"**Retail restoration and mitigation: forest conservation during the Grape Rush**"

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Vineyards are continuing to expand over oak woodlands, grasslands, mixed evergreen forest, and even redwood forests of Sonoma and Mendocino County. The full extent of future vineyard conversions is difficult to forecast. In Napa County, market conditions for premium wine grapes have driven vineyard conversions up steeper slopes and more varied soil types that traditional vineyards would have avoided. In northern Sonoma County, large and numerous vineyards are now appearing even in areas of serpentine soils near Lake Sonoma, and on ridgetops and steep slopes of the outer coast ranges. This change in the landscape is beginning to become quite visible, both visually and politically.

Many vineyard conversions, particularly in oak woodlands and grasslands, are currently allowed without permits or rigorous environmental reviews (under CEQA) of the effects of converting from rangeland to intensive agriculture. Some conversions to vineyards are regulated by county and state agencies, at least in part. The recent proposal of "Preservation Ranch" vineyards in the heart of the Gualala River watershed, in Sonoma and Mendocino County, has triggered early discussion of mitigation for forest conversion among project proponents, Sonoma County agency staff and supervisors, and environmental organizations.

The heart of the proposed mitigation concept for Preservation Ranch is forest restoration as a means of compensating for the loss of forest to vineyards. Forest restoration is also proposed for some other, smaller vineyard conversions as a form of mitigation. This suggests a possible trend of a routine permit process for vineyard conversions based on mitigation that relies on the practice of restoration forestry. The nature of mitigation and restoration, particularly of coastal forests in this region, should be given a hard look before they are accepted as a routine permit process.

"Mitigation" in practice is usually different from mitigation as defined by law and regulation. Mitigation in practice is often reduced directly to compensation for an impact to the environment. Compensation is usually treated either as a *quid pro quo* (something for something else) exchange, or a payment or credit-based system. Restoration of the same type of habitat lost from development of a project is a typical type of compensatory mitigation. When this type of exchange is formally consolidated into "mitigation banks", with formal pre-approval from permit agencies, developers can simply pay their way towards loss of habitats, without having to argue about the merits of individual restoration plans, or the impacts of projects. Acreage of habitats lost or gained (presumably) becomes the barter system. The underlying premise of compensatory mitigation is that public trust natural resources are successfully replaced and protected, acre for acre by habitat restoration, often with "no net loss" – a key concept originating from an executive order on national wetland policy (established in the 1980s by the elder President George Bush). Faith in the effectiveness of restoration ecology to replace lost habitats and ecological functions is the cornerstone of this type of mitigation.

Mitigation in most environmental laws and regulation has a very different emphasis. Mitigation in law generally treats compensation as a last resort. Mitigation in law stresses finding ways to avoid, prevent, and minimize harm to the environment, and directly fixing problems caused by harmful activities. Compensation for impacts generally applies only after they are reduced to a bare, unavoidable minimum. (This is also known as "mitigation sequencing"). This conservative standard mitigation approach places much greater priority on protection of existing lands and natural resources, and less on attempts to replicate or manufacture them. This approach is not popular with most project proponents, since it usually means looking at ways to reduce the project size, or alter its configuration or the range of its activities. Minimization and avoidance of project size or form may sometimes imply less return on investments for commercial ventures.

The emphasis on compensatory mitigation in permits places a great burden on restoration ecology, but also lightens the burden of proof for its effectiveness. Permit agencies can't do business on the basis of compensatory mitigation if they recognize all the uncertainties about ecological restoration. They have to assume that restoration of habitats will in fact achieve what they promise and predict, and are not unduly speculative. Restoration in a mitigation context is thus very different from "pure" or "*pro bono*" restoration – ecological restoration for its own sake. Important natural resources are sacrificed deliberately in a compensatory mitigation context, and at a large scale. Stakes are much lower when "pure" ecological restoration experiments are put into practice. Underachieving restoration experiments may be disappointments, but they don't contribute to habitat loss unless they are used to compensate for sacrificed real habitats.

Ecological restoration, however, is not as predictable a technology as, for example, road building or the hydraulic design of flood control channels. Most scientific publications in restoration ecology recognize that it is, and will remain, an experimental science and immature technology. The ability to predicting or control the specific results of large-scale ecological experiments over long periods of time is generally lacking. A great deal of faith (or, in scientific jargon, "working hypotheses" or "assumptions") is therefore inherent in restoration ecology.

Habitats also vary tremendously in their inherent ability to be "restored", and in the degree of scientific understanding and technical experience with restoration. Only a handful of habitat types have a strong track record for restoration. Some types of wetlands and coastal dunes have some of the longest track records for restoration, and they include mixed results. Unfortunately, "restoration ecology" in forested ecosystems is a very young science, in contrast with the relatively mature applied science of forestry (timber management and production). Environmental objectives like conservation of endangered plant or fish and wildlife species, biodiversity, and major ecosystem functions have only recently begun to merge with forestry sciences. Almost all we know about "restoration" of redwood forests, for example, comes from legacies of inadvertent "experiments" – second-growth forest regeneration, and variation in thinning practices over relatively short periods of time.

Despite the inherent uncertainty and youth of "restoration forestry" (and its related "sustainable forestry" theme), the demand and hope for what it may offer has already pulled it into the arena of commercial environmental consulting, commercial non-profit "restoration forestry" enterprises, and now, compensatory mitigation. We are at the verge of accepting forest "restoration" as the regulatory currency of exchange for vineyard conversion at increasingly larger scales. And we are at the verge of routinely assuming it can and will deliver what it promises. How well does this assumption square with what we actually know, rather than what we expect or wish for?

What we know about the "degraded" forests proposed for restoration in the Gualala River watershed is that they have been subject to past excesses of timber harvest. We know that they are in variable stages of recovery as second-growth or third-growth forests. Regeneration of vegetation cover over time is stabilizing landslides and gullies, reducing erosion and sedimentation to streams as cut-over forests mature. Many of our second-growth forests obviously have recovered some populations of sensitive endangered wildlife, such as the northern spotted owl, without the benefit of deliberate "restoration" – only to have these regenerated habitats disturbed by short-rotation timber harvests, or eliminated by vineyards, in some cases. In some cases, forest and soil damage is severe and persistent, especially on steep, unstable ridges, where regeneration of forest is slow and uneven.

So where and when is restoration forestry really needed, and where and when will "rest as restoration" – natural forest regeneration – be a sufficient or better alternative? Mitigation works only when developers can get credit for doing something that they pay to be done, but won't happen by itself. A self-regenerating, "self-restoring" ecosystem has limited utility as raw material for restoration under "no net loss" policies for compensatory mitigation. Proponents of mitigation have a vested interest in emphasizing or "selling" the promises of ecological benefits they can finance with "restoration forestry", and a similar interest in downplaying or denying the ability of forests to recover on their own. Even environmental advocates can develop uncritical, complacent perspectives about restoration, perhaps because of the scarce optimism it offers.

A rigorous, critical evaluation of restoration forestry proposals, and recovery of existing forest habitats, is needed before "forest restoration" becomes a stock in trade for mitigation of escalating vineyard conversions. The quality controls and scientific scrutiny for forest restoration are very uneven. Some Habitat Conservation Plans in development for Mendocino County have scientific review panels by nationally recognized scholars and other experts in forest ecology, forestry, and restoration. At the other end of the spectrum, at least one non-profit "restoration forestry" enterprise operating in the Gualala River watershed appears to finance its work in part through by harvesting and milling irreplaceable downed old-growth redwood logs and stumps ("buckskins"), advertising "old growth restoration" and old-growth picnic tables for sale on the same website. Downed old growth redwood is considered by forest scientists as a "structural legacy" providing critical wildlife habitat (especially for old-growth dependent species) that cannot practically be restored. Skid roads are also constructed in some "forest restoration" sites to harvest buckskins and thin tanoaks for firewood. This

"restoration forestry" has in fact been proposed as mitigation for vineyard conversions in Annapolis. In contrast, adjacent commercial industrial timber harvests, regulated under California Forest Practice Rules, deliberately leave downed logs, snags, and old stumps as protected wildlife habitat. The forest management plans of community-based nonprofit restoration forestry organizations, in contrast, are still in their infancy. They are not available to provide a working model for mitigation. This is a paradoxical spectrum of forest management practices for non-profit "forest restoration" and commercial for-profit timber harvest. It is even more paradoxical to consider which has been proposed as mitigation for converting forests to croplands.

Who will design, regulate and monitor "forest restoration" practices used as mitigation, and ensure proper scientific supervision for the many decades it will take to replace existing forests? Can we ensure that restoration forestry practices will be a significant ecological improvement over regulated industrial timber harvest practices? How long will it actually take to accrue measurable forest restoration benefits to offset the immediate, certain, and complete loss of habitat when vineyards replace forests? Who will judge whether forests are so "degraded" or irreparably damaged that restoration forestry should count as compensatory mitigation? Will the emphasis on compensatory "restoration" drown out discussion of the primary goals of mitigation – namely, avoiding and minimizing impacts?

Vigilant public participation will be essential to ensure that political and regulatory decisions about vineyard conversion, and its mitigation, are fully informed by rigorous public interest review, and scientific scrutiny.

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