

The 2007 **CRUSHPAD**[™] 30 White Wine Plan Companion

30 Steps to a Great White Wine

While there are many options and decisions to be made from vineyard to bottle, the basic steps to winemaking have not changed much over the past couple thousand years. In fact, turning grapes into your basic wine is a pretty straightforward process. You squish the grapes and let the yeast do the work. However, making a truly fantastic wine, the kind of bottle that transform the every day into a truly unique sensorial experience, is a different story. That's why we're here to help.

Creating a special wine requires making choices- some of them are small, but every one is important. If you make good decisions, avoid mistakes and respond quickly when nature throws you a curveball, then you're probably going to make a whole lot of people happy with your wine. We'll help you get there.

To make it easier, we've created the **Crushpad 30** - a list of 30 (more or less) winemaking decisions that help define the style of wine you want to make. The **Crushpad 30** walks you through each step of the winemaking process, from the varietal you'd like to work with, all the way through to toast level of your barrel. The **Crushpad 30** also provides an excellent communications tool to ensure that anyone helping you along the way is clear of what your goals are.

Developing your wine plan is an exciting process. However, if it's your first time, completing a wine plan can seem a somewhat intimidating task, even with the **Crushpad 30** close at hand. Don't worry. We're here for you. Our winemaking team is eager to answer questions and walk you through the process so that you can produce the wine you've always dreamed of. If you have any questions, simply give us a call and we'll be sure to take care of your wine plan needs.

Ready to make your own wine? Let's get started.

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Your Name _____

Wine Name _____

Winemaker Name _____

How many barrels of this wine are you making? _____

Style Describe characters you would like to highlight or downplay in your wine.

Varietal

Which varietal will you be making? _____

Vineyard

From which vineyard will your fruit be sourced? _____

Alcohol Levels

Target Alcohol (13% - 15.5+%)

What percentage of alcohol would you like your wine to have? _____

Maximum Alcohol (13% - 15.5+%)

What is your preferred maximum percentage of alcohol? _____

Table wines in the U.S. generally contain alcohol levels ranging between 12% and 16%. The winemaker will aim for a particular percentage of alcohol depending on the style and varietal of wine they are working with.

Traditionally, climate and the ripeness level of the fruit at harvest determine the percentage of alcohol. Fully matured grapes, grown in warm weather, contain higher concentrations of sugar that translate to higher levels of alcohol. Conversely, cool cloudy weather patterns can prevent grapes from developing high sugar levels. Less sugar means the yeast has less food to eat, thus lower alcohol levels. Winemakers can make adjustments to achieve the desired percentage of alcohol. Amelioration is the process of adding water back to the must in an effort to lower the concentration of sugars the yeast have to feed on. This makes for a wine with a lower percentage of alcohol.

The level of alcohol in wine has an effect on how it plays on the palate. Lower alcohol California Chardonnays and Pinot Noirs, weighing in below 13.5%, are often likened to their Burgundian counterparts and lauded for their sophisticated elegance. Robust, full-bodied versions with alcohol levels reaching the 15% range, have been greeted with critical and consumer praise. Varietals with bold fruit and assertive tannins like Cabernet Sauvignon and Syrah can generally maintain structure at levels between 14% and 15%. Many Zinfandel producers push alcohol levels even higher, into the 16% range, with success. Extremely high alcohol percentages risk the danger of tasting hot on the palate and can mask the complexity of flavors otherwise present in the wine.

Wineaux Translation: Alcohol gives a wine body. Too little alcohol and you've got a wine that tastes thin and tannic. Too much and it's hot. Aim for the midrange to play it safe.

Amelioration

Ameliorate? Yes, achieve desired alcohol No Winemaker's Discretion

Amelioration is when water is added to a must in an effort to dilute the concentration of grape sugars. High sugar levels bring the potentials of high alcohol levels and fermentations that have difficulty completing to full dryness. High sugar levels are more common in areas like California, where sunshine is plentiful, grapes easily mature to full ripeness, and winemaking trends have shifted toward longer hang times for the fruit before harvesting.

Although there is a concern about dilution of the wine, it is important to note that most of the high sugar level in very ripe grapes is due to dehydration and adding water back merely restores the balance that was in the grapes.

Wineaux Translation: Ripe grapes have high sugars. To achieve a reasonable alcohol level, water is added.

pH Level

Target pH (3.3 - 3.8)

What pH would you like you wine to have? _____

Maximum pH (3.5 – 3.8)

What is your preferred maximum pH level ? _____

The pH scale is designed to measure whether a substance is acidic or alkaline. The scale ranges from 1 to 14 with the value of 7 considered neutral. Substances below 7 are acidic, the lower the number, the stronger the acidity level. Wines generally have values somewhere between 3.0 and 4.0.

Acids are perceived as tart or prickly sensations on the palate and work to protect the wine's appearance while preventing bacterial growth. Generally speaking, lower pH wines pair better with meals. Wines with pH values between 3.2 and 3.4 tend to feature refreshing crisp acidity and bright colors. Many white wines fall into this range. Wines with pH levels between 3.5 and 3.7 offer a more lush, less lean mouthfeel and are common in Pinot Noir and reds grown in cooler areas. Those with pH levels at 3.8 and above can appear oily and rich, but may also be perceived as flabby and are prone to the development of harmful bacteria.

Wineaux Translation: pH is the measure of the strength of acidity. Lower pH wines show better with food while higher pH wines can be more impressive by themselves.

Total Acidity

Target TA (.5 - .8)

Achieve desired pH or enter a range for desired acidity level _____

Total acidity (also referred to as titratable acidity) is a measure of the total acids present in wine. TA is related to pH but the concepts are not identical. While pH measures acid strength, TA measures the amount of acids present.

Acidity is perceived in degrees of tartness and decreases as the grapes become riper. Tartaric acid is the primary acid, but others such as malic and citric can be found as well. As the harvest date draws near, TA in the grapes drops (due to the respiration of malic acid). It is important to pick the grapes with enough TA or an adjustment will need to be made. TA is important, but somewhat less important than pH as most winemaking decisions (including acid additions) are based on pH, not TA.

TA values for table wines usually fall somewhere between 4.0 and 9.0 grams of acid per liter.

Wineaux Translation: Total acidity measures the amount of acid, while pH measures strength. Most winemaking decisions are based on pH and levels can be adjusted by adding tartaric acid.

Acid Adjustment

Acid Addition?

Yes, achieve target range No Winemaker's Discretion

In warm weather growing regions where grapes are able to reach full maturity or where fruit is picked very ripe, the concentration of grape acids are reduced. Wines with low acidity levels can taste flabby, weak and often lack complexity. In an effort to create a greater balance between acidity, fruit flavors and tannins, the winemaker may choose to acidify the must.

Acidification helps accentuate fresh fruity characters while working to prevent the development of harmful bacteria. Tartaric acid, naturally found in grapes, can be added prior to fermentation to increase the concentration of acids in an effort to achieve more balance in the finished wine.

Wineaux Translation: Acid balance is required for a sense of freshness and to be food-friendly. If your acid is too low (again, common in very ripe grapes), add it.

Destem Level 100% Whole Cluster _____% Destem
 Winemaker's Discretion

Destemming is the process of removing berries from the stems. In the vineyard, grapes are harvested as whole clusters. When the fruit arrives at the winery, it is sorted for quality and can be sent through a destemming machine. The destemmer removes the fruit from stems with minimal rupture of the grape skins. Fermenting with whole berries creates a lighter-bodied style of wine that accentuates fruity characteristics.

Several wine styles skip the destemming process altogether. This is typically done for white wines that undergo whole cluster pressing and some red wines, such as Beaujolais Nouveau, that are fermented whole cluster in an effort to highlight fruitiness and soft structure. Whole cluster pressing with white varieties helps accentuate a more delicate mouthfeel and fruit forward aromatics. Destemming white grapes provides a tiny amount of oxidation that contributes to greater body and an extra layer of tannins.

Wineaux Translation: White grapes usually aren't sent through the destemming machine while most red wines are. However, destemming white grapes can provide greater tannin extraction and more body.

SO₂ Yes Winemaker's Discretion

Sulfur Dioxide (SO₂) is commonly used during the winemaking process as a tool to prevent bacterial spoilage and oxidation.

Sulfur adjustments are typically made during key periods when the grapes or wine are at greatest risk for spoilage. For red wine, SO₂ is first added after the destemming/crushing process. During this initial stage, concentration levels of between 20 to 50 mg/L are used to inhibit bacterial growth and prevent wild yeast strains from starting fermentation. Because white wines rarely go through the destemming and crushing process, they have SO₂ added immediately after the grapes are pressed.

Aromatic white varieties, such as Sauvignon Blanc and Viognier, require the antioxidant effect of SO₂ to maintain the complex bouquet associated with the grape varieties. However, the protective qualities of SO₂ can prevent any bitter and astringent phenolics from oxidizing out from the wine. Depending on the style of Chardonnay being made, different levels of SO₂ are sometimes used by winemakers. At higher levels, SO₂ is used to produce fresh, lighter styled Chardonnays. With lower levels of SO₂, fruit characteristics take a backseat to more complex aromatics and nutty tones. However, because the wine isn't protected from oxidation, the color takes on a brownish quality.

SO₂ is also added just after malolactic fermentation and is maintained at a level (e.g., 25 parts per million) throughout the life of the wine. SO₂ levels that are too high can increase the bitterness while bleaching color from a wine. Without SO₂, wines would typically oxidize and/or be attacked by microbes. Note that organically labeled wines do not use SO₂ and tend to not age more than a year or two.

Wineaux Translation: SO₂ is a necessary part of winemaking. 99.99% of wines made in the world use SO₂ to protect them.

Yeast

Yeast Cultured Native Winemaker's Discretion

Which yeast strain will you be using? _____

Yeast is the catalyst for fermentation in wine production. A member of the fungi kingdom, this single-celled organism feeds off sugars present in grapes and produces alcohol and CO₂ as by-products of this process. In addition to creating alcohol, yeast strains can influence the aroma and flavor of wine.

There are many strains of wild or “native” yeast present on the grapes as they come from the vineyard. Some are good, some are dangerous to the wine. The winemaker can choose to ferment with these native yeasts for more natural winemaking. Proponents believe that the resulting wines are more complex but their impact on the finished wine is not predictable. Native yeast often creates more volatile acidity and stuck fermentations are not uncommon.

Alternatively, the winemaker can choose to use commercial cultured yeast that has been proven to have specific results in the finished wine. Proponents of cultured yeast strains point to a cleaner fermentation, control over the finished product and lower probability of stuck fermentations as advantages.

There are middle ground practitioners that start with native yeast and then add a large amount of cultured yeast near the end of the fermentation to ensure that it completes. Very little real-world research has been done to compare these techniques.

There are dozens of cultured yeast strains available depending on which varietal and style of wine you are creating. Please consult with your winemaker to help determine which yeast strain best suits your needs.

Wineaux Translation: Non-interventionalist winemakers will choose native yeasts, while those focused on consistency will choose cultured yeasts.

Fermentation Vessel

Ferment Vessel Oak Barrel Stainless Steel

A fermentation vessel is the container where maceration and fermentation take place. Stainless steel tanks, oak tanks, oak barrels and are common fermentation vessels.

Stainless steel is practical for several reasons. It can be easily cleaned and sterilized to prevent contamination from microbial growth. Stainless steel tanks can also have thermostats and insulated jackets attached to control the temperature of the fermentation but are inefficient for small lot winemaking. Oak barrel fermentations are thought to smooth bitter tannins and create a softer more supple wine. However, they are expensive, difficult to clean and are prone to bacterial contamination.

Wineaux Translation: Whites are fermented in barrel or in stainless steel while reds are fermented in plastic bins, stainless steel or, increasingly, oak.

Fermentation Temperature

Target Fermentation Temperature

- Cold (9°- 12°C) (48° – 54°F) Cool (12° – 17°C) (55° – 63°F)
 Winemaker’s Discretion

The fermentation temperature has an impact on the style of wine produced and the extraction level of color, tannin and flavor. White wines are usually fermented at cooler temperatures than red wines. The cooler temperatures decrease the activity level of yeast, resulting in a slower and longer fermentation that can last several weeks.

White wines, fermented at cold temperatures between 9°C and 12°C, highlight bright fruit aromatics and flavor. Wines fermented at these temperatures typically do not require lengthy aging and are designed for early consumption. Whites undergoing a warmer fermentation between 12°C and 17°C, take on more weight and complexity as varietal characteristics emerge on the nose and palate. These are often aged in oak and may go through malolactic fermentation to create a softer, more elegant wine.

Wineaux Translation: Warmer fermentations favor bigger, more extracted wines while cooler fermentations favor more aromatic and elegant wines.

Malolactic Fermentation

- Malolactic Innoc?** Inoculate Native
 Prevent Winemaker’s Discretion

Malolactic fermentation, also referred to as secondary fermentation, uses bacteria to transform muscular malic acids (think green apple) into smoother tasting lactic acids (think milk). The process reduces the wine’s acid content and helps create a creamier textural quality in the mouth. With the exception of very light styles, all red wines undergo malolactic fermentation. Secondary fermentation for white wines depends on the region, varietal and style the winemaker wants to create. Lighter grapes, like Riesling, which feature crisp acidity and explosive aromatics, usually avoid malolactic fermentation so that the grape's natural vibrancy isn't lost. However, depending on the desired wine style, larger bodied varietals, like Chardonnay and Viognier, may go though at least some degree of secondary fermentation to add complexity and smoother textural qualities.

Wineaux Translation: If you want a racy, lean, aromatic white wine, then block malolactic fermentation. Otherwise, let it go.

Vessel Type

- New Oak Barrel
- 50% Zebra Barrel
- 33% Zebra Barrel
- Neutral Barrel
- Stainless Barrel
- Winemaker's Discretion

Stainless Steel

Stainless steel is used as a fermentation vessel for a variety of reasons. Steel is non-reactive, so unlike wood, it doesn't impart any flavors into the wine. This characteristic is beneficial for white wine styles and rosés that wish to accentuate crisp acidity.

Winemakers, who want to add more body to a white wine, can create a blend from juices fermented in stainless steel and oak barrels. The winemaker will set up trials containing different percentages of stainless/oaked wines until the desired weight and acidity level is achieved.

Stainless steel also has the benefit of coming in many sizes and can have insulation jackets and thermostats attached to better control the fermentation and aging temperatures. Steel vessels are easily cleaned, so build up of harmful bacteria is minimized.

Oak

Oak barrels are the traditional vessel associated with wine production. Oak imparts flavors and textural qualities that provide layers of complexity to a finished wine.

New oak is used to describe barrels that are being used for the first time in wine production. They impart a greater amount of sensory character to a wine as the charring inside the barrel is exposed to wine for the first time. The aromas and flavors are leached into the wine during the fermentation and aging process. Each time a barrel is used, the amount of flavors available will diminish.

Used oak is the term given to barrels that have already undergone wine aging. Depending on the varietal and style, the maker may choose to use a barrel that has already been used to age or ferment wine. A significant portion of the aromas and flavors that a new barrel can impart are no longer available in used barrels, so they are often chosen to provide more subtle wood character to wines during aging. After several uses, typically 3-4 years, the barrel no longer imparts any flavors and is called neutral oak.

For single barrel lots, Crushpad has created a "zebra barrel" which is a blend of new and used oak.

Wineaux Translation: New oak imparts more dramatic tones and is good for red wines with lots of tannins. Each time a barrel is used there are fewer characteristics imparted into the wine.

Oak

Oak Origin and Cooperage

- American French Winemaker’s Discretion
- Other _____
- Which cooperage will be used? _____

French Oak

France is one of the main producers of oak barrels for use in wine. The forests are mostly located in the center of the country and barrels are named for the primary region the wood comes from, but may also be named for the specific forest the wood is harvested from. Two of the prized regions are Tronçais, a government owned forest north of Moulins and Bertranges in the Nevers region. Many of today’s coopers tend to mark their oak “bois de centre” or “Center of France.” Winemakers generally use French oak for its subtle contributions when making wines in a European style.

American Oak

Wood for American oak barrels is harvested primarily in the Midwest region of the country, from the states of Missouri, Ohio, Kentucky, and Arkansas. American oak is thought to impart more dramatic notes associated with the wood such as vanilla, dill and coconut. American oak species have a tighter wood grain due to an increase in tyloses, the woody growths that seal the pores in the growth rings. American oak barrels are less expensive than their French counterparts as the tighter grains allow the wood to be processed by sawing rather than splitting, resulting in less waste.

Eastern European Oak

Oak harvested from Hungary and Slovenia is increasingly becoming a more popular alternative to either American or French oaks. Oak from this region is considered to be very similar in character to French oak, with slightly more assertive wood tannins, but typically costs much less. The forests are located mainly in the provinces of Baranya, Somogy, Zala, Borsod-Abauj-Zemplen, Heves, and Veszprem.

Wineaux Translation: Oak can have a significant impact on a wine. French oak is associated with elegance. American oak is believed to impart power and Eastern European woods are considered a blend of the two.

Fining

Fine Your Wine? Yes No Winemaker's Discretion

Fining is the process of clarifying and stabilizing a wine. A fining agent is mixed in to bind with particles suspended in wine that would make it appear cloudy when poured into a glass. Since fining agents are slightly heavier than wine, the bound particles precipitate out and settle to the bottom of the tank. Afterwards, the clarified wine is carefully racked off the settled material into a new vessel.

There are several types of fining agents commonly used to target specific goals. Bentonite is a type of clay used to remove protein compounds from white wines that can cause it to appear hazy. Protein based agents, such as casein and albumin found in milk and egg whites, can remove excessive tannins and astringent phenols and help clarify the color of a wine. Trace amounts of copper sulfate are sometimes used to remove aromas associated with reduction.

Excessive fining can strip a wine of body and color; so as with any adjustments, trials should be undertaken prior to adding.

Wineaux Translation: If the wine is cloudy or too tannic, then a fining is typically warranted.

Filtering

Filter Your Wine? Yes No Winemaker's Discretion

Filtering is employed to remove solid particles and improve the clarity of a wine. Filtration occurs when wine is pushed through a membrane where particles are trapped on the filter's surface.

Vigilant winemakers choose the size and style of the filter carefully so the complexity and character of the wine isn't compromised during the process. If excessive filtration is used, loss of tannic structure, flavors and color may occur.

Filtration occurs in graded stages. Initially, a coarse filter (called a "bug catcher") is used to remove larger particles before moving onto a finer graded filter that improves clarity to the desired state. Prior to bottling, white wines that have not undergone malolactic fermentation, are usually sterile filtered. Sterile filtration uses a very tight membrane to remove all yeast and bacteria from a wine to prevent a possible second fermentation from occurring in the bottle.

Many producers choose to have their wines produced without any filtration. Unfiltered wines tend to have more sediment and stand a slightly greater chance of being affected by harmful bacterial.

Wineaux Translation: If you decided to block malolactic fermentation, it's important to filter. Filtering also helps deliver brilliant color and increases microbial stability.
