We were too far down and too far out for far too long to be where we are now, which looks pretty good, and downright exceptional when you remember the past ten months. In case you are suffering from a protective form of amnesia to help your blood pressure, let’s review.

Winter. This must be what it feels like to lose all your money in a casino. Not the walk-in-put-everything-on-one-spin-of-the-wheel-and-pray method, but the night-long bust at the $5 blackjack table kind of loss. Hand after hand, hour after hour, frustration and disbelief mount while one thought resists the evidence of the situation. The thought being: my luck has got to change.

Replace luck with weather and you will get a feel for the winter 2013/14. In recent memory, winter damage events have involved periods of relative warmth that were then followed by rapid temperature drops. The absolute low temperature is part of the problem, but the vines have also partially de-acclimated and aren’t as hardy as they might be without the preceding “heat.”

This one-two punch was part of the story this year again (see Figure 1), as a very nasty low temperature hit in mid-January (blue line) just as the temperature necessary to freeze buds was rising (green and black). But the second part of the story is that it was just too darn cold. Geneva (not the worst of the Finger Lakes) had seven episodes of temperatures below 0°F — the last occurring in early March. Two or three low temperature episodes would be closer to the norm for cold winters.
The January low was going to cause damage to *vinifera* no matter when it happened (-10°F looks to do significant damage at any time). But the cold-hardiness of the vines was pretty good for most of the winter because the winter never turned off. It still wasn’t enough. Sometimes even decent cards get beat.

One notable thing about the Finger Lakes damage was that it was worse at the northern ends of Seneca and Cayuga Lakes. (Figure 2), where one vineyard recorded a low of -22°F. The North end of Cayuga lake froze.

In the Lake Erie region (Figure 3) lows ranged from -10° to -15°F. It was even colder in Northern NY. Temperatures were reported to reach -34 to -40°F in parts of the Thousand Island region of northern New York, which is egregious.

On Long Island, moderated by both the Atlantic Ocean and Long Island Sound, there was basically no injury.

**Bud Mortality.** The low January and February temperatures prompted the Lake Erie, Finger Lakes, and Eastern NY grape extension programs to collect and examine buds. They went to 240 vineyard blocks across the state and collectively cut an estimated 20,000 buds. That’s a lot of buds.

In *vinifera*, primary bud injury in the Finger Lakes ranged from 15 – 100%, with overall averages at 60-80%. Averages in Lake Erie and Hudson Valley samples were 40-80%. These numbers prompted us to prepare for significant crop reduction. We advised growers to leave extra buds to compensate – and they did.

**Spring.** N/A… Oh, OK, June was actually pretty nice and probably played a large part in keeping up-state vineyards at least in the game. Without June (Figure 4), the September miracle wouldn’t have mattered. Also, it was at this point people began to suspect that maybe damage was not as severe as some of the early estimates suggested.
Summer. What to say? There was sun. There was rain (see July, Fig. 4) (except on Long Island see Fig. 5). It was warm, but rarely hot and whenever the temperature rose the humidity almost always accompanied (except on Long Island). This weather, while not ideal, would have been acceptable if the season had gotten off to a stronger start, but as it was the disease pressure was already high and the vines had a lot of catching up to do.

Summer 2014 was not catch-up weather. On Long Island, where things also started later but with less moisture, there was plenty of sunshine but relatively cool temperatures, leaving the grapes also a tad behind the last two (really great) years. The good news was that this slight delay was not a “will they make it?” kind of situation like the rest of the state was facing.

Crop estimation. In a followup survey to our bud survey for Ag & Markets, funded by the NY Wine and Grape Foundation, we used cluster counts from 180 vineyards to estimate potential crop reduction – the operative variable being that if more than a 40% crop reduction was evident on a particular grape variety, Farm Winery licensees could get permission to buy fruit out of state. We have a list posted (https://grapesandwine.cals.cornell.edu/extension/statewide-viticulture-program-reports-0) but the short answer is that we predicted that most of the vinifera in the Finger Lakes, Hudson Valley, and Lake Erie region would qualify. This turned out to be partially correct.
Late start to ripening. We spent a fair amount of August trying to figure out when to start Veraison to Harvest. Lake Erie accidentally sent some samples one week before we finally agreed to start, and we couldn’t physically squeeze them. Things were looking bleak.

Fall. We were behind, and not just a little. The first V to H week had some of the lowest sugar and highest acid numbers ever seen in the newsletter. The jokes about December harvests—and not for ice wine—that had been percolating throughout the year looked less like jokes.

But September was catch-up weather, providing what Gerry Barnhart of Victory View vineyards called a “finishing kick.” From week one to weeks two through five, the numbers went from scary to not so bad to reasonable (Fig. 5&6).

“September made the vintage,” according to Matt Spaccarelli at Benmarl. The early varieties were now more than ready and the later stuff was visible on the horizon.

We are not strangers to the compressed harvest, and the “four week blur” as Vinny Aliperti of Atwater and Billsboro calls it, is nothing new, but if there was ever a year where you could call it relatively welcome, 2014 is the year. By mid-October, Tim Martinson was in my office discussing our V to H endgame, an idea that seemed unfathomable a month earlier. I originally thought we would have to make a plan for the Thursday of Thanksgiving.

More crop than predicted. And at the end of the season, it became apparent that there was a lot more Riesling out there than we had initially estimated. Some excess tonnage even made its way on to the ‘Finger Lakes Grape Classifieds’ site run by the Finger Lakes Grape Program. While we are not quite sure how this happened, two items can be noted: First, growers can claim some success with leaving extra buds: It worked and produced a reasonable crop for them. Second, berry weights were high – over 13 blocks that we sampled for Veraison to Harvest, average berry weight was 0.2 grams higher than our 5 year average. For a vine with 40 clusters and 50 berries per cluster, that works out to an extra 0.9 lb of fruit per vine, or 700 lb/acre. In short, vines may have compensated for fewer clusters by producing larger berries.

In summary. Spring is apparently the appendix of seasons. There’s some function there, but removing it doesn’t kill us.

September, however, can crush our dreams or make them come true. Choose your favorite sports and/or movie analogy; this year was a last-second, just-in-the-nick-of-time experience.

There was definitely damage and loss, and early in the season it was bad enough to earn the infamous disaster declaration that allows New York farm wineries to purchase out of state fruit. In the end, only a handful of wineries even signed up to do so, however, and when all is said and done, fewer than five may actually exercise that option.

Even on relatively warm Long Island, Rich Olsen-Harbich of Bedell and Andrew Rockwell at Premium report low pH and very low rot. The rest of New York can at least second the low pH part. Most people seem pretty happy with the quality, however, especially when they stop to remember that it very easily could have been a whole lot worse. Rich Olsen-Harbich sums it up best: “Every year is a new adventure.”

While one might argue that this year was more of a thriller than an adventure, at least we can celebrate another happy ending. I’ll call Disney.
BIG BERRIES FUEL CONCORD HARVEST

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The Concord crop in Western NY and the Finger Lakes was larger than many had anticipated. Yields were similar in many blocks to the 2013 crop (which was close to a record harvest). Niagara yields were down from last year’s large crop, but still exceeded early estimates.

National Grape Cooperative’s harvest update projected a 125 ton crop for the tri-state (NY, PA, and OH) region. While that’s lower than last year’s record 139,000 T, it’s higher than earlier estimates that had pegged the crop at 108,000 tons. Niagara was down to 14,200 T from 19,000 tons last year, but still higher than the 12,400 tons estimated earlier in the season (National Grape Cooperative Harvest Update #3).

Soluble solids on Concords easily reached 16-17 °Brix, in some cases weeks before they were harvested.

These two large crops in a row followed on the heels of the extremely small 2012 crop, which was 50% below average, due to extensive spring frost injury following perhaps the earliest budburst (April) on record.

Utilization down. Particularly in the cash market, significant contract cancellations and allocations have left an estimated 10,000 tons unharvested. Simply put, following the surplus of a large 2013 crop, processors in the cash market bought fewer grapes – or in one case, cancelled contracts last January. Kevin Martin, farm business management specialist with the Lake Erie Regional Grape Extension Team, estimated that around 2/3 of the 23,000 grapes previously contracted shifted to other processors (and from tonnage to acreage contracts), with a net loss of 10,000 T contracted. Cash market prices went down from 2013 by $20, but growers made up for some of that with higher Brix readings (processors pay more for higher soluble solids).

Crop estimation and berry size. One reason for the larger-than-expected crop was that berry size was large. Luke Haggerty reports that berry weight at the ‘nine site study’ that monitors commercial vineyards at lakeside, bench, and escarpment sites averaged about 3.7 grams, where normal range is somewhere around 3.2-3.4 g. On gravelly soils at the CLEREL lab, this year’s average was 3.4 g, with the long-term average around 3.0 g. Bottom line: berry weight was about 20% above average, and this difference showed up as early as the berry weight estimations made at 30 days postbloom.

In Luke Haggerty’s July 21 article on crop estimation (Lake Erie Vineyard Notes, July 2014 issue), he stated that “as a result of adequate heat and water the fresh berry weight 20-30 days after bloom (Figure 1) is showing 19% larger berries than the 15-year average.”

However, the large berries (and large crop) still caught many processors and growers by surprise. One reason for this is how crop estimation is done. Processors like to get the information early, so many go out just past fruit set and count clusters and berries per cluster. This usually provides a reasonable estimate of the crop size, but it doesn’t take into consideration berry size and weight. So when weather conditions favor (as they did this year) large berries, the estimate comes in low.
As a result, some processors found themselves scrambling for space to contain the larger-than-expected crop.

I will note that mechanical crop estimation at 30 days postbloom does incorporate berry weight into crop estimates, and that this information could be of use to growers and processors in updating crop estimates.

Terry Bates noted that this year’s large berry size isn’t unprecedented. “The berries were big this year but there were four other years (2001, 2002, 2004, and 2009) in the past 15 that were as big or bigger on average.” Processors take note.

Impact of Mechanical Thinning in 2013. One of my questions for this season was how the use of mechanical thinning last year (on 50% of acreage) would affect this season’s crop. Some blocks were thinned and harvested early, while others were unthinned and harvested late (into November in some cases). One might expect that unthinned blocks, harvested late, would have a much smaller crop this year than blocks that had been thinned and harvested early.

There is really no hard data, but some interesting anecdotes. Kevin Martin thought that there were some notable impacts – particularly on small (<2.5 lb pruning weight) vines that had been heavily cropped, some of which produced only a 2-4 T crop this year.

Niagaras and winter injury. Many Niagara blocks suffered some winter injury following last winter’s Arctic Vortex blast. Kevin’s impression was that the winter injury was crop-size related: Those that were heavily cropped last year suffered injury, while those with a low crop last year came back with a good crop. Mechanical thinning, widely used in Concords last year, is not as effective or widely used with Niagaras. Luke Hagger-ty noted that some of these injured vines had a lot of Crown Gall injury this year – up to 46% of the vines he checked in one vineyard exhibited galls.

Outlook. When I asked about the outlook for Concord markets in the short and long term, Kevin stated he thought that growers were feeling the impacts of something that started in 2012 with the small crop: Market share was lost to other commodities, and it takes a while to get that back.

That, combined with two large crops in a row, and processor changes, and the outlook is for the 10,000 T surplus to continue over the next few years. Some acreage will probably go out of production. In five years, processors may again find themselves short as the surplus gets utilized. The one processor that purchased no grapes this year (Carriage House) is still making jams and jellies out of Concord fruit, and will need grapes in the future as supplies tighten.

Thanks to Kevin Martin for his detailed comments on the Lake Erie harvest used in this article.
In many respects, the 2014 season recapped 2013—when one looks at the standard maturity indices. We sampled 56 blocks in the Long Island, Hudson Valley, Lake Erie, and Finger Lakes for nine weeks stretching from the end of August to the last week in October. Many varieties were harvested by the 7th week, and just a few mostly Riesling and Cabernet Franc blocks remained in the final sample week.

Shown in the figures that follow are summaries from the last five growing seasons of our weekly Veraison to Harvest samples. For five cultivars that are broadly represented in NY (Cabernet Franc, Merlot, Noiret, Riesling, and Traminette) we show trends in berry weights, brix, pH, and titratable acidity. The black dotted line represents the five-year average. For the most part, we have collected from the same blocks each year – and each of these curves is the average of 3-12 vineyards sampled across NY.

Since the cool 2009 season dropped off our charts this year, the past five years represent two warmer-than-average years (2010 and 2012) and three more ‘average’ years (2011, 2013, and 2014).

**Berry weights:** These tend to jump around a lot, but in all the cultivars featured, berry size and weight was slightly above (Riesling, Traminette) to a few tenths of a gram/berry higher than average (Cabernet franc, Merlot, Noiret).

**Brix:** Soluble solids started out the lowest of the five seasons for all cultivars except Noiret, and jumped up rapidly from week 2 to 3 (mid-september), reflecting the warm, sunny weather in early September. By harvest, they converged on the 5 year average.

**pH.** Juice pH started out and remained at the lowest levels of the five years of sampling in all cultivars.

**Titratable acidity.** TAs started out the highest in the past five years, reflecting delayed arrival of veraison and the generally cool weather this past summer. But by harvest TAs converged on the long-term average for the varieties.

In short, the season started out slow, but our warm and sunny September moved things along rapidly, and these cultivars ended up with favorable maturity.
Radical Leaf Removal around Bloom to Reduce Cluster Compactness in Riesling

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Ed. Note: Meredith is the recipient of the 2014 Shaulis scholarship, which is designed to give an undergraduate student the opportunity to participate in research and extension projects at Cornell and the New York State Agricultural Experiment Station. The scholarship is supported by the Nelson Shaulis Fund for the Advancement of Viticulture.

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Grape varieties with tight clusters, such as Riesling, Chardonnay, Pinot noir and Vignoles, are prone to late-season cluster rots such as Botrytis cinerea and sour rot organisms. Canopy management practices, such as basal leaf removal after fruit set, shoot thinning, and shoot positioning can promote air flow and improve cluster exposure to sunlight – significantly reducing Botrytis by modifying the microclimate around the cluster. But what if vineyard managers could reduce fruit set by removing leaves a few weeks earlier around bloom and thereby produce less compact clusters that would impede the berry-to-berry spread and reduce berry splitting?

This summer, I examined the effect of basal leaf removal at different times around bloom on fruit set and cluster compactness. My project was an extension of Alice Wise’s research on Long Island Chardonnay, and took place under the guidance of Tim Martinson. The objective of the experiment was to study how leaf removal timing affects cluster density in Riesling, with the hope that less compact clusters would lower the susceptibility to common fruit rots, and specifically Botrytis bunch rot. Previous studies, notably recent work by Brian Hed at the North East, PA vineyard laboratory, have indicated this could be a promising approach.

Loomis Trial. We set up the experiment at the Loomis Vineyard at the NYSAES, and also did a second trial at a nearby commercial Pinot noir vineyard (results not reported here). At four weekly intervals, two before bloom (June 9 and June 13), one at trace bloom (June 18) and one post bloom (June 24), we removed six leaves (nodes 2-7) from all shoots on the treated vines. On an adjacent row, we selected six control vines that remained untreated throughout the experiment.

Leaves 2-7 were removed from all shoots at four one-week intervals. This is the ‘trace bloom’ treatment.

Photo by Tim Martinson
The vines were on a cane pruned VSP system, and were “pallisaged” (shoots were wrapped around the 6’ high trellis wire) rather than hedged to deter lateral shoot growth.

Immediately following the leaf removal treatments, leaves from shoots of similar length to the treated vines were collected and the leaf area at each node was recorded. Leaf area analysis showed that during the first two treatments, our treatment (removal of the six basal leaves) removed about 90% of the total leaf area of each shoot. At trace bloom, when shoots were longer and there were more nodes, about 75% of leaf area was removed. The post bloom treatment also removed about 75% of total shoot leaf area, because the number of nodes did not change much between trace bloom and post bloom.

**Physiology.** Around bloom, leaves are exporting photosynthate to both shoot tips and clusters to support shoot growth and fruit set. Removing leaves limits the amount of photosynthate available at this critical time, particularly since much of the photosynthates allocated to the fruit come from leaves adjacent to the fruiting zone. With the source of photosynthate limited, vines channel their energy into maintaining their vegetative growth rather than supplying energy for fruit set. Conversely, when shoot tips are removed, more photosynthate is channeled into the fruit, increasing set – the opposite of what we were aiming for in this trial.

We hypothesized that the greatest effect of leaf removal on fruit set would be around bloom, because that’s when there is most competition among shoot tips and clusters for photosynthetic products. Removing a large amount of photosynthesizing material shocked the vines and forced them to make a choice for energy allocation, thereby reducing fruit set. An interesting side observation from the experiment was the differences in how much the vine canopies “bounced back” after being defoliated; there was no observational pattern to which treatments were fastest in re-filling their leaf canopies, but this experiment could be of further interest.

*Figure 1: Leaf removal affected fruit set, producing fewer berries per cluster (top) and fewer berries per cm of rachis (bottom) at the ‘prebloom-2’ and ‘trace bloom’ timing. The early ‘Prebloom 1’ and late ‘Postbloom’ treatments were similar to the untreated ‘control’.*

*Typical cluster from the ‘trace bloom’ leaf removal treatment (top) and from the untreated control (bottom). Hail damage is evident on the lower cluster. Photo by Meredith Persico*
Data to evaluate cluster compactness. In early August, I randomly selected and harvested two clusters per vine. I evaluated cluster compactness by counting the number of berries in each cluster and by measuring rachis length. To obtain an index of ‘cluster compactness’ I divided the number of berries per cluster by rachis length. This represents how many berries there were per centimeter of rachis.

Results. The two most effective times were right around bloom: the second pre-bloom treatment (five days before trace bloom) and during trace bloom (when cap-fall is starting). These two treatments (Figure 1, top) reduced both the number of berries per cluster and cluster compactness (berries per cm of rachis, Figure 1, bottom). Berry weights were also measured and recorded. When observations were made in the second week of August, there was no significant difference in average individual berry weight, although average cluster weight was lower due to the lower number of berries per cluster in the pre-bloom and trace bloom treatments.

In conclusion, in this study we found that leaf removal around bloom can reduce fruit set, and that timing of leaf removal during trace bloom is crucial.

Botrytis ratings at harvest. At harvest, we weighed individual clusters and rated each cluster (14-45 clusters for each of the six count vines per treatment) for botrytis incidence (presence or absence) and severity (% of cluster infected). Preliminary results showed that leaf removal at the immediate prebloom, trace bloom, and post-bloom timings all reduced incidence and severity relative to the control vines (Figure 2). The trace bloom timing (trt 3) had the lowest incidence of botrytis (fewest clusters with any botrytis), but the pre-bloom treatment had the lowest severity of botrytis. The earliest treatment, 2 wk prebloom, showed botrytis levels similar to the untreated control vines.

Practical implications. This trial reinforced the importance of leaf area and photosynthesis around bloom in supporting fruit set. By radically removing up to 75% of leaf area in the two weeks around bloom, we were able to significantly reduce fruit set, and produce clusters that were measurably ‘looser’ and ended up with significantly less Botrytis at harvest. However, we also undoubtedly provided more sunlight exposure to the clusters, which may have also limited botrytis, regardless of how looser clusters influenced spread of botrytis. Normal leaf removal three weeks after bloom may have accomplished the same thing.

As a practical matter, manual leaf removal at bloom would be very expensive in a commercial setting, and probably not economically feasible except in very specific situations where growers are aiming at an ultra-premium product. But our results underline the role that photosynthetically-active leaf area plays in influencing fruit set.

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Thanks to the many people contributed to bringing Véraison to Harvest to press each week.

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