

LOOKING BACKWARD: Dec. 31—Jan.1, 2014

As I said a year ago, conventional (Shapiro) wisdom has it that the first year of a drought is good for butterflies, but the second is bad. How about the third? 2014 was the third drought year, as was much-discussed in the media. I was able to maintain the tempo of site visits, despite a serious accident on Sept.11 that had me in the hospital for 3 days, and knees that are increasingly unforgiving on Castle Peak. Here are the numbers of site visits in 2014 vs. 2013:

Site, 2013 visits, 2014 visits:

SM 31,32; GC 32,30; WS 34,33; NS 32,33; RC 31,33; WA 21,21; LC 18,18; DP 18,21; CP 7,9; SV 18,20. Totals 233, 250. That 250 is second to 2012 (256) for most field days.

We'll look at MIGRATORS and LOW-ELEVATION SITES first.

The rainfall season was less bizarre than 2013—there were small storms throughout, spaced reasonably enough to prevent catastrophe. While the annuals started off stunted, spring showers jump-started them and by late spring the annual grassland looked reasonably normal. The riparian overstory looked normal all year, though the understory began to show serious stress by September. Good autumn rains caused a rapid greening at the end of the season. Poison oak, snowberry and wild rose were the most-stressed understory species; late in the season the Blue Oaks in the foothills did not undergo early leaf senescence, as many had last year. In Rancho Cordova the areas burned in arson fires in 2013 had a bumper crop of annuals in 2014 as compared to the unburned areas. Late-season bloomers like *Eriogonum nudum*, *E. wrightii*, *Euthamia*, *Heterotheca oregona*, *Holocarpha*...had some degree of stunting and reduced flowering, but *Trichostema* was happy as a clam, and covered as usual with *Ochloides sylvanoides*.

The CA Tortoiseshell, *Nymphalis californica*, remained in limbo. It was never recorded at Gates Canyon at all (vs. once last year). The only other low-elevation record was 1 at Suisun on iii.1 (the only low-elevation *N. milberti* of the year was seen there the same day!). Here are the day-positives for *N. californica* for the last three years in the Sierra:

Year	LC	DP	WA	SV	CP	Total
2012	3	3	4	1	4	15
2013	2	4	9	0	5	20
2014	3	3	8	0	5	19

Again, I had no reports or observations of breeding, *anywhere*.

The Painted Lady, *Vanessa cardui*, had a much stronger spring migration than last year—reflecting better rains in the desert--, but a weak and very prolonged fall one. Here are summary counts for the low-elevation sites, dividing the season into halves on viii.1:

Site 2014>viii.1	2012<viii.1 2012>viii.1	2013<viii.1 2013>viii.1	2014<viii.1 2014>viii.1		
RC 4	37	10	25	45	106
GC 4	15	19	9	35	121
WS 7	44	18	27	37	116
NS 2	55	22	32	38	140
SM 16	35	42	20	77	159
Totals 33	186	111	113	232	642

The pattern is pretty obvious!

The Monarch, *Danaus plexippus*, held about constant at (low, low) numbers, but unlike recent years maintained a constant summer presence in the Valley. Again, breeding was not observed at any of my sites. But as of this writing there appears to be widespread breeding on exotic milkweeds in the East and South Bay counties, with some success (Jan.2, 2015) but pockets of disease as has been observed in similar winter breeding in coastal SoCal. Here are cumulative 3-year adult counts at my lowland sites:

Site	2012	2013	2014
RC	2	2	4
GC	13	5	5
WS	5	8	11
NS	8	8	4
SM	10	17	18
Totals	38	40	42

Again for the second straight year, no breeding was seen at either LC or SV. At LC, *Asclepias cordifolia* was devastated by a black-spot disease in 2013 and the biomass this year was only about 10% of what it was before the plague. Will it recover?

The population dynamics of the Buckeye, *Junonia coenia*, have been extremely erratic. In 2012 it peaked early in the season, then crashed—a very unusual pattern. In 2013 it started strong, became scarce in midsummer, then exploded in autumn (especially at NS). In 2014 it peaked early at GC (vi.26, 35 animals), WS (vi.13, 53),

and NS (vi.11-80) and late at RC (x.11,37) and SM (x.13, 43). Though a few lingered into early winter, there was no autumn boom at most sites as is traditional. Total counts:

Site	2012	2013	2014
RC	93	143	173
GC	69	63	196
WS	74	188	247
NS	153	395	483
SM	101	95	132
Totals	490	884	1231

The near-absence of the Buckeye late in the season at NS was in dramatic contrast to 2013. It had actually been more abundant earlier in the season than it was in 2013.

The Buckeye was a constant presence, in low numbers, at the Sierran sites in 2014 and was briefly common at SV in autumn at Rabbitbrush.

And the Fiery Skipper, *Hylephila phyleus*:

Site	2012	2013	2014
RC	202	273	196
GC	26	34	22
WS	325	229	185
NS	351	444	325
SM	400	392	628
Totals	1304		1472
1356			

Larvae of this species are heavily preyed upon by the naturalized European Paper Wasp, *Polistes dominula*. So one might expect an impact on adult numbers—but there has been none detectable. And the wasp has almost completely disappeared from all the Valley sites, though it is commoner than ever at LC, where the infestation is centered on the PG&E gazebo.

Now for species of special concern (or, if you prefer, the flying dead):

All our low-elevation *Satyrium* have been at a low ebb, but they seem to be gaining ground, except some species at GC:

<i>S. sylvinus</i> :	WS 2012:0	WS2013:7	WS2014:0
	NS 2012: 20	NS2013: 22	NS 2014: 44

	GC 2012: 8	GC2013:5	GC 2014: 4
<i>S. californica:</i>	GC 2012: 13	GC2013: 16	GC 2014: 40
	RC 2012: 2	RC2013: 6	RC 2014: 4
<i>S. tetra:</i>	GC 2012: 2	GC2013: 1	GC 2014: 0 (grim!)
<i>S. auretteorum:</i>	GC 2012: 3	GC2013: 9	GC 2014: 17
<i>S. saepium:</i>	GC 2012: 3	GC2013: 3	GC2014: 2

Great Copper, *Lycaena xanthoides:*

NS 2012:5	NS2013: 12	NS2014: 31
WS 2012: 2	WS2013: 1	WS2014: 1
SM 2012: 4	SM2013: 4	SM2014: 1

The Yuma Skipper, *Ochlodes yuma*, which is always scarce, at SM went from 10 in 2012 to 2 in 2013 but back to 7 in 2014. These numbers are not significant.

The Silvery Blue, *Glaucopsyche lygdamus*, has bounced around erratically, partly due to fire:

NS2012: 0	NS2013:12	NS2014:3
RC2012: 15	RC2013:4	RC2014:6

Pyrgus scriptura is probably extinct at NS, though its host plant is just as abundant as ever:

NS2012: 0	NS2013: 1	NS2014:0
WS2012: 38	WS2013: 29	WS2014: 35
SM2012: 2	SM2013:3	SM2014:8

And *Pholisora catullus* may be extinct at NS, though there was one record in a backyard garden a half-mile away!

WS 2012: 37	WS 2013: 23	WS2014: 17
NS 2012: 4	NS 2013: 5	NS 2014: 0

Erynnis tristis is way down from last year's record highs, except at RC:

RC 2013: 24	RC 2014: 25
SM 2013: 9	SM 2014: 2
WS 2013: 35	WS 2014: 20
NS 2013: 42	NS 2014: 31

GC 2013: 31

GC 2014: 12

Both *Ochlodes sylvanoides* and *Poanes melane* had population explosions in 2012 and have been unsteady-to-contracting since:

<i>O. sylvanoides:</i>	2012	2013	2014
GC	161	229	81
WS	18	13	4
NS	59	60	20
RC	89	83	191
SM	40	11	50

P. melane:

GC	85	79	47
WS	20	7	1
NS	20	29	16
RC	2	4	4
SM	3	6	1

Indications are that both of these skippers will retreat back to their riparian strongholds after briefly reoccupying the suburbs. *Ochlodes agricola* was uncommonly scarce in the foothills.

Lorquin's Admiral, *Limenitis lorquini*, like *E. tristis* had its overall best year ever in 2013, but contracted in 2014, especially at WS, its traditional stronghold (not resident at SM, oddly):

RC2012: 8	RC2013: 34	RC2014: 14
GC 2012: 38	GC2013: 67	GC2014: 38
WS 2012: 37	WS2013: 61	WS2014: 21
NS 2012: 6	NS2013: 11	NS2014: 29

This species recolonized both RC and NS after years of absence there. It seems fine at NS. I'm not so sure about RC!

After disappearing from the entire vicinity, the Variable Checkerspot, *Euphydryas chalcedona*, returned in 2014; 7 were seen at GC from v.2 to v.25, including at least one female. It had persisted a few miles north at Cold Canyon but was not seen in the chaparral zone along the entire length of Blue Ridge Road in either 2013 or 2014!—despite Yerba Santa blooming up the yin-yang.

The Mourning Cloak, *Nymphalis antiopa*, having made major recent gains after regional near-extinction, may be slipping a little again:

RC 2013: 4	RC2014: 12
SM 2013: 1	SM2014: 1
WS 2013: 13	WS 2014: 12
NS 2013: 10	NS 2014: 3
GC 2013: 40	GC 2014: 27

The Pygmy Blue, *Brephidium exile*, arrived at my sites later than average and was scarce. At its metropolis at Suisun it peaked on x.13 (1473 animals), similar to 2013 (x.14, 1713). These are low, but not catastrophically low, peaks. Right now its breeding habitat is under ~5" of water.

The western Tiger Swallowtail, *Papilio rutulus*, continues on a roll after recolonizing Davis, but is losing ground at some sites:

SM 2012: 12	SM 2013: 21	SM 2014: 22
GC 2012: 40	GC 2013: 90	GC 2014: 47
WS 2012: 44	WS 2013: 63	WS 2014: 27
NS 2012: 28	NS 2013: 25	NS 2014: 31
RC 2012: 42	RC 2013: 57	RC 2014: 46

While the Pale Swallowtail, *P. eurymedon*, after a two-year eruption is down to below-average numbers:

GC 2012: 70	GC 2013: 53	GC 2014: 8 (!)
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The Anise Swallowtail, *P. zelicaon*, showed a lot of volatility, but it is maintaining a presence at all sites:

RC 2012: 5	RC 2013: 4	RC 2014: 2
SM 2012: 58	SM 2013: 13	SM 2014: 27
WS 2012: 3	WS 2013: 4	WS 2014: 1
NS 2012: 20	NS 2013: 31	NS 2014: 18
GC 2012: 8	GC 2013: 3	GC 2014: 1

The conspicuous winner in the population-dynamics sweepstakes has been the Gulf Fritillary, which continued to expand its range and its abundance despite a setback caused by a freeze a year ago:

RC 2012: 5	RC 2013: 18	RC 2014: 38
WS 2012: 0	WS 2013: 4	WS 2014: 12
NS 2012: 11	NS 2013: 16	NS 2014: 31
SM 2012: 0	SM 2013: 12	SM 2014: 18

Its increasing numbers are accompanied by a lengthening flight season; it's essentially an all-year bug now, subject to the killer whims of Jack Frost.

In 2012 my Valley sites showed a conspicuous return to the 1970s pattern of nearly-constant (and high!) numbers of species flying from mid-spring to late autumn, despite substantial seasonal turnover in the fauna. In 2013 there was a conspicuous dip in species numbers in early summer, with numbers then rising to an autumn maximum. 2014 was more like 2012 than 2013 at most sites, but not RC. Putting aside the things that are gone, like *Euchloe ausonides*, these drought years are remarkably reminiscent of the 70s. The maximum numbers of species recorded at low-elevation sites were: SM, 19 on ix.29; RC, 18 on v.28 and again x.11; WS, 21 on ix.30; NS, 22 on vi.11; GC, 29 on v.13. These were all slightly higher than in 2013, except GC was 2 lower. Strikingly, the peak dates in 2013 were very close to this year's—SM x.2, RC x.11, WS ix.22, NS vi.4, GC v.21.

Willow Slough (vii.4) had 19 species and 317 individuals, down from 22 and 918 in 2013—which was a dramatic reversal of recent fortune at a site whose fauna has long been in decline (largely driven by vegetational succession). The single biggest contributor to the decline was *Pieris rapae*, which crashed locally due to a drastic decline in its host plant, *Lepidium latifolium*, caused by a combination of drought and a pathogen (*Albugo*). This plant has been one of the drivers of succession that was destroying butterfly habitat, so the Cabbage White's loss should be everyone else's gain if the trend continues.

Overall, this third year of drought has had minimal visible impact on the Valley fauna, presumably because so much of it is riparian- and/or irrigation-associated. In the foothills some species either did not show up this year (e.g. *Thorybes pylades*, *Satyrium tetra*, *Speyeria coronis*) or were unusually scarce (*Callophrys dumetorum*, *Satyrium saepium*, *S. sylvinus*). One of the most striking observations is the complete lack of desert and subtropical strays. This was also true in the mountains. We still really have no idea why things like *Pholisora catullus* and *Pyrgus scriptura* are in such bad shape.

It was again a poor year for *Colias eurytheme*, with no big outbreaks. Highest numbers registered were: RC 44 (v.28), WS 22 (vii.21), NS 22 (v.3), SM 16 (x.13) and GC 25 (v.13). There were a remarkably high number of days at all sites when the species was not recorded at all. *Pontia protodice* had a low-level presence all season after May, with no local outbreaks.

In phenological terms, spring was predictably early. Of the 21 surviving indicator species monitored in the Valley since 1972 (two have gone extinct regionally), 1 tied for earliest first-flight date ever (*Hylephila phyleus*, ii.21), 8 were either 2nd earliest ever or tied for 2nd earliest (*Vanessa annabella*, i.2; *Pyrgus scriptura*, ii.1; *Vanessa atalanta*, i.2; *Phyciodes mylitta*, ii.13; *Papilio rutulus*, ii.16; *Pyrgus communis*, ii.1; *Atalopedes campestris*, iii.7; *Danaus plexippus*, ii.1), 2 for 3rd (*Plebejus acmon*, ii.21; *Vanessa cardui*, i.23) and 2 for 4th (*Nymphalis antiopa*, i.14; *Lycaena helloides*, iii.23). None had the 1st, 2nd, 3rd or 4th latest first-flight date. At Gates Canyon, of 16 indicator species monitored since 1976, there were 3 earliest (*Battus philenor*, i.25; *Incisalia iroides*, i.25; *Pieris "napi"*, i.25), 2 second (*Pieris rapae*, i.15; *Erynnis*

propertius, i.25), and 2 third (*Colias eurytheme*, i.25; *Adelpha bredowii*, iii.20 (note: there was an earlier sighting by W. Weathers). Here too, there were no latest firsts, though the newly-returned *Euphydryas chalcedona* got a fairly late start on v.2. One can score earliness of the season in a variety of ways, but by most of them 2014 was one of the 5 earliest seasons since the project began in 1972. Many species flew continuously into late autumn and then disappeared abruptly, though there was no weather event associated with this. WS dropped from 14 species on xi.9 to 4 on xi.17 and GC from 10 on xi.1 to 5 on xi.11. The others dropped less precipitously.

Not even one *Leptotes marina* was recorded (anywhere on the transect!) this year.

On to the SIERRA.

It was another year of poor snow pack and early melt-out. At Lang two species (*Nymphalis antiopa*, *N. californica*) were flying ii.23 and 4 (*N. californica*, *N. antiopa*, *C. echo*, *Pieris "napi"*) on iii.15. The first butterflies (*Nymphalis antiopa*, *Celastrina echo*) were recorded at Donner on iv.2, and by v.16 there were 18 species flying. At Castle Peak there were 3 species on v.27 (*Anthocharis stella*, *Colias eurytheme*, *Celastrina echo*), but just 10 days later there were 35. Peak species numbers were reached at LC on vi.1 (28), DP vi.8 (39), and CP vi.19 (40). The corresponding data in 2013 were LC vi.2 (42), DP vi.22 (32), and CP vi.29 (41). 32 had eclipsed 36 in 1983 (the "year of the big snow") as the lowest species maximum ever at DP, so this year was a decided improvement. But LC was terrible! CP was pretty average; the season ended early again, but 10 days later than last year. Donner, having been terrible in 2013, was much more normal in 2014 at least in terms of species counts and lists, but many things were exceedingly scarce (a few examples: *Euphilotes enoptes*, *Glaucopsyche lygdamus*, *Plebejus saepiolus*, *Lycaena arota*, *L. heteronea*, *Neophasia menapia*, *Ochlodes sylvanoides*, *Thorybes pylades*...). *Chlosyne hoffmanni* was way down, and of course *Nymphalis californica* was nearly absent. But *Pyrgus ruralis* had an outstanding year. None of the *Speyeria* had a good year, with *S. mormonia* especially low, and *S. coronis* commonest at CP! A propos frits, both *S. callippe juba* and *S.c. nevadensis* had the worst year I have ever seen. But it was the best year I've ever seen at DP for *Phyciodes orseis herlani*! All the montane *Satyrium* were low, especially *saepium* (everywhere) and *behrii* (SV). Both *Mitoura nelsoni* and *M. siva* were terrible.

Euphydryas editha was recorded at Donner for the first time ever on v.27—a seemingly fresh male. It has been taken sporadically as singletons hilltopping on Castle Peak, but is not resident there. The nearest known breeding colony is at the top of Grouse Ridge (~8000'). Ted Gilliland got another one at Donner on vi.7. It will be interesting—to say the least—to see if this is an actual colonization! There was one at Lang on vi.2.13, but none seen this year.

2013 was the worst year ever recorded at SV, and you may recall that all three species of *Cercyonis* collapsed—*C. silvestris* seen only twice, *C. oetus* once, and *C. pegala boopis* not at all. This was all unprecedented. The maximum number of species seen was 21 (vi.21); rabbitbrush bloomed out very early and the season ended by mid-October. Remarkably, 2014 was normal! The maximum number of

species was 25 (vi.28) but the numbers of species were higher than in 2013 the entire season (on viii.2.13 there were an incredibly-low 9 species; on viii.7.14 a much more normal 14...). There was still plenty of blooming rabbitbrush on x.29, with 3 species still flying. As for the *Cercyonis*, *C.p.boopis* was not only back, but had its best flight in years—from vii.25 through viii.17; *C. silvestris* was scarce and seen only on vii.25, and *C. oetus* vi.28-vii.25. *Atlides halesus* was recorded only on x.5. There was a huge late-summer/autumn explosion of *Phyciodes mylitta*, with hundreds of animals flying (but no aberrations found); these had bred on Canada Thistle, *Cirsium arvense*, which was nearly defoliated by the larvae.

Both *Strymon melinus* and *Junonia coenia* appear to have bred at LC, DP and SV in 2014. *Pontia beckeri* and *P. occidentalis* had a good year at SV; *P. protodice* was quite scarce. There was a rare record of *Speyeria mormonia* at SV on vii.25. Both *Polites sabuleti*-group entities were rather scarce at SV, “*verdi*” more so than *tecumseh*.

At WA the peak of species was 25 on v.22 (vs. 27 on v.14.13) and it was generally a mediocre season, with nearly everything scarce (except *Adelpha bredowii*, *Erynnis propertius*, and *Parnassius clodius*), no *Speyeria callippe juba* at all and very few west-slope *Hesperia “colorado”* - the unnamed serpentine animal that flies in autumn started early and flew viii.17-ix.20, by which time the dwarf rabbitbrush had nearly bloomed out. The weeping rocks were dry much of the summer, and the vegetation in the main canyon was severely water-stressed, with very little in bloom after early July. Numbers of all *Papilio* trended sharply down at all Sierran sites.

There were just enough thundershowers to keep the vegetation alive and prevent another 1992, when an early melt-out was followed by a total summer drought and all the vegetation dried up. This may in itself account for 2014 being decidedly better at DP and SV than 2013—the timing, not the amount, of precipitation looks to have been critical. I’m sure the statistics will show that the drought has had much more impact on butterflies in the Sierra than near sea level. But it has so far been less of a disaster than might have been expected. We’ll see how the recent noise plugs into the long-term signal.