Deer (37)
4)	00:14	Coyote (4)
5)	00:28	Deer Mouse (9)*
6)	00:33	Badger (1)
7)	00:47	Elk (1; heard only)
8)	01:34	Mountain Beaver (Aplodontia) (2; heard only at known colony)
9)	01:53	Brush Rabbit (7)
10)	02:30	Long-legged (Hairy-winged) Myotis (2)
11)	02:32	California Vole (2)
12)	02:32	Shrew-mole (1)*
13)	02:33	Brazilian Free-tailed Bat (1; heard only)
14)	03:31	Dusky-footed Woodrat (1; heard only at nest)*
15)	03:46	Bobcat (2)
16)	03:51	Northern River Otter (2; heard only)*
17)	03:58	Western Harvest Mouse (1)
18)	04:30	Pallid Bat (8)
19)	04:30	Yuma Myotis (5; probably seen at roost, confirmed with bat detector)
20)	05:15	Townsend's Big-eared Bat (20)
21)	05:36	Black-tailed Jackrabbit (11)
22)	06:01	Harbor Seal (220)
23)	06:50	Sonoma Chipmunk (3)
24)	07:24	Western Gray Squirrel (1)
25)	08:13	Harbor Porpoise (10)
26)	08:47	California Sea Lion (2,500)
27)	11:44	Steller Sea Lion (35)
28)	11:59	Northern Fur Seal (800)
29)	12:04	Northern Elephant Seal (6)
30)	14:57	Humpback Whale (1)
31)	16:55	Common Bottlenose Dolphin (1)
32)	17:56	California Ground Squirrel (10)
33)	19:56	Western Pipistrelle (20)
34)	19:56	Merriam's Chipmunk (1; heard only)*
35)	20:40	Greater Bonneted (Mastiff) Bat (10)
36)	20:58	Dark-nosed Small-footed Myotis (1; heard only)*
37)	21:17	Silver-haired Bat (4; heard only)*
38)	22:49	Long-eared Myotis (1; heard only)*
39)	22:51	Californian Myotis (1; heard only)*
40)	23:26	Northern Raccoon (2)
41)	23:37	Desert Cottontail (1)*
42)	23:52	Heermann's Kangaroo Rat (1)