LOOKING BACKWARD: Dec.31—Jan.1, 2015

Conventional wisdom (i.e., mine) holds that the first year of a drought is good for butterflies, and the second is bad. 2014 was the third. 2015 was the fourth—unprecedented in modern California history. I kept up the tempo of site visits, with nearly-identical numbers per site to previous years, to wit:

Site:	2013	2014	2015
Suisun Marsh	31	32	32
Gates Canyon	32	30	33
West Sacramento	34	33	35
North Sacramento	32	33	33
Rancho Cordova	31	33	31
Washington	21	21	21
Lang Crossing	18	18	18
Donner Pass	18	21	22
Castle Peak	7	9	7
Sierra Valley	18	20	20
Totals:	233	250	252

That's second to 2012 for most field days (256).

As we did last year, we'll look at MIGRATORS and LOW-ELEVATION SITES first.

As in the previous year, riparian vegetation fared well and showed little sign of water stress until the end of the season. There were numerous arson fires in North Sacramento but not in Rancho Cordova. The destruction was fortunately quite limited, with no essential resources being destroyed—though there was a loss of numerous Coyotebrush plants both in 2014 and 2015. By late September there was a general lack of nectar sources, especially in grassland. Many Coyotebrush plants in Rancho Cordova died, apparently of drought stress, further reducing the availability of nectar in autumn. Oregon Ash, Poison Oak, Snowberry, Elderberry and Wild Rose were heavily stressed late in the season. In West Sacramento the availability of Euthamia, Aster, Ammi and Helianthus was greatly reduced. But it was a good year for Hemizonia and Heliotropium. Unlike 2013 but like 2014, Blue Oak did not drop leaves early.

The CA Tortoiseshell, *Nymphalis californica,* remained in limbo. Hibernators were recorded at Gates Canyon, unlike 2014 (1 record in 2013): 3 on i.24 and 1 on ii.13. In addition, a fresh one was seen on iv.19, the only indication of any breeding having taken place in the Coast Range. Singletons were seen at Valley sites as follows: Rancho Cordova, 1 each on ii.2, ii.16 and x.7; West Sacramento, 1 on ix.25; North Sacramento, 1 each on v.4, v.16 and v.26. Both migrations thus appear to be represented.

Here are the day-positives for this species at the Sierran sites for the past four years:

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
2015	4	3	8	0	1	16

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

The Painted Lady, *Vanessa cardui,* had a much stronger spring migration than last year, which had in turn been much stronger than 2013 – but the fall migration at low elevation was barely noticeable:

Site	2012<viii.1, >viii.1	2013<viii.1,>viii.1	2014<viii.1,>viii.1	2015<viii.1,>viii.1
RC	37, 10	25,45	106,4	269,1
GC	15, 19	9,35	121,4	236,2
WS	44, 18	27,37	116,7	360,3
NS	55, 22	32,38	140,2	431,3
SM	35, 42	20,77	159,16	388, 12
Totals	186,111	113,232	642,33	1664,21

Draw your own conclusions!

The Monarch, *Danaus plexippus,* had its best year in a decade, breeding throughout the Valley all season long, and reversing a decline lasting decades!

Site	2012	2013	2014	2015
RC	2	2	4	6
GC	13	5	5	25
WS	5	8	11	24
NS	8	8	4	23
SM	10	17	18	86
Totals	38	40	42	164

There was breeding at SV on *Asclepias speciosa* but none seen at WA or LC on *A. cordifolia.* The colony of the latter at LC was reduced to only two stems after last year's devastating disease, however.

The Buckeye, *Junonia coenia,* had perhaps its best year on record, peaking early as in 2012 but becoming fairly scarce late in the season. It was present essentially all season long in the Sierra, including Castle Peak, where it was already present vi.25.

Site	2012	2013	2014	2015
RC	93	143	173	350
GC	69	63	196	269
WS	74	188	247	634
NS	153	395	483	1274
SM	101	95	132	391
Totals	490	884	1231	3818

The Fiery Skipper, *Hylephila phyleus,* as the preferred prey (larvae) of the introduced European Paper Wasp, *Polistes dominula,* was expected to decline but if so, did so only marginally and locally:

Site	2012	2013	2014	2015
RC	202	273	196	171
GC	26	34	22	69
WS	325	229	185	328
NS	351	444	325	454
SM	400	392	628	534
Totals	1304	1472	1356	1556

Now for the species of special concern, the flying dead!

It was overall a poor year for *Satyrium* at all elevations. For low elevations:

S. sylvinus WS 2012:0 2013:7 2014:0 2015: 4

NS 2012: 20 2013:22 2014:44 2015:10

GC 2012: 8 2013: 5 2014: 4 2015: 10

S. californica GC 2012: 13 2013:16 2014:40 2015:61

RC 2012:2 2013: 6 2014: 4 2015: 4

S. tetra GC 2012: 2 2013: 1 2014:0 2015: 3

S. auretorum GC 2012: 3 2013:9 2014: 17 2015: 7

S. saepium GC 2012: 3 2013:3 2014:2 2015:3

S. saepium was very rare in the Sierra, it was not recorded at Lang for the first time ever, and only three times at Donner (1 on viii.22, 2 on ix.11), but one was recorded at Castle Peak on viii.16, which is a rare event. *S. fuliginosum* was recorded once at Donner (vii.25) and not at all at Sierra Valley; numbers at

Castle Peak were very low (vii.14-28 only). At Donner, *S. sylvinus* was recorded only twice (vii.12, vii.25, one individual each) and *S. californica* not at all!

Great Copper, *Lycaena xanthoides* :

NS 2012: 5 2013: 12 2014:31 2015:22

WS 2012: 2 2013: 1 2014: 1 2015: 0

SM 2012: 4 2013: 4 2014: 1 2015: 2

There were 4 records of the Yuma Skipper, *Ochlodes yuma,* at Suisun, down from 7 in 2014.

The Silvery Blue, *Glaucopsyche lygdamus,* remained low in North Sacramento but exploded in the burned-over part of Rancho Cordova:

NS 2012:0 2013: 12 2014:3 2015:8

RC 2012: 15 2013: 4 2014:6 2015: 125

Pyrgus scriptura seems extinct as a breeding resident at NS, though there must be a larger metapopulation as rare strays continue to turn up. WS seems healthy, though the autumn brood was very scarce (usually it's the commonest):

NS 2012:0 2013:1 2014:0 2015:1

WS 2012: 38 2013: 29 2014: 35 2015:55 (only 10 >ix.1)

SM 2012: 2 2013:3 2014:8 2015: 13

And *Pholisora catullus* was very happy in WS but is close to extinction at NS:

WS 2012: 37 2013: 23 2014:17 2015:71

NS 2012:4 2013:5 2014:0 2015: 1

And some others of interest…

Erynnis tristis had its biggest year on record!

RC 2012: 10 2013: 24 2014:25 2015: 32

SM 2012: 1 2013:9 2014: 20 2015: 50

WS 2012: 9 2013: 42 2014: 31 2015: 76

NS 2012: 59 2013: 42 2014: 31 2015: 88

GC 2012: 27 2013: 31 2014:12 2015:66

Totals 106 148 119 312

Both *Ochlodes sylvanoides* and *Poanes melane,* after a huge year in 2012, have been unsteady:

O. sylvanoides: 2012 2013 2014 2015

GC	161	229	81	99
WS	18	13	4	1
NS	59	69	20	20
RC	89	83	191	116
SM	40	11	50	30
Totals	367	405	346	266

P. melane:

GC	85	79	47	54
WS	20	7	1	3
NS	20	29	16	13
RC	2	4	4	5
SM	3	6	1	5
Totals	130	125	69	80

Lorquin's Admiral, *Limenitis lorquini,* continued its strong showing:

RC	2012:8	2013: 34	2014: 14	2015:29
GC	2012: 38	2013:67	2014:38	2015:47
WS	2012:37	2013: 61	2014:21	2015:31
NS	2012:6	2013:11	2014:29	2015:26
Totals	90	173	102	133

The Variable Checkerspot, *Euphydryas chalcedona,* had returned to Gates Canyon in 2014 after an apparent local extinction: 7 were seen. In 2015, 14 were seen.

The Mourning Cloak, *Nymphalis antiopa,* is sharply down after riding high for a few years:

RC	2012: 22	2013: 4	2014: 12	2015:6
SM	2012:2	2013: 1	2014: 1	2015: 0
WS	2012: 5	2013: 13	2014: 12	2015: 2
NS	2012: 15	2013: 10	2014: 3	2015: 4
GC	2012: 49	2013: 40	2014: 27	2015: 20
Totals	93	68	55	32

The Pygmy Blue, *Brephidium exile,* arrived late again and was scarce. But at Suisun, its metropolis, it peaked on x.13 (3722 animals) as compared to 2012 (ix.30, 2723), 2013 (x.14, 1713), and 2014 (also x.13, 1473).

The Western Tiger Swallowtail, *Papilio rutulus,* continues to hold its own since recolonizing widely:

SM 2012:12 2013: 21 2014:22 2015: 19

GC 2012: 40 2013: 90 2014: 47 2015: 94

WS 2012: 44 2013: 63 2014: 27 2015: 47

NS 2012: 28 2013: 25 2014: 31 2015: 38

RC 2012: 42 2013: 57 2014: 46 2015: 40

Totals 166 256 173 238

The Pale Swallowtail, *P. eurymedon,* has bounced back from last year's low at GC:

2012: 70 2013:53 2014:8 2015: 32

And the Anise Swallowtail, *P. zelicaon,* continues its volatility:

RC 2012: 5 2013: 4 2014: 2 2015: 2

SM 2012: 58 2013: 13 2014: 27 2015: 16

WS 2012: 3 2013: 4 2014: 1 2015: 3

NS 2012: 20 2013: 31 2014: 18 2015: 36

GC 2012: 8 2013:3 2014:1 2015: 2

Totals 94 55 49 59

The Gulf Fritillary, *Agraulis vanillae,* now occupies the entire area and continues to increase in abundance:

RC 2012: 5 2013: 18 2014: 38 2015: 12

WS 2012: 0 2013:4 2014:12 2015: 18

NS 2012: 11 2013: 16 2014: 31 2015: 38

SM 2012: 0 2013: 12 2014:18 2015: 47

Totals 16 50 99 115

It survived low temperatures into the low 20s last winter at several locations. It is now breeding as far north as the Redding area!

Some general observations…

Since 2012 – i.e., during the drought – the seasonal pattern of species richness at my Valley sites has resembled the 1970s in having nearly constant species numbers all summer (there was more of a midsummer dip in 2013). As I remarked last year, if one discounts the regionally-extinct things, these years are remarkably like the 70s. The maximum numbers of species recorded at my low-elevation sites were: GC, 30 (v.1; 1 more than last year); SM, 20 (ix.18 and x.3; 1 more than 2014); WS, 26 (ix.25; 5 more!); NS, 27 (v.26; 5 more!); and RC 17 (iii.25, x.7 and x.16; 1 less). The WS and NS highs were unprecedented in recent history and were in record territory. Most of these peak dates were also close to last year's—SM (ix.29), WS (ix.30); NS (vi.11), RC (x.11) and GC (v.13), which were also similar to 2013. In short, these are real reconstituted patterns corresponding to the drought years.

Willow Slough (vii.4) had 20 species and 1624 individuals; in 2015 it had 19 and only 317, in 2013 22 and 918. The number of species had been in a long nearly monotonic decline before the drought—then it jumped up to its 1970s-early 80s range again! The very low numbers of bugs the last two years were largely due to poor performance by *Pieris rapae,* which in turn was seemingly driven by pathogen-induced decline of the principal host plant, *Lepidium latifolium.* But *P. rapae* shot back up this year, accounting for 1094 of the 1624 bugs seen, or 2/3 of them! So the rest of the fauna changed little since last year.

Phenologically, 2015 was not extremely early at low elevations, and there was a tendency for flight seasons to end a bit early and abruptly, though a few things flew to the bitter end – *Phyciodes mylitta* at Gates until xii.1, *P. rapae* at West Sac on xii.22 (and slopping over to i.2.16!). There was an unseasonable *Celastrina echo* at Gates on xii.14 (this has happened before). Tropical migrants were few—*Phoebis sennae* at Suisun , vii.19 and x.22, *Leptotes marina* in West Sac, ix.13 and ix.25. Among the early flight dates were *Papilio zelicaon* and *Danaus plexippus* at SM, i.28, and *P. "napi"* at GC, i.31.

On to the Sierran sites.

It was another year of poor snow pack and early melt-out, but very early flights were set back by weather reversals in the short term. At Donner 4 species were flying iii.26 (including *C. echo*), 7 on iv.17 and 22 on v.2. Bad weather set the number back to 5 on v.24 but it rebounded to 20 5 days later. Several early records were set. At Lang *Philotes sonorensis* set a new early record on ii.15, and there were 12 species already out by iii.26. At SV *Pontia occidentalis "calyce"* set a new record on ii.17! At the other end of the year, the Sierran season ended very early, and maximum species numbers were quite low—Lang, 28 on vii.1; SV, 21 on vi.28; DP, 37 on vi.18; WA, 24 on v.2. Castle Peak had 32 species already flying at my first visit on vi.13 and peaked the next time at 37 on vi.25. At LC the number of species fell to 15 on vii.15 and never rose above 12 again; on viii.19 there were 10 but by ix.1 only 2! At DP it fell to 11 on viii.9 and fluctuated between 4 and 7 through ix.26, with zero on x.10. At Washington there were 13 on vi.19; the highest thereafter was 11 on viii.19, dropping below 5 thereafter. Castle Peak ended with 4 on ix.19. SV, as often happens, hung on best, with 19 species on ix.11, 12 ix.23, 9 x.2 and 5 x.10—they were all the usual set, but they usually fly until Hallowe'en or later. Rabbitbrush bloomed out everywhere from 3-6 weeks earlier than average, but even taking that into account, numbers of most things were low. At SV *Pontia beckeri* and *Coenonympha tullia ampelos* had very good years, and migrating Monarchs were abundant at Canada Thistle in late summer. At DP and CP the various *Lycaena* were all rare, especially *arota,* which, however, showed up at CP, where it is seldom seen, on viii.16. An *L. rubidus* was recorded at SV, vi.28. As earlier noted, all the *Satyrium* were rare at all Sierran sites. Only a handful of *S. behrii* were seen at SV (vi.18, vi.28), but the elusive very-late-flying

alpine population at Castle Peak was flying on viii.16. Although *Mitoura nelsoni* was close to average on the West slope, the East slope *M. siva* was recorded at SV only on vi.28 (one individual!)

All the *Cercyonis* were seen at all their sites, but *C. silvestris* was extremely scarce at SV; *C. pegala boopis* was in average numbers, below the 2014 outbreak. All *Polites* (*sonora* and all the *sabuleti* complex), the usual *Hesperia comma*-complex West Slope entity, and *Ochlodes sylvanoides* were scarce everywhere.

The Buckeye, *Junonia coenia,* as noted already, was present all season in the Sierra and recorded as early as iii.26 at Lang and v.2 at Donner. *Plebejus acmon,* which does not normally overwinter at Donner, was also already flying on v.2. *P. lupini* was extremely scarce at both DP and CP, and numbers of *Euphilotes enoptes* at LC and DP were the lowest I have ever seen. *Agriades glandon* had a poor year at Donner but was fairly normal on Castle Valley.

It was the worst fritillary year I have ever seen. All *Speyeria* at all sites were extremely scarce, with both subspecies of *callippe* barely detected (none at WA, two day-positives at LC, vi.7 and vii.1; 1 at SV, vi.18. *S. coronis* was not seen at Castle, and twice at Donner (1 on viii.9, two on viii.22). *Neophasia menapia* was rare everywhere, and *Parnassius clodius* below-average, but not catastrophically so. *Polygonia zephyrus* was absent at rabbitbrush in the fall, with only two seen at Donner (ix.26) and none elsewhere. *Apodemia mormo* was not seen at Donner, and was recorded at Lang only on viii.17 (1 individual!).

Obviously, we need to do a rigorous quantitative study of the drought years. But I can say with confidence that after a partial recovery in 2014 from the catastrophic 2013 Sierran season, 2015 was once again terrible in the mountains. In summary, however, it seems safe to conclude that the fourth year of drought is not correlated with any butterfly disasters at low elevation—indeed, 2015 was overall a very good year—but the opposite is true from Washington upslope, somewhat less at Sierra Valley than on the West slope.

As I write this on i.6.16, the snow pack is around 105% of average water content for date, and El Nino seems finally to be kicking in. The big question for the Sierran butterfly fauna is what kind of overwintering population exists, and can a good snow pack do any good at this late date? I guess we'll find out. Here's to a better year.