FRIENDS OF THE EEL RIVER

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Via Email and U.S. Mail

California State Water Resources Control Board
Attn: Jeanine Townsend, Clerk to the Board
PO Box 100
Sacramento, CA 95812-2000
commentletters@waterboards.ca.gov
rrfrostregulation@waterboards.ca.gov
Comments on the Russian River Frost Protection Regulation Draft EIR
State Clearinghouse # 2010102053

Dear Chairman Hoppin and Members of the Board:

Friends of the Eel River is pleased to provide the following comments on the Draft EIR for the Russian River Frost Protection Regulations as proposed by SWRCB.

Project Description incomplete and ill-defined.

The Purpose of this Project, as stated in the DEIR, is:
"The State Water Resources Control Board (State Water Board) proposes to adopt a Russian River Frost Regulation that would be designed to prevent salmonid stranding mortality due to water diversion for purposes of frost protection of crops in the Russian River Watershed in Mendocino and Sonoma counties (proposed regulation)." (DEIR 1)

The proposed regulation "would provide that water diversions from the Russian River stream system, including hydraulically connected groundwater, for purposes of frost protection from March 15 through May 15 are a violation of the prohibition against the unreasonable diversion or use of water, unless water is diverted in accordance with a Board approved water demand management program (WDMP), or the water is diverted upstream of Warm Springs Dam in Sonoma County or Coyote Dam in Mendocino County. In order to be approved, a WDMP would need to include: (1) an inventory of the frost diversion systems within the area subject to the WDMP, (2) a stream stage monitoring program, (3) an assessment of the potential risk of stranding mortality due to frost diversions, (4) the identification and implementation

of corrective actions necessary to prevent stranding mortality, and (5) annual reporting of program data, activities, and results." (DEIR i)

Since the proposed regulation is still in Draft form, the Water Demand Management Programs for implementation do not yet exist, and the administrators ("individual or governing body") have not yet been identified or perhaps might not yet exist as entities, the Project Description within the DEIR is significantly incomplete, and does not allow the public, agencies, interested stakeholders and the SWRCB to completely and accurately determine the environmental impacts of them. There are too many possible variations within the range of future "individual projects developed in response to the proposed regulation [that] can be expected to identify project-specific environmental effects" for this DEIR and proposed Regulation to be meaningfully addressed at this point.

"The lead agency for these projects must identify any project-specific environmental effects and either mitigate them to less-than-significant levels or adopt a statement of overriding considerations for approving the project despite the potential for significant environmental impacts. Mitigation measures for individual projects will be applied on a project-level basis and shall be tailored in consultation with the appropriate regulatory agency. Projects undertaken in response to the proposed regulation that involve individual water right applications or petitions will be evaluated under CEQA at a project-specific level by the State Water Board or, depending on the proposed project, by another lead agency." (DEIR iii)

Since future project implementations may well <u>not</u> be under the authority of SWRCB as a lead CEQA agency, defining a continued and identifiable chain of responsibility is difficult or impossible to achieve. The DEIR fails to analyze the potential pitfalls and problems likely with different agencies, institutions, organizations or individuals who would be charged with implementing the "individual projects" and their identifiable environmental impacts under CEQA.

This DEIR must be revised and recirculated *by SWRCB* when these future critical components of the Project are identified and/or created and analyzed under CEQA for their competency, credibility, ability to carry out and fund the programs, authority and effectiveness. Further, the exact final programs envisioned within the proposed WDMPs will need to be reviewed with SWRCB as the lead agency under CEQA, for their effectiveness, completeness, relevance, validity, and inherent ability to enact the Project objectives proposed in this DEIR and draft Regulation. Failure to do so leaves the public and decisionmakers in the dark as to the actual likely environmental impacts of specific subsequent individual projects, the ability to review and revise them while still in a flexible stage of development, and the ability and willingness to comply fully with SWRCB's Project purpose, responsibility and authority.

As described in the CEQA Guidelines (§ 15002, subd. (a)), the basic purposes of CEQA are to:

(1) Inform governmental decision makers and the public about the

potential, significant environmental effects of proposed activities.

(2) Identify ways that environmental damage can be avoided or significantly reduced.

(3) Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.

(4) Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

At this point in the development of the Project and this programmatic DEIR, the cart is significantly before the horse. Without further scrutiny within a revised and recirculated DEIR, the CEQA mandates for a clear and stable project description are not met, and such a truncated process significantly impairs the public's and decision makers' ability to provide informed analysis and recommend changes in the Project while it is still flexible.

We believe that local agencies, where possible, will be motivated by grape and wine industry pressures and demands, to use mitigated negative declarations and administrative approvals of project specific implementations and local WDMPs and/or Best Management Practices guides. This will severely undercut the likely effectiveness of the work that the SWRCB has started with this important set of Regulations. This must be prevented from happening by SWRCB mandates and future environmental review under its own authority as a lead agency under CEQA. The DEIR and revised Regulations should clearly address this. This is particularly important where any questions about water rights are involved, as discussed below.

Unclear delegation for implementation of Regulations.

Merely passing on a series of critical decisions and details of the WDMP and administration of the Project(s) to the next level of definition and institutional implementation ("and individual or governing body") fails to provide sufficient information at the current level of proposed project approvals and programmatic DEIR to adequately assess and address environmental impacts. Who are the proposed "individuals" or "governing bodies"? Without this specific information, it is impossible for the public, stakeholders and decision makers to determine the ability to carry out the regulations as proposed, and to determine the actual environmental impacts as purported in the DEIR.

For instance, in 2010, Sonoma County Board of Supervisors and the Sonoma County Agricultural Commissioner proposed the use of a new private benefit corporation, the Russian River Water Conservation Council (RRWCC), to help draft and administer the county's Frost Protection program, including future Best Management Practices (BMPs), and perhaps the WDMPs required in this Project. However, the secretive RRWCC is apparently composed entirely of grape growers, vintners and their attorneys, with absolutely no public or regulatory agency participation or engagement proposed, and

since its inception in April 2010, none has been allowed. The RRWCC and Sonoma County have only allowed limited public participation after numerous protests from other water and fisheries stakeholders about its secrecy, and after filing of CPRA requests for copies of draft regulations and other background documentation.

Participation was reluctantly allowed by the County, but only after the proposed regulations were in final draft stages. The RRWCC had insisted that all stream gauge and water usage data collected and analyzed through it and the private "Independent Science Review Panel" (ISRP) was the legal and proprietary property of RRWCC and its members, and was not to be available to the public, regulatory agencies or other stakeholders unless and until released in an annual report. No effective, timely or meaningful participation by the public and stakeholders was invited, encouraged or allowed during development of Sonoma County's ordinance provisions, and that stance remains even after Sonoma County adopted their final Frost Protection registration ordinance on February 8, 2011, modifying the earlier Ordinance adopted on Dec. 14, 2010. Friends of the Eel River and other stakeholders have been denied access to the County's and Agricultural Commissioner's implementation applications, documentation and other meetings and communications with grape growers under the adopted Registration Ordinance.

Negotiations and prior agreements for a Sonoma County Frost Protection regulatory ordinance collapsed in February 2011, when the County insisted on indemnification of the County as program administrator against damages due to takes of protected species, and when it insisted on transparent real-time reporting of stream gauging data and full documentation of water diversions. Grape growers refused to agree, leading to an abandonment of the original Ordinance's permitting and regulating provisions, and diluting it to a 'registration' process alone.

See attached articles: "Frustrated supervisors blindsided over frost plan for grapes," "Key elements of Russian River frost plan withdrawn," Press Democrat, Feb. 7, 8, 2011; "Sonoma Wine Industry Freezes Out the Public", Eel River Reporter, Spring 2011

Would SWRCB envision an entity such as the RRWCC as a "governing body"? Sonoma County Agricultural Commissioner? Sonoma or Mendocino County Board of Supervisors? Sonoma County Water Agency? Sonoma or Mendocino County Farm Bureau? MRSA or URSA or RRPOA? the "Independent Science Advisory Group" (SAG)? the Sonoma County Water Coalition? Trout Unlimited? California Sportfishing Protection Alliance? University of California Cooperative Extension? The DEIR is silent on the impacts of this critical subject and its ramifications for environmental impacts and the proclivity and ability to address them.

If details of further implementation of WDMPs and administration are to be passed on to others besides SWRCB, they must be identified with sufficient specificity within the DEIR to be meaningful, with the nature of the entity or individual becoming part of the assessment for environmental impacts of the Project and its subsequent parts. The process of reviewing those future parts of the proposed Project must be clearly identified,

and subject to public CEQA review, comments and participation in the outcomes. The DEIR fails completely to address this inconsistency, incompleteness, potential incompatibilities, and the inherent problems. It must be revised and recirculated to identify and rectify these problems.

Improper delegation of authority for administration of WDMP and water rights concerns.

The proposed Regulation states:

"The WDMP, and any revisions thereto, shall be administered by an individual or governing body (governing body) capable of ensuring that the requirements of the program are met."

"(a) After March 14, 2012, any diversion of water from the Russian River stream system, including the pumping of hydraulically connected groundwater, for purposes of frost protection from March 15 through May 15 shall be unreasonable and a violation of Water Code section 100, unless the water is diverted in accordance with a board approved water demand management program (WDMP), or the water is diverted upstream of Warm Springs Dam in Sonoma County or Coyote Dam in Mendocino County."

[at c(4)]: "*In developing the corrective action plan, the governing body shall consider the relative water right priorities of the diverters* and any time delay between groundwater diversions and a reduction in stream stage." [emphasis added]

The proposed Regulation provides that "compliance with the regulation shall constitute a condition of all water right permits and licenses that authorize the diversion of water from the Russian River stream system for purposes of frost protection. This includes permits and licenses authorizing diversions from March 15 through May 15 for agricultural or irrigation use that were issued by the Board prior to 1979, when frost protection became a separate use under the Board's regulations. The purpose of this provision is to make compliance with the regulation an enforceable condition of permits and licenses." (DEIR, 15)

However, there is no discussion in the DEIR, nor any accounting for the inability of any "individual or governing body" other than SWRCB or the courts to legally, timely, authoritatively and effectively address such issues as the "relative water right priorities of the diverters." The DEIR and proposed Regulation blithely assume that all applicants are legal water rights holders, an unsubstantiated assumption.

For instance, Sonoma County Assistant Counsel David Hurst stated explicitly during development of the county's Frost Regulation Ordinance, that Sonoma County has no authority, nor any interest, in inquiring about the legality of any frost protection applicant's claim of legal water rights. He justifiably insisted that the County has no such authority, and even if they did enquire, that Sonoma County had no interest in pursuing any potential problems, inconsistencies or conflicts. (personal communication, October

18, 2010). Yet the local process envisioned in SWRCB's proposed Regulation potentially places responsibility for ensuring that legal water rights are a part of any frost protection water use application and method of use, and correction of problems, with some other entity than SWRCB.

Sonoma and Mendocino Counties, nor the proposed "individuals or governing bodies" have no authority to enforce water rights, or authority to interpret or judge the "relative water right priorities of the diverters" or to demand that a diverter claiming superior water rights to cease diversions of water deemed by this Regulation to be 'unreasonable or not beneficial.' As a result, any delegation of enforcement activities to "an individual or governing body" such as the counties are highly likely to be contested and ineffectual, gutting the very authority to implement and achieve the State's goals of this Project.

Nowhere does the proposed Regulation even require that applicants divulge whether or not they have legal water rights or license of any kind, nor even if they have completed applications for water rights which are currently pending before SWRCB. As noted, Sonoma County Counsel has stated unequivocably that the County does not have any authority to ask that question, nor to make any decisions about frost protection water use based on the existence or non-existence or priority of legal water rights.

"(e) Compliance with this section shall constitute a condition of all water right permits and licenses that authorize the diversion of water from the Russian River stream system for purposes of frost protection."

The Regulations apparently presume the prior existence of a legally valid water right or license on the part of the applicant. However, since the application requires neither any statement or proof of an existing valid water right or license, nor actual evidence to be provided to demonstrate valid water right or license, the approval of an application to comply with the WDMP could be made for an applicant with no legal water rights or license.

That would inherently contradict the Regulation's requirement that the WDMP "shall be administered by an individual or governing body (governing body) capable of ensuring that the requirements of the program are met." No individual or governing body other than SWRCB has the full authority to effectively and legally process meaningful applications and ensure full implementation of the WDMP. This renders the Regulation and WDMPs essentially meaningless.

The DEIR must address these inherent problems, which will have significant adverse environmental impacts in the worst case scenarios, provide effective corrections or alternatives, and the DEIR must be revised and recirculated to allow for meaningful review and comment from the public.

Proposed Regulation and DEIR Project Description fails to address intrinsic relationship of frost irrigation pumping and diversions, Russian River water balance and the inflows from the Eel River

The proposed Regulation would explicitly not apply to diversions above Coyote Dam (Lake Mendocino) or Warm Springs Dam (Lake Sonoma), because "these two dams are barriers to salmonid migration" and, "diversions for purposes of frost protection above the dams do not have the potential to harm threatened or endangered salmonids above the dams." (DEIR, 16)

The E. Branch Russian River (EBRR) and Lake Mendocino are treated in the proposed Regulation and DEIR as if they are a closed system. The Regulation and DEIR state that frost irrigation by farmers in the Potter Valley and other withdrawals from EBRR above Coyote Dam (including by the Mendocino County Russian River Flood Control and Water Conservation Improvement District) should be exempt from the proposed Regulations, and assume that there are no impacts to salmonid habitat since it is above the declared limits of anadromy.

The DEIR further states that "any potential effects of diversions at or above the dams on salmonids below the dams would be mitigated by the large storage capacity of the reservoirs and the instream flow requirements imposed by Decision 1610." (DEIR 16)

However, the EBRR and Lake Mendocino are <u>not</u> part of a closed hydrologic system: in fact, the inflows from the Eel River through the Potter Valley Project to the EBRR are currently assumed to be an integral part of the water balance for the Russian River system. Under current management of the Russian River watershed, the Russian River is seasonally overdrafted and over-appropriated, and reaches would dry up or lose surface flows without supplemental inflows from the Eel River, which are stored and/or passed through Lake Mendocino to EBRR.

The DEIR, at <u>3. Project Description</u>, <u>4.2 Hydrology and Water Quality</u>, and at <u>8. Cumulative and Growth-inducing Impacts. Water Supply</u> (DEIR 124) completely and erroneously omits any discussion of the environmental setting and hydrologic relationship between the Eel River, the Potter Valley Project diversions, inflows to the EBRR, storage in Lake Mendocino, and their ultimate relationship to the water balance for flows in the Russian River main stem and hydraulically connected ground water. In addition, the impacts of continued diversions of water from the Eel River to its own populations of listed salmonids, water quality and public trust resources must also be addressed. See, Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 870-71

The DEIR must be corrected and recirculated for comment.

Demands above Coyote Dam include the Potter Valley growers' uncoordinated diversions or rediversions of water for frost protection of crops including grapes. The withdrawal of waters from EBRR, primarily derived from the Eel River transfers via the Potter Valley Project, reduce important springtime inflows to Lake Mendocino. Lake

Mendocino's water supply pool storage, augmented with Eel River water, has been deemed necessary for supplying flows to EBRR and the main stem Russian River. This stored water is used to maintain SWRCB's D.1610 minimum flows, instream and public trust values and uses, to make up for pumped drawdown and other losses to hydraulically connected groundwater, evaporation and transpiration, to make up for losses from water demands by downstream water rights holders and municipal potable water suppliers, as well as to make up for the thousands of acre feet of water diverted by the large number of the Russian River watershed's illegal and unpermitted water users. As the DEIR notes (pg 13), timed releases from Lake Mendocino can be made "in anticipation of a frost event to meet the increased demand downstream" as well.

All of these components are cumulatively responsible for reduction of stream stage that can cause stranding mortality downstream of Lake Mendocino. Without including water withdrawals, timings and volumes from the EBRR above Lake Mendocino within the Russian River's water balance distorts the hydrological data, modeling and remedies necessary to assure sufficient flows to prevent fish stranding mortality.

High instantaneous demands on the EBRR above Lake Mendocino can indeed have secondary impacts on the ability of the Russian River's watershed to avoid mortality of salmonids. Such downstream stranding mortality may occur during the frost season, or, with substantial loss of storage capacity of L. Mendocino, later in the season and life cycles of the listed salmonids of the Russian River, as scarce water is not available to address drawdowns for municipal and agricultural use, including heat irrigation for grape growers. The proposed Regulation and DEIR fails to acknowledge this inherent problem, with both direct and indirect environmental impacts, and must be corrected and recirculated.

In addition, if inflows and subsequent water levels of Lake Mendocino are significantly reduced by upstream frost protection pumping, there is an added pressure, legally, politically and economically, to continue or to increase diversions from the Eel River to make up the difference through the Potter Valley Project. This has, led to significant adverse impacts to salmonids and water quality in the Eel River below Cape Horn Dam. The DEIR fails to acknowledge, analyze and address these critical issues.

See FOER's previously submitted "Comments on the Notice of Preparation for the Russian River Frost Protection Regulation EIR", Nov. 30, 2010, attached. Unfortunately, the DEIR failed to respond to many of the comments in this letter. These comments are hereby incorporated in full as comments on the DEIR, and to be treated and responded to as such.

Unless the proposed Regulation and DEIR are willing to explicitly exempt and eliminate all inflows from the Eel River for modeling and for use in addressing maintenance of Russian River flows, the DEIR must include all impacts to the Eel River of this continued diversion. Else, it must provide a water balance for the Russian River with NO water inflows from the Eel River.

The proposed Regulation must be revised to regulate any diversions of water from the EBRR above and from L. Mendocino from March 15 through May 15 as well, for such withdrawals to be recognized as reasonable and beneficial uses of water.

The proposed Regulation and DEIR fails to address these aspects of a correct and complete Project Description and Project impacts, thereby making its evaluation of environmental impacts under CEQA significantly invalid and incomplete. It should be revised and recirculated.

Annual Reporting of program data, activities and results is insufficient to protect against stranding mortality for listed fish and protect the Public Trust.

The proposed Regulation states:
"(1) Inventory of frost diversion systems: The governing body shall establish an inventory of all frost diversions included in the WDMP. The inventory, except for diversion data, shall be completed within three months after board approval of a WDMP. The inventory shall be updated annually with any changes to the inventory and with frost diversion data. The inventory shall include for each frost diversion:
(A) Name of the diverter,; (B) Source of water used and location of diversion,; (C) A description of the diversion system and its capacity,; (D) Acreage served,; and
2(E) The rate of diversion, hours of operation, and volume of water diverted during each frost event for the year."

"c(5) Annual Reporting: The governing body shall submit a publically available annual report of program operations, risk assessment, and corrective actions by September 1 following the frost season that is the subject of the report."

Annual reporting makes it impossible for the regulatory agencies (including NMFS, EPA, USFWS, CDFG), other water users and other upstream and downstream water rights holders to effectively prevent, avoid, correct and end high, instantaneous, cumulative water demands from producing stranding mortality and other damages to protected fisheries and their critical habitats on a timely basis. Delayed reporting can and will continue to lead to damages to redds and instream habitat necessary for fish survival and recovery and protection of Public Trust resources.

Timely self-reporting by offending frost water diverters, their agents, associations or neighbors cannot be depended upon to systematically and effectively prevent similar disastrous results. This is acknowledged at 6.10.5 Adopt a Regulation That Requires Real-Time Diversion Monitoring and Reporting – Alternative 5. "This alternative would be the most effective in terms of ensuring fast response to situations in which salmonids are at risk for mortality due to stranding." (DEIR 93)

Compliance with the currently proposed Regulations in this respect could result in loss of a year class of juvenile salmonids in a particular tributary, yet there is no action to

prevent that required. This significant adverse impact is not remedied in the Regulation or in the DEIR.

"Even though this alternative may be the most effective in fulfilling the objective of preventing harm to salmonids by providing for immediate response and corrective action in situations of potential salmonid mortality, this alternative does not consider that there may be streams in which the risk to salmonids is low. It may be unreasonable to require all frost diverters to install real-time diversion monitoring, especially on streams where salmonid stranding is not likely to occur. Accordingly, this alternative is less likely to meet one of aspect of the project objective, which is to minimize the impact of regulation on the use of water for purposes of frost protection." (DEIR 93)

The rationale given to discard this alternative makes no sense. Without real time monitoring, those streams that do experience stranding conditions have no effective protection. For the sake of sparing some minor costs for real-time monitoring on streams where no low-water stranding occurs, the analysis gives up the benefits of preventing or quickly alleviating conditions where salmonids are indeed put in jeopardy or conditions of take under ESA. This is supposed to be the primary purpose of the SWRCB's proposed Regulation, yet that is abandoned here with no supporting evidence of undue costs.

While Alternative 5, *Adopt a Regulation That Requires Real-Time Diversion Monitoring and Reporting*, comes closest to this necessity, it still leaves the reporting to suffer from up to a 36 hour lag time, during which time the damages to salmonids may well be inflicted and irremediable. There is no effective reasoning offered in the DEIR to reject instantaneous reporting of monitoring results from diverters.

Alternative 4, Adopt *a Regulation Similar to California Code of Regulations, Title 23, Section 735*, appears to eliminate this entire issue by reasonably requiring off-stream storage for frost irrigation.

The very efficacy of the WDMP and these Regulations to prevent damages to protected salmonids and their habitat is severely undercut unless instantaneous reporting of stream stage data is required in the Regulations. Without that provision, there can be no assurance that water used for frost protection will indeed be "reasonable and beneficial". Further, unless the Regulation requires real-time monitoring data to be available to the interested public, agencies and stakeholders, the DEIR disastrously understates the impacts of the Regulation, and must be rewritten and re-circulated as a Revised DEIR.

No mandate of full public and stakeholder participation in monitoring and development of Annual Report will lead to failure to protect salmonids and their habitat.

The proposed Regulation states:

("2) Stream stage monitoring program: The governing body shall develop a stream stage monitoring program in consultation with National Marine Fisheries Service (NMFS) and California Department of Fish and Game (DFG). For the purposes of this section, consultation involves an open exchange of information for the purposes of obtaining recommendations."

It is not clear what is meant by "open exchange of information". Does this require public notice and the right of the non-grape growing and or wine industry public to provide meaningful and timely input? Or are the public and other stakeholders excluded from timely participating in inter-agency correspondence? The ability of the wide range of stakeholders to participate in a meaningful and effective development of regulations, oversight, reporting and the values for this program can easily lead to distorted and invalid conclusions about the programs' effectiveness and protection of listed salmonids and their habitat.

Indeed, during the entire development in 2010 of Sonoma County's ill-fated frost control regulations and registration, the public was repeatedly excluded from timely and effective participation in the grape and wine industry's collaboration with the County staff and Agricultural Commission's staff to craft favorable regulations for their frost protection activities. In fact, as previously noted, the public and non-industry stakeholders remain excluded by Sonoma County and the Agricultural Commissioner's staff from additional developments and discussions of implementation of the Sonoma County Frost Protection Registration Ordinance to this date.

SWRCB must not be lured into this trap as well. Exclusion of the public and stakeholders (including downstream water rights holders, fisheries, recreational and tourism interests, other non-grape agricultural interests, property owners, tribal, local, state and federal agencies, municipal water customers and ratepayers) from an active, timely and transparent participation in the WDMP process, implementation, reporting, administration, review and modifications will very likely lead to deteriorated conditions for listed salmonids, and likely lead to increases in stranding mortality and other damages to protected habitat. The DEIR fails to recognize and address these inherent problems and environmental impacts.

Given the likelihood of additional harm to salmonids if the process and oversight is limited as proposed, the DEIR must analyze these impacts in a Revised and recirculated DEIR.

Additional Actions that may be taken by affected persons

Chapter 6 lists Actions that may be taken by persons affected by the proposed Regulations. We offer some additional options and supporting information.

Crop Insurance
The use of crop insurance to reduce the risk of losses due to weather related events is a common tool used throughout the United States for a wide variety of crops, including grapes. The use of crop insurance in successfully ameliorating losses in grape production is discussed in the attached article, "Choosing Crop Insurance", Stephen Yafa, Wines & Vines, January 2011. It is standard agricultural practices for the growers to internalize the costs of weather-related risks by purchasing crop insurance, so as to take on the consequences of planting a particular crop on their land within a normal range of weather events, as part of their reasonable costs of doing business.

Selective Inverted Sink fans; Microwave heating technology; overviews of options
We are attaching several articles and manufacturer's information and research links, showing the use of "selective inverted sink" fans (SIS) as an effective alternative to frost water irrigation for vineyards.
See: "To blow up or down?", Paul Franson, Wines & Vines, December 2009
"Saving Water and Energy with the Cold Air Drain", associated research studies and test cases, applications, Shur Farms, www.shurfarms.com
"Grapevine Frost Protection Technology Tested", Hudson Cattell, Wine & Vines, April 30, 2010
"Frost Protection Considerations", G. McGourty, R. Smith, UC Cooperative Extension, n.d.

Economic Analysis severely flawed

Please note that the Economic and Fiscal Impacts of the Proposed Frost Regulation provided at DEIR Appendix D fails to provide any quantitative analysis or accounting for the values of the steelhead, coho and Chinook salmon themselves; any value of recreational, sports or commercial fisheries for these species with their recovery; the tourism values of having a river with a viable and recovering salmonid populations; lost property values for Sonoma and Mendocino land without salmon and steelhead as part of the regional attractiveness; the intrinsic value of the salmon and steelhead; and the regional identity as not just the Redwood Empire, but also the historic identity of the Russian River watershed as a prime salmon and steelhead region of the country and North Bay region.

As a result, the economic analysis is completely skewed and invalid, with only a declaration of the most severe costs of purported losses to the grape and wine industries and no costs or benefits related to the loss or recovery of steelhead, Chinook or coho salmon. However, like any real balance sheet, it should have included the net gains for a recovered, and revered, salmon and steelhead population throughout the Sonoma and Mendocino watershed of the Russian River – or conversely, for their loss in this region.

For the economic analysis to have any value, credibility, validity and relevance to the proposed Regulation, the DEIR should include a completely revised and balanced

economic analysis including the quantitative values of a recovering or lost fishery. At the very least, the losses purported to accrue to the grape and wine industries must be balanced with the losses attributable to the long-term loss of salmon and steelhead in the region. In addition, the continued demands for Eel River water (never compensated or paid for by its Russian River water beneficiaries) and the losses to Eel River threatened and endangered salmon and steelhead populations, fisheries, tourism, recreation, tourism, tribal rights and historic identities, and North Coast regional identities, should be included in any so-called economic analysis that attempts to quantify the value of grapes and wine production vs. proposed regulatory controls on the indiscriminate use of water and public trust resources for frost control irrigation.

Friends of the Eel River appreciates the opportunity to provide comments and suggestions on the Russian River Frost Protection Regulation DEIR. We reserve the right to raise other issues and provide comments on the DEIR until the time of the final public hearing to be held on the Draft EIR.

Please send any notices related to the Project EIR to:

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Nadananda@eelriver.org

Sincerely,

David Keller
Bay Area Director, Friends of the Eel River

Cc: Ellison Folk; Nadananda

Attached:
"Frustrated supervisors blindsided over frost plan for grapes," Press Democrat, 2/7/11
"Key elements of Russian River frost plan withdrawn," Press Democrat, 2/8/11
"Sonoma Wine Industry Freezes Out the Public", Eel River Reporter, Spring 2011
"Choosing Crop Insurance", Stephen Yafa, Wines & Vines, January 2011

"To blow up or down?", Paul Franson, Wines & Vines, December 2009
"Saving Water and Energy with the Cold Air Drain", associated research studies and test cases, applications, Shur Farms, www.shurfarms.com
"Grapevine Frost Protection Technology Tested", Hudson Cattell, Wine & Vines, April 30, 2010
"Frost Protection Considerations", G. McGourty, R. Smith, UC Cooperative Extension, n.d.
"Comments on the Notice of Preparation for the Russian River Frost Protection Regulation EIR", Friends of the Eel River, submitted to SWRCB Nov. 30, 2010

Frost Protection Considerations

Glenn McGourty, Winegrowing Advisor
Rhonda Smith, Viticulture Advisor
UC Cooperative Extension

University of California
Division of Agriculture and Natural Resources

Presented with the assistance of…

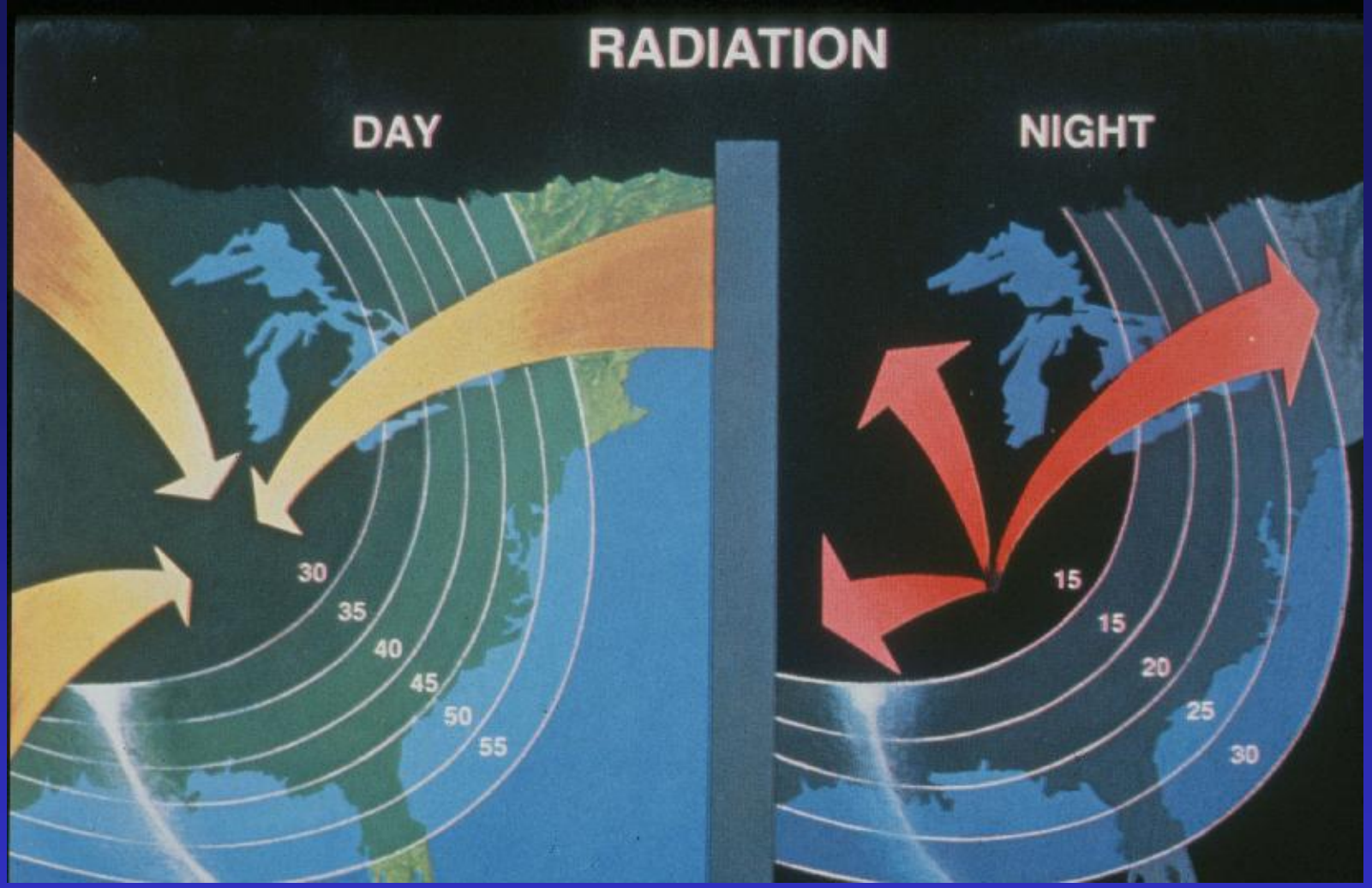
- Rick Snyder, Biometeorologist, UCD Department of Land Air and Water
- http://biomet.ucdavis.edu/
- Rhonda Smith, UC CE Farm Advisor, Sonoma County
- Rachel Elkins, UC CE Farm Advisor, Lake County
- Steve Lindow, UC Berkeley

To be covered….

- Radiation frosts versus Advective freezes
- Passive frost protection methods
- Active frost protection methods
- When to turn sprinklers on and off

Why Frost Protect?

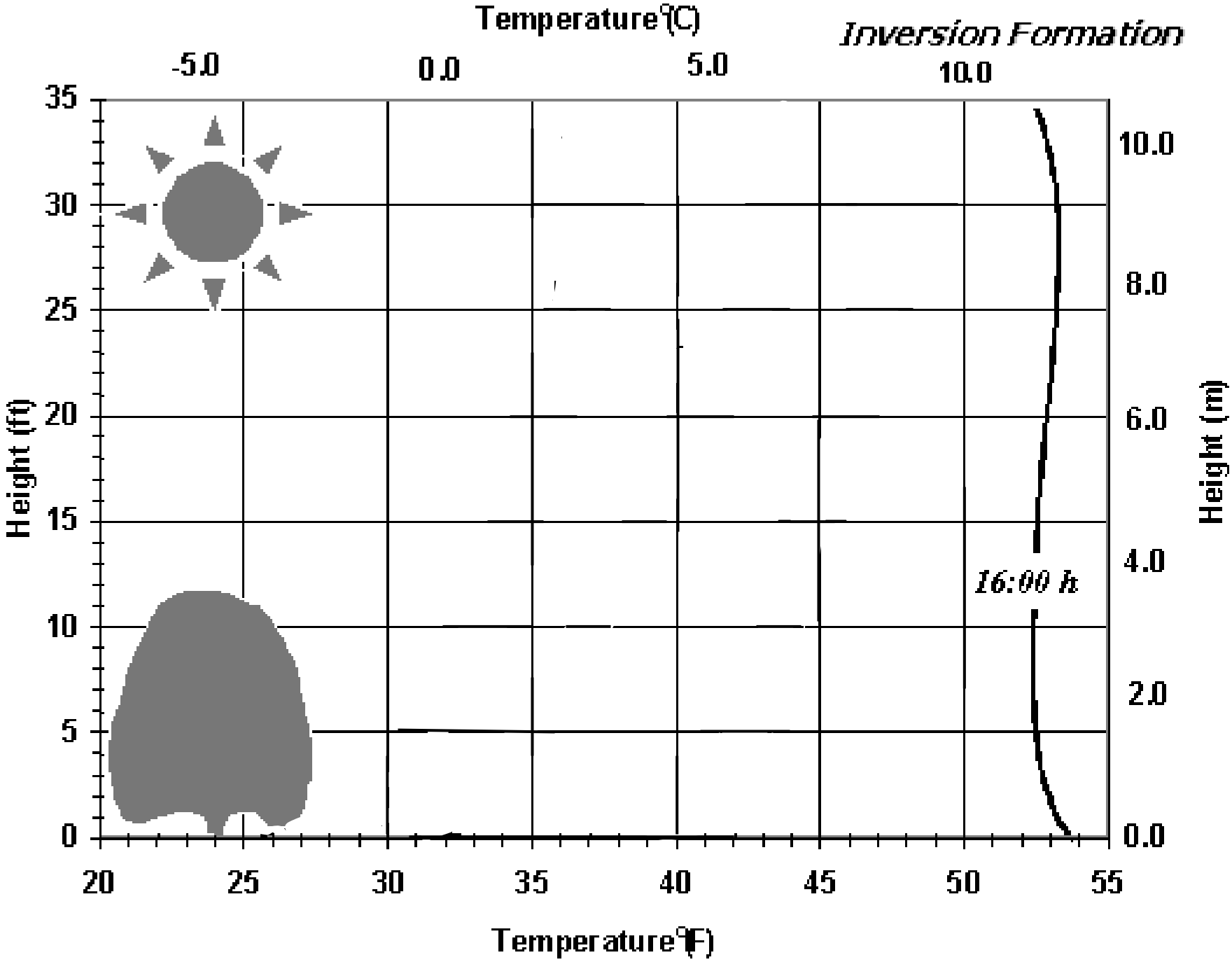
- All green parts of the vine are susceptible to frost, all during the growing season



More heat radiates AWAY from earth than it receives

Radiation Frost

- Occurs when nights are clear, and heat radiates from the earth
- Air is stratified, with coolest air close to the ground, and the air is usually still
- If warm air is 10-50 feet above the ground, it is possible to mix the air with fans
- These frost events are frequently mild, and usually above 27 °F


Temperature(C)
Inversion Formation
-5.0
0.0
5.0
10.0
35
30
25
20
15
10
5
0
Height (ft)
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Height (m)
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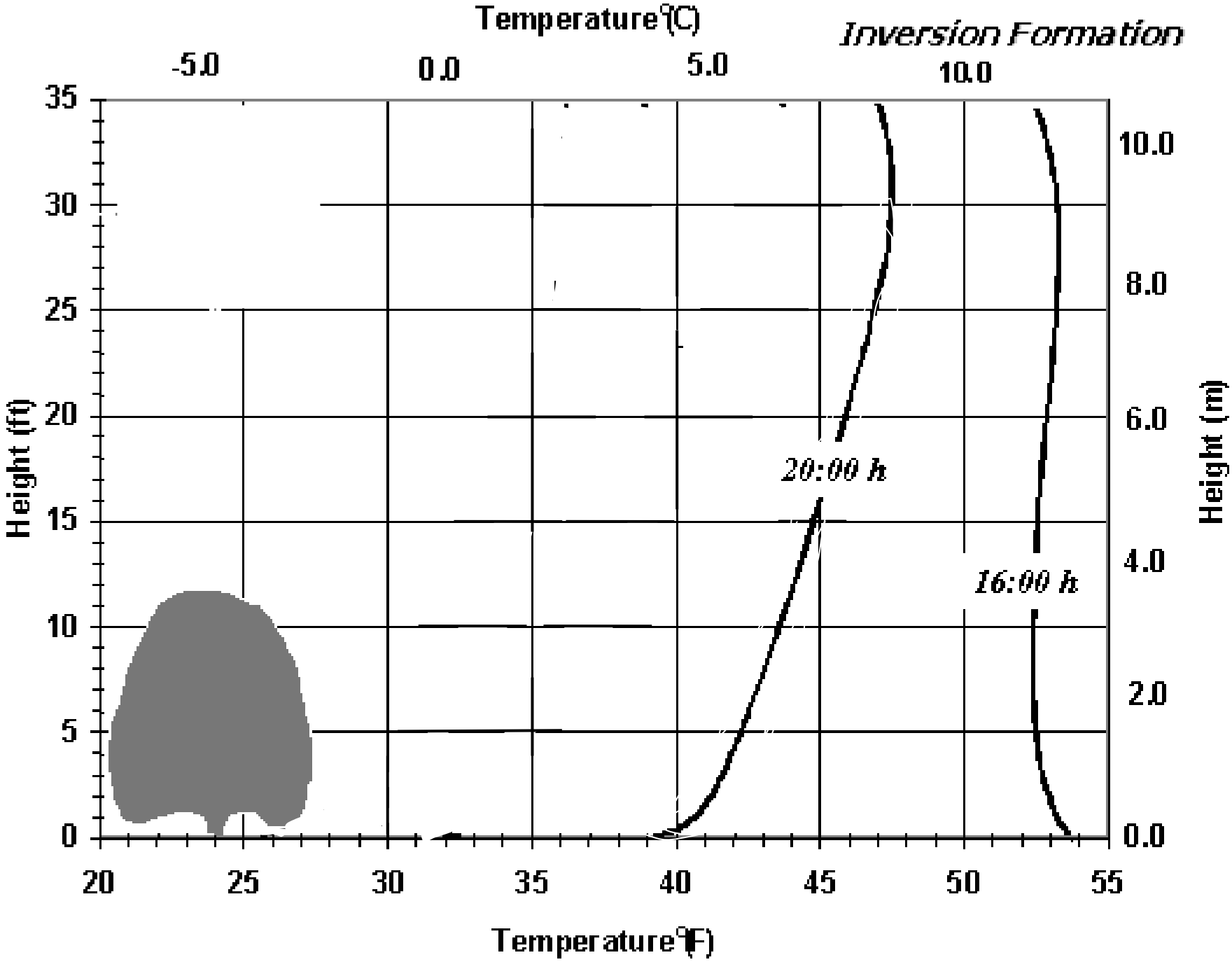
Temperature(F)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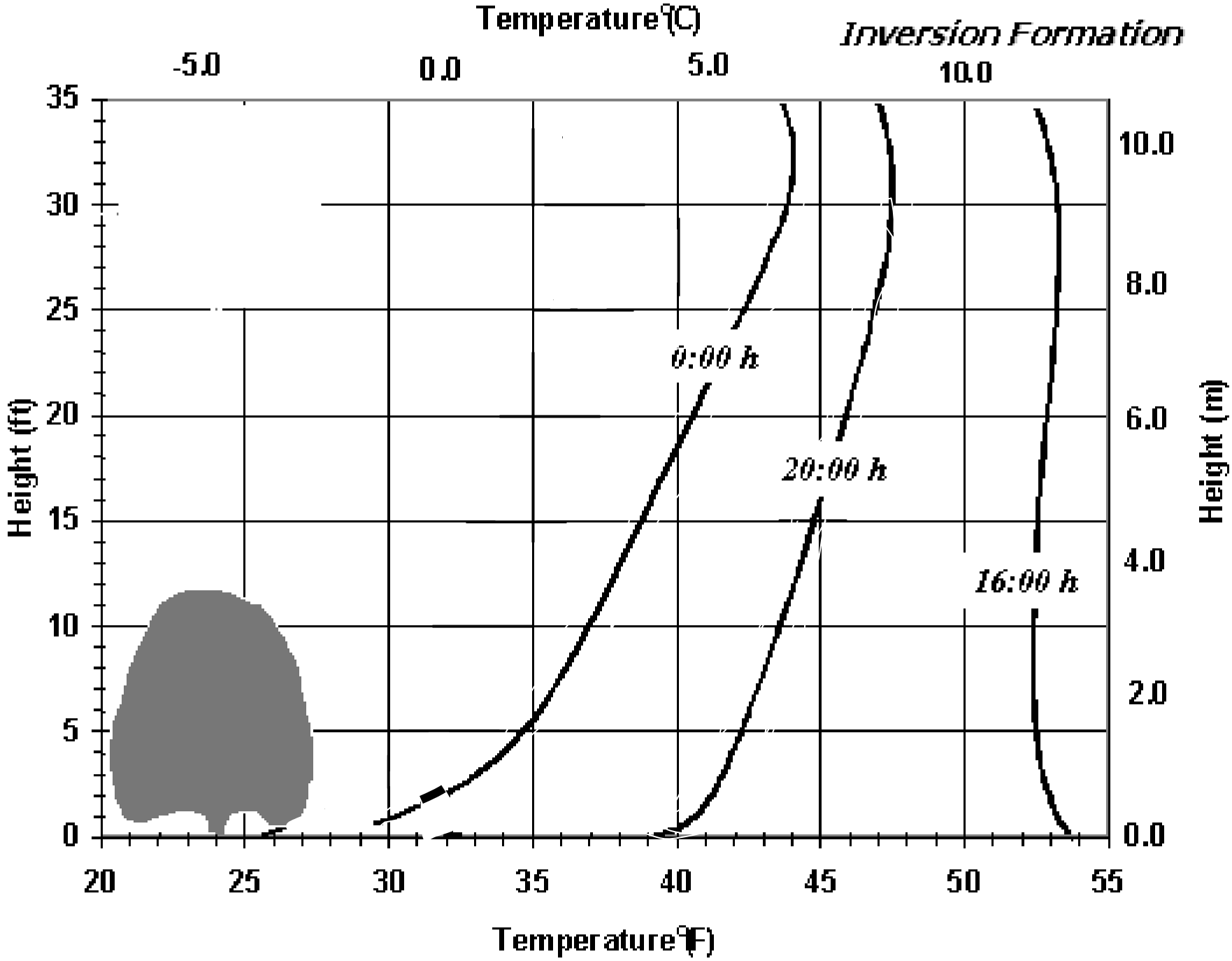
Temperature (F)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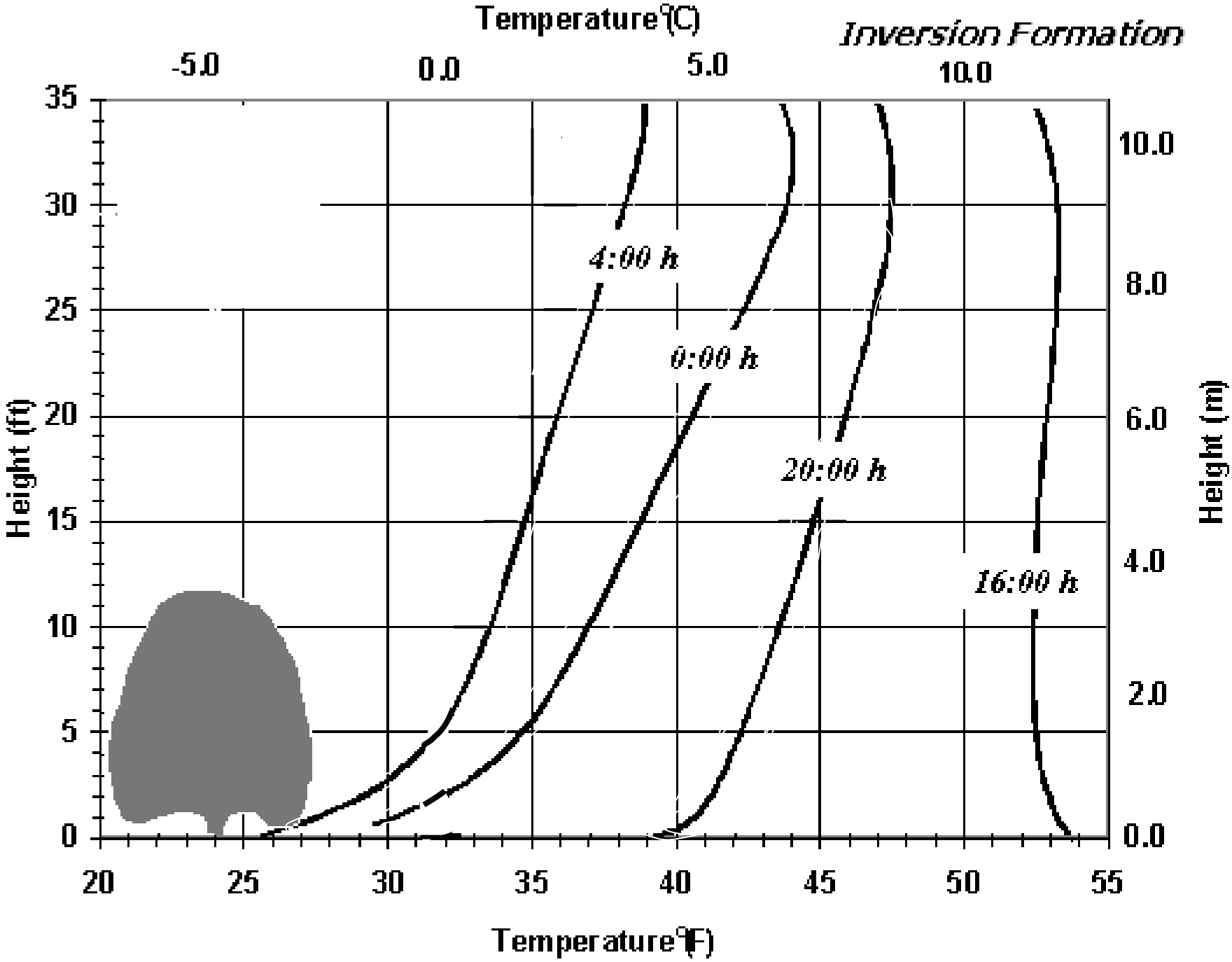
Temperature(F)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Height (m)
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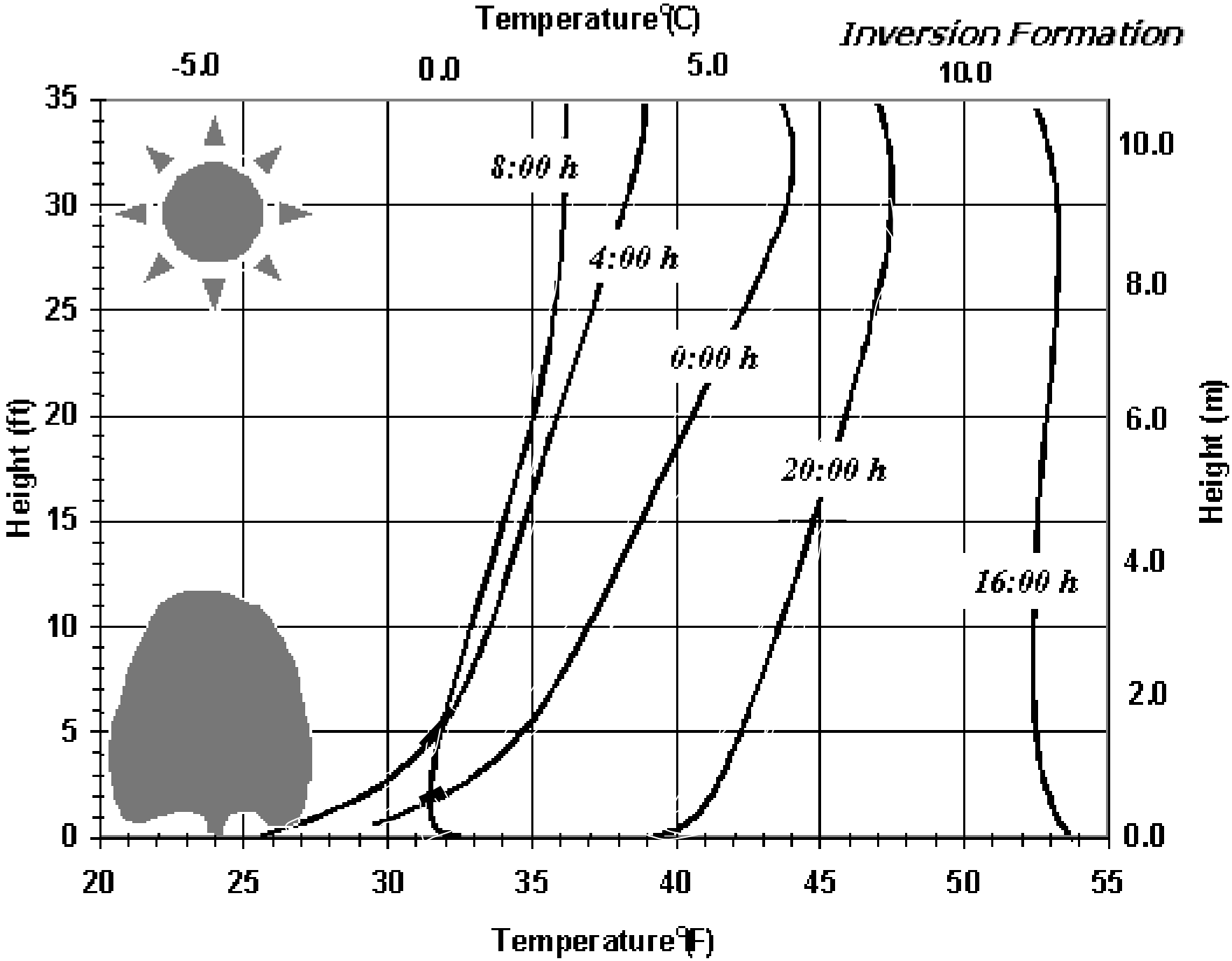
Temperature (F)


Inversion Formation
Temperature (C)
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5.0
10.0
8:00 h
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Height (ft)
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Height (m)
10.0
8.0
6.0
4.0
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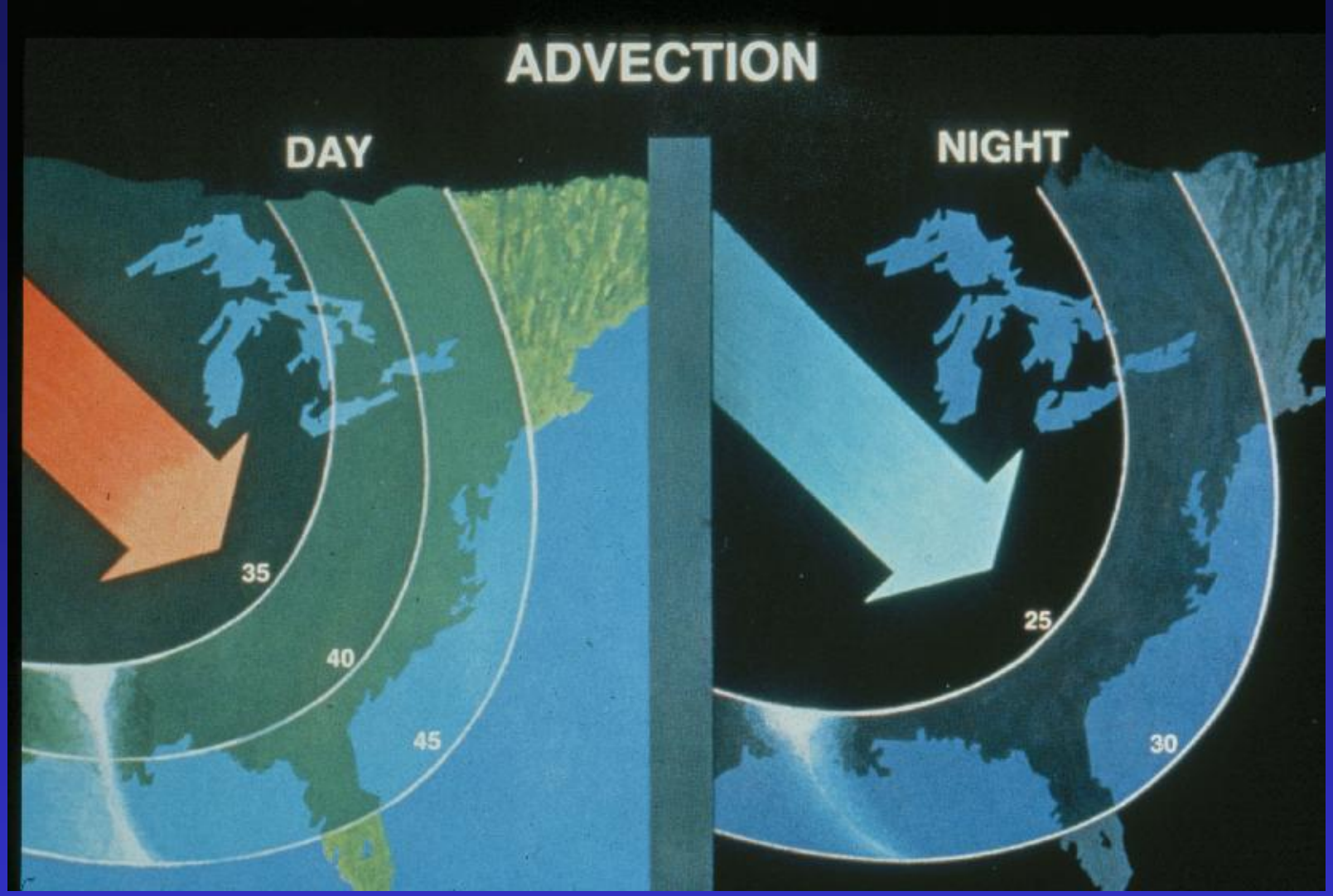
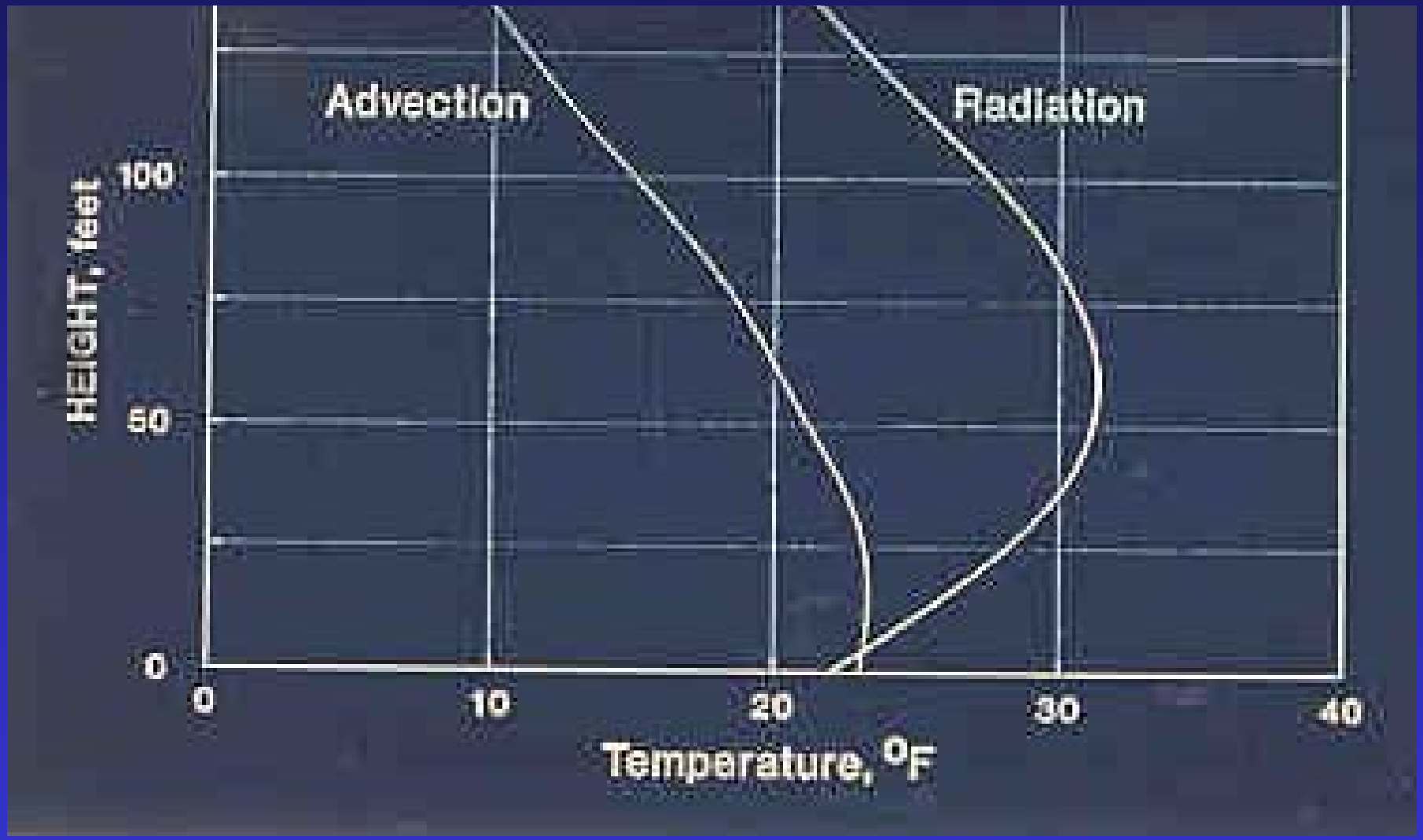
20
25
30
35
40
45
50
55
Temperature (F)

Advective Freeze

- This is caused by a large cold air mass, usually accompanied by wind and low humidity
- The air may actually become colder with elevation
- These freezes can be very cold, going down to 21 °F
- These can cause more damage than radiation frosts because active protection measures are not effective



Moderate to strong winds; no inversion; low relative humidity


Advection
Radiation
HEIGHT, feet
100
50
0
0
10
20
30
40
Temperature, °F

For radiation frosts only!

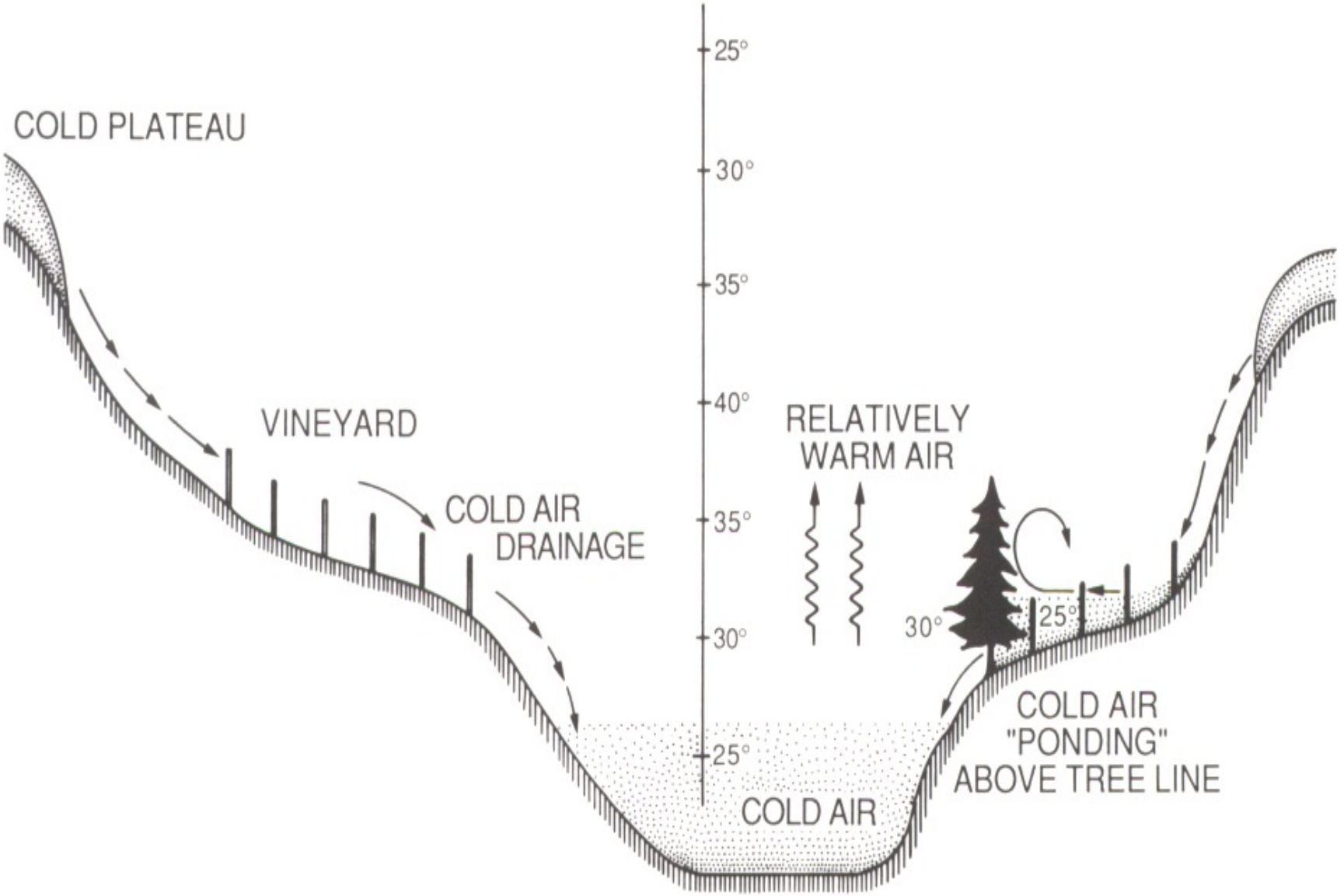
Passive Frost Protection Methods

- **Site selection**
- **Late vs. early varieties: Cool facing slopes for early varieties**
- **Soil water management**
- **Ground covers**
- **Time and method of pruning**

Site Selection

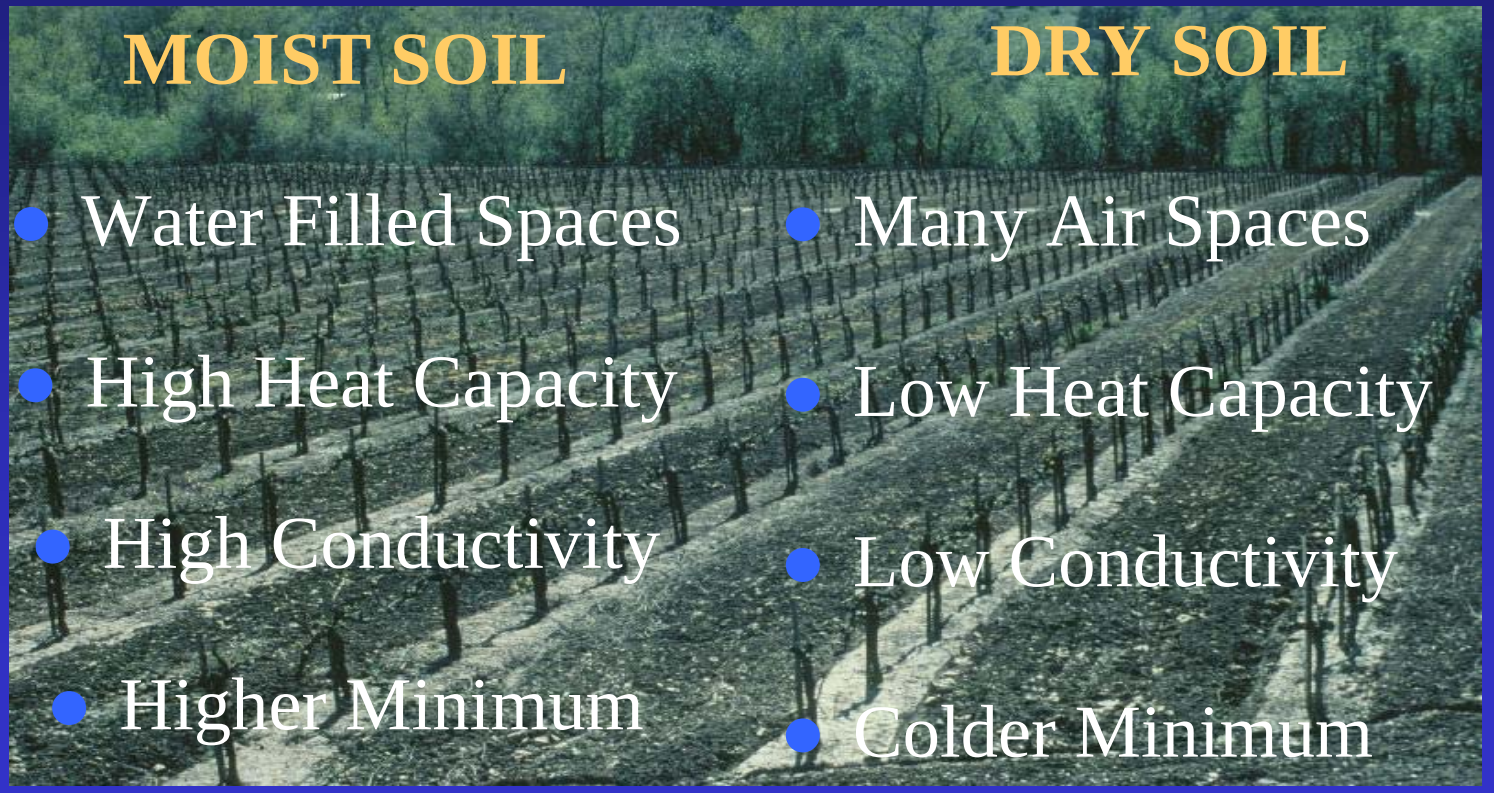
- **Old tradition of planting vineyards--upland areas are best if you have a choice**
- **South and West facing slopes tend to be warmest…*(but are they the safest for other concerns??)***
- **Manage brush, trees or other air dams that prevent cool air from flowing out of the vineyard**

Site Selection: Cold Air Flow



From "*Site Selection for Commercial Vineyards*", Pub. No. 463-016 Virginia Cooperative Extension

Soil Water Management



MOIST SOIL

- Water Filled Spaces
- High Heat Capacity
- High Conductivity
- Higher Minimum

DRY SOIL

- Many Air Spaces
- Low Heat Capacity
- Low Conductivity
- Colder Minimum

Soil Water Management

- **Keep soil water content near field capacity**
- **Wet 2-3 days early**
- **Wet entire surface**
- **Wet the top foot**

Soil Water Management
To Reduce Frost Risk

- Maximum protection: Bare, packed soil - either cultivated or sprayed with herbicides

- Drawbacks: Erosion risk, loss of soil organic matter, destruction of soil structure, poor footing for early spring spraying

Ground Cover

- Reflects Sunlight
- Evaporates Water
- Reduces Stored Soil Heat
- Colder Minimum
- Ice Nucleating Frost
- Prevents erosion, many other benefits

Frost and Vineyard Floor Management

Ground Preparation	Temperature Change
Bare, Firm, Moist Ground	Warmest
Shredded Cover, Moist	0.5 ºF cooler
Low Cover, Moist Ground	1 to 3 ºF cooler
Dry, Firm Ground	2 ºF cooler
Freshly disked, fluffy	2 to 3 ºF cooler
High cover crop	2 to 4 ºF cooler
High cover crop, restricted air drainage	6 to 8 ºF cooler

Wilbur Reil, Yolo & Solano Tree Crops Advisor, retired

Ice Nucleating Bacteria

- Pseudomonas syringae
- Erwinia herbicola
- Pseudomonas flourescens
- Pseudomonas viridiflava
- Xanthomonas campestris var. vesicatoria

Most of the data on the risks associated with ice nucleating bacteria being present on grass cover crops is from citrus and pears.

Ice Nucleating Bacteria

+ -

Ice Nucleating Bacteria

+ -

Compromise with cover crops

- Plant in every other row with a ground cover
- Avoid species like bell beans and peas that cannot be mowed closely during frost period - or else disk in, mow short
- Mow everything early, before bud emergence (as much as 2 weeks ahead of time)
- If over head sprinklers used as frost protection, then growing cover crops in a frost prone regions becomes much safer


Double Pruning

Sprays

- Frostban (A506)
- Frost Shield
- Copper Compounds

Probably only copper is truly effective, and it would be best focused on the cover crops, since they produce the most bacteria (but any Cu in runoff can be very toxic to fish)

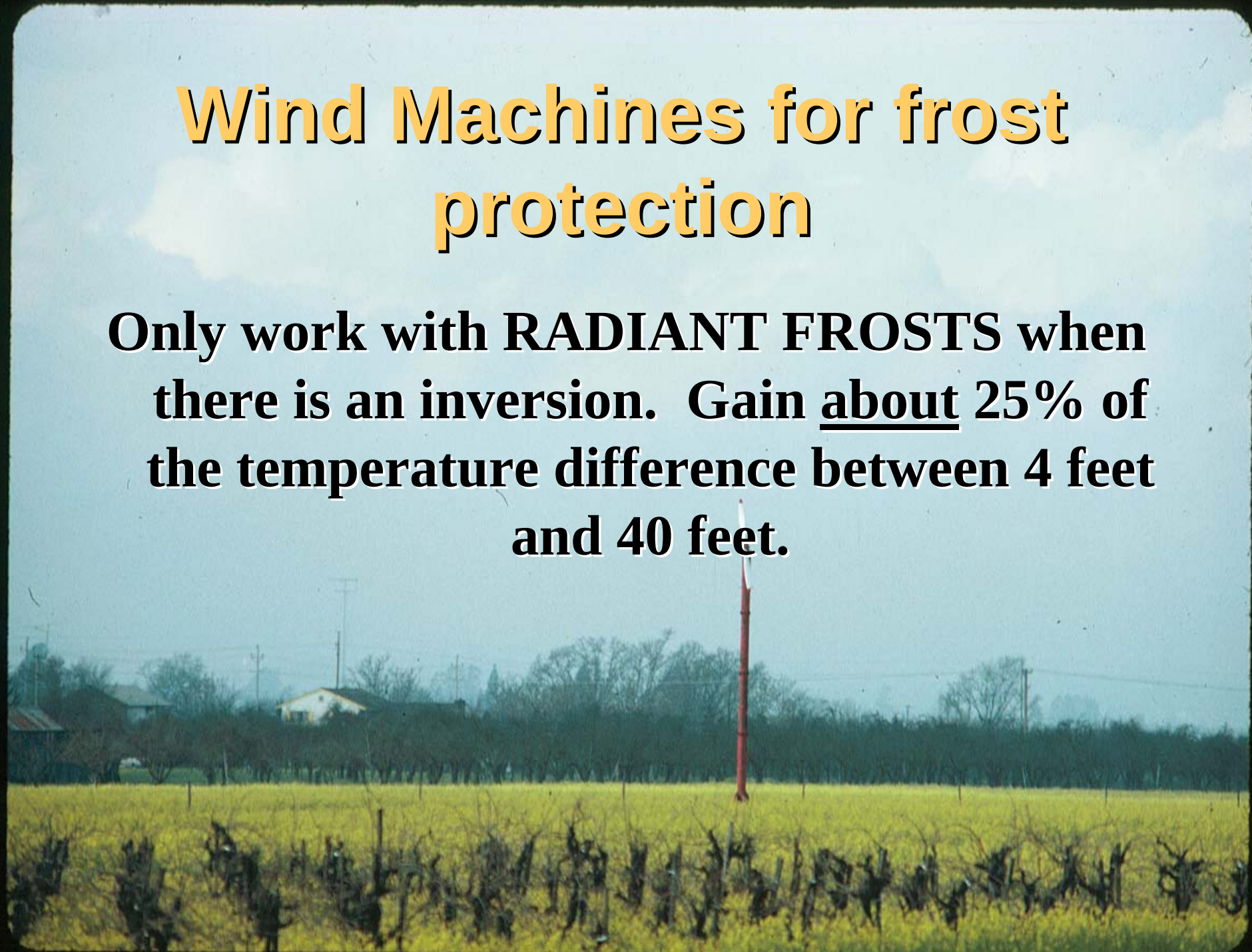
For radiation frosts only

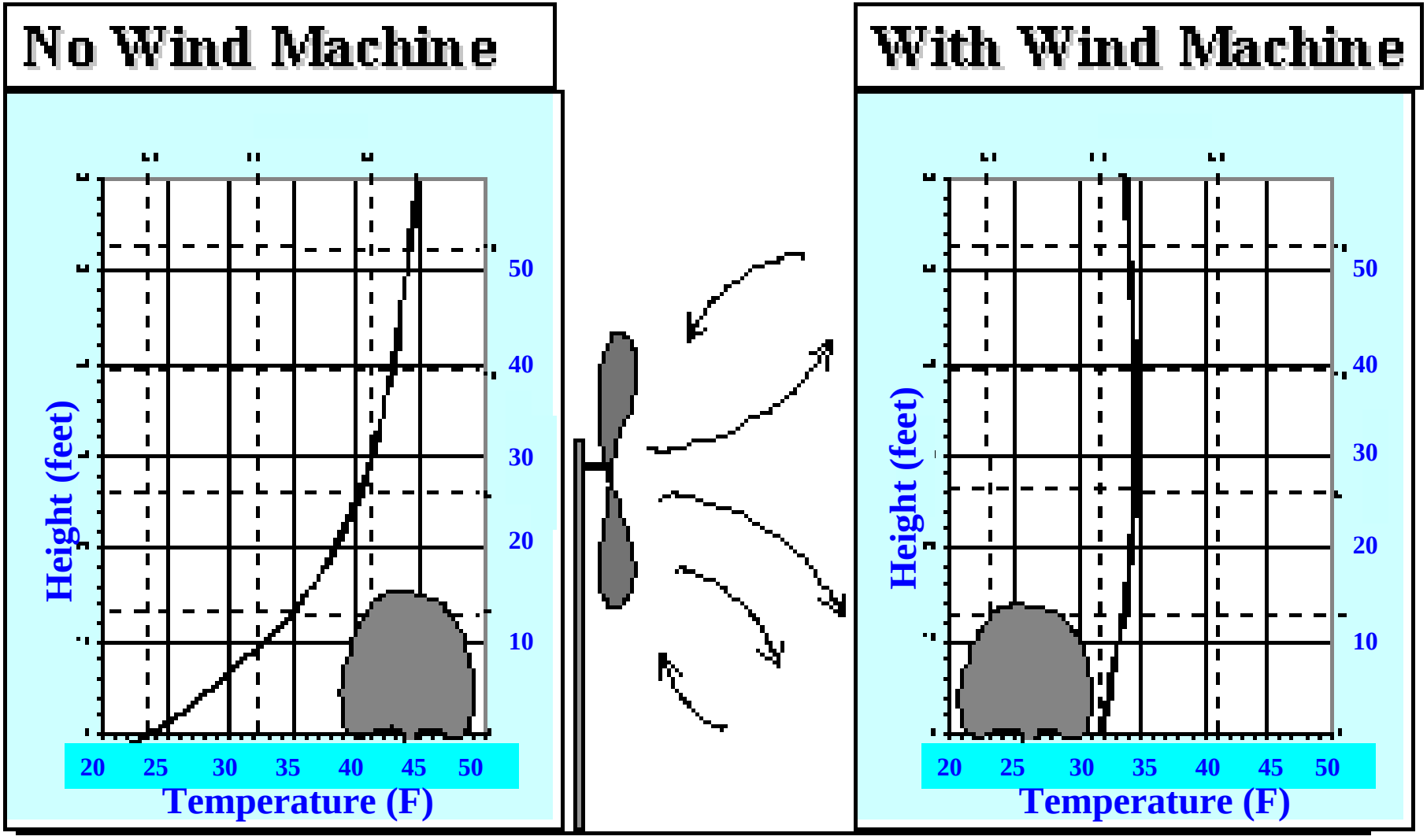
Active Frost Protection Methods

- **Wind Machines**
- **Orchard Heaters**
- **Overhead sprinklers**
- **Micro-sprinklers**

Wind Machines for frost protection

Only work with RADIANT FROSTS when there is an inversion. Gain about 25% of the temperature difference between 4 feet and 40 feet.





From *Principles of Frost Protection*, R. Snyder, UCD

Wind Machines

- **Turn on fans when the temperature at 5 foot height is above the critical damage temperature.**

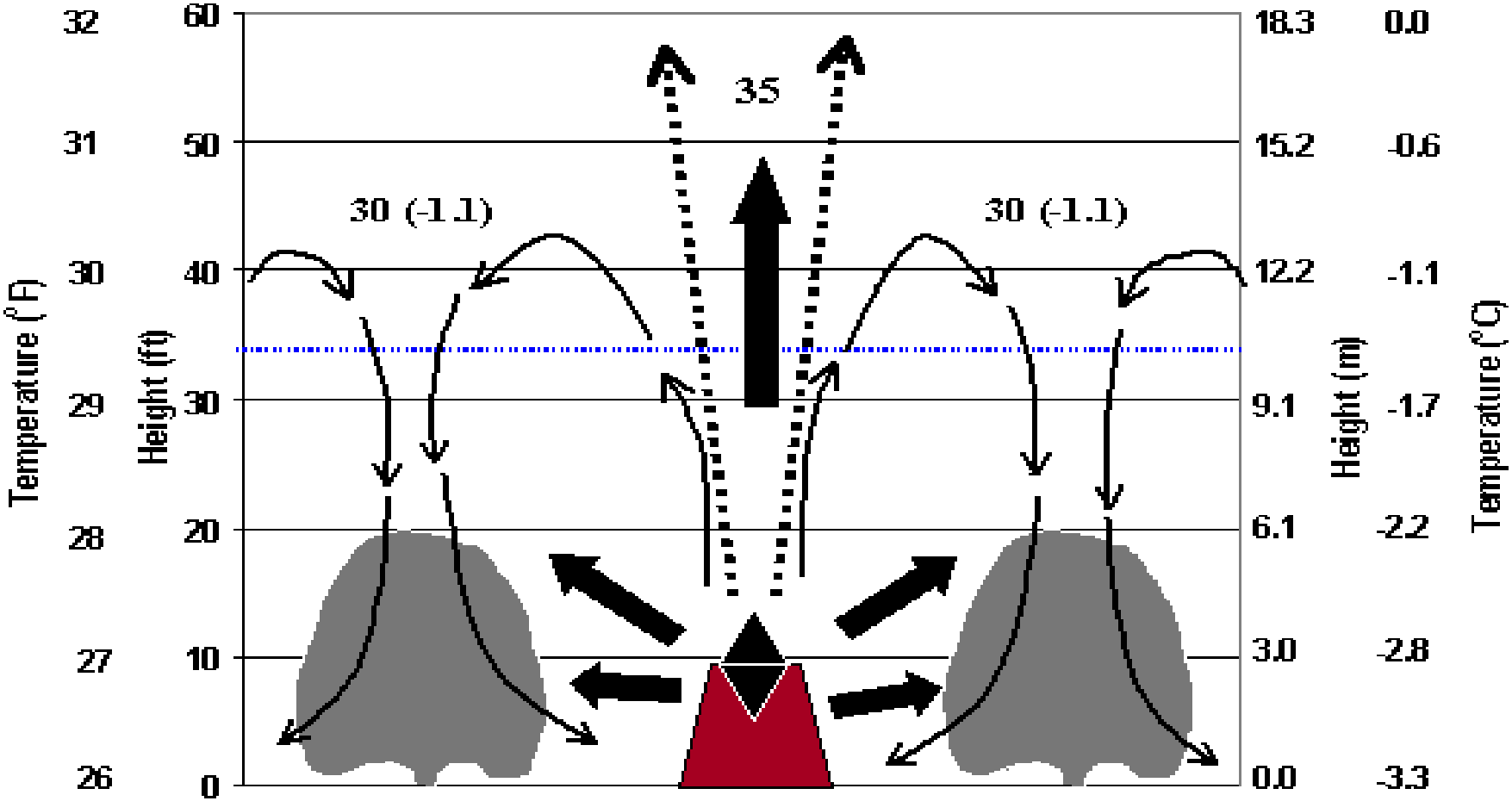
OR

- **Turn on fans before the temperature at 5 foot height falls much below the temperature at 33 foot height.**

Orchard heaters increase the effectiveness of wind machines

20-25 heaters/acre plus wind ⏩ 3 to 4 degree rise

Heaters



Heaters provide convective mixing of air. Work best with an inversion.

From *Principles of Frost Protection*, R. Snyder, UCD

Sprinkler Frost Protection

- The object is to maintain an ice/water interface around the green tissue
- When the water freezes, heat is liberated from the water, and a temperature of **32** °F is maintained as long as there is a mixture of water and ice with water dripping off the plants.

Sprinkler Requirements

Conventional pulsing sprinklers

- Uniform application of water
- Precipitation rate of 0.11 inches/ hour
- Equivalent of ***about*** 50 gallons per minute per acre
- Good pressure is needed (most systems > 50 psi)

Sprinkler Requirements

Conventional pulsing sprinklers

You Need Serious Water

When to turn on & off sprinklers

Definitions

- **Dry bulb temperature** = air temperature measured with a thermometer
- **Wet bulb temperature** = air temperature that occurs when heat is removed from the air to evaporate water until the air becomes saturated. Measured with a psychrometer OR calculated from DEW POINT and air temperature
- **Critical temperature** = the dry bulb temperature at which the crop begins to be damaged

Dew Point temperature

The dew point temperature is the air temperature when the air has reached 100% relative humidity. It assumes that water vapor content does not change. At the dew point temperature, water vapor in the air is likely to condense on surfaces as dew (or frost).

The dew point temperature can be measured or estimated from air temperature and relative humidity or from dry and wet-bulb temperatures. The weather service often reports the dew point temperature.

Dew or Frost Formation?

A Dew Point of 45 ºF:

- **Dew** begins to form on vegetation or other objects exposed to a clear sky when the temperature drops to 45 degrees F

A Dew Point of 28 ºF:

- **White frost** will appear when the temperature drops to 28 degrees F!

A **“high”** dew point (above 35° F)

- Temperature fall during the night is slow and steady with few fluctuations

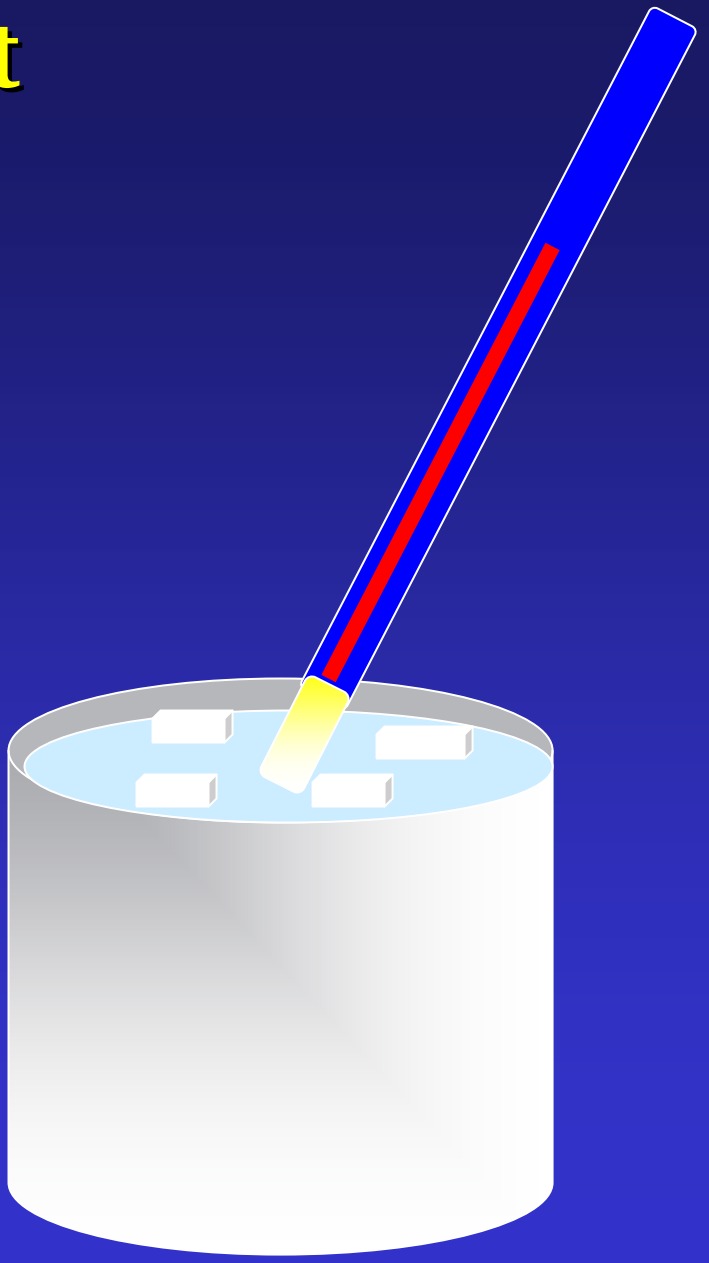
* Frost is rarely a problem when dew point is above 45° F.

A **“low”** dew point (below 25° F)

- Temperature fall is rapid
- Watch thermometers carefully
- Humidity is very low
- Frost damage is likely

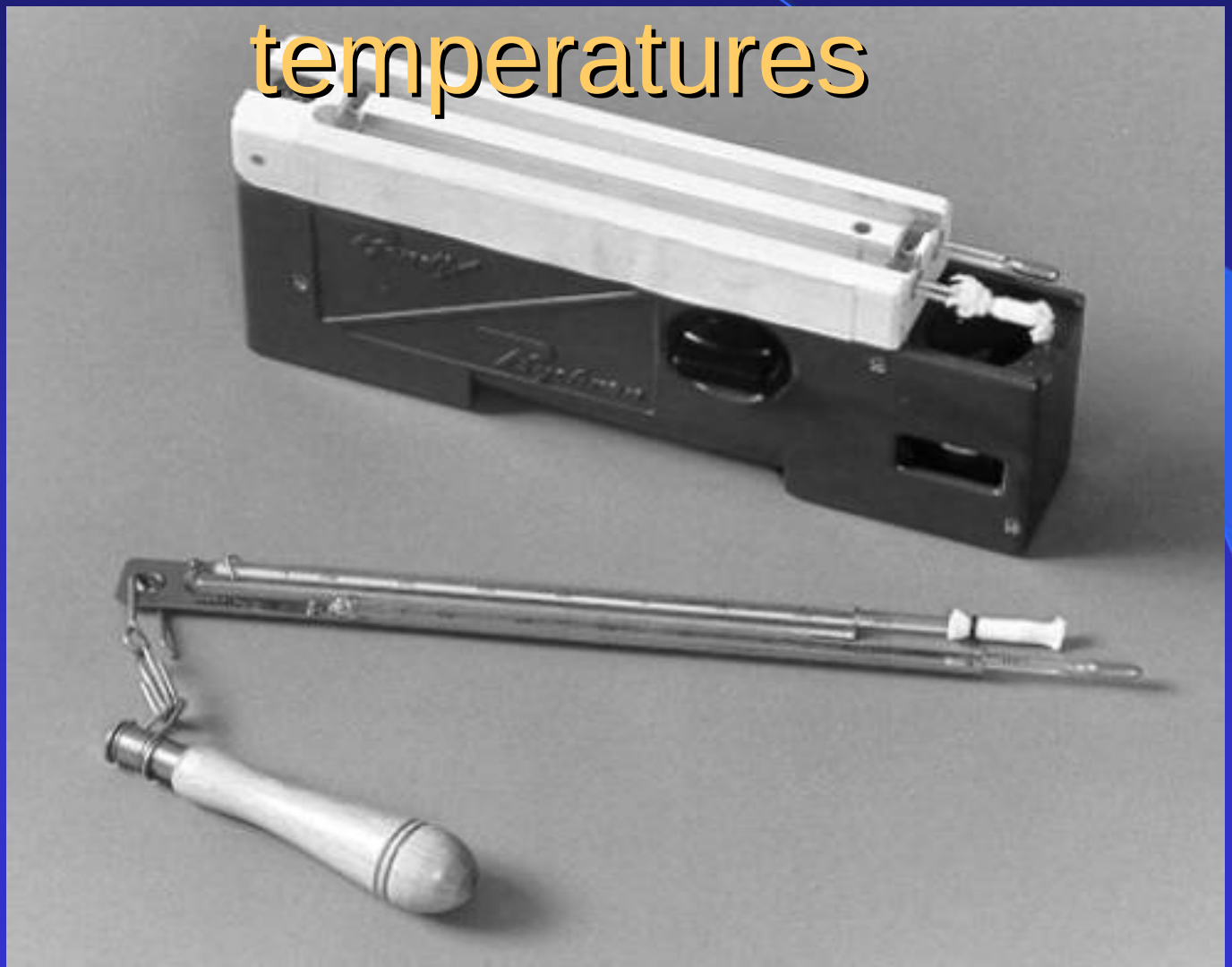
Measuring Dew point Temperature

Slowly add ice cubes to the water to lower the can temperature. Stir the water with a thermometer while adding the ice cubes to insure the same can and water temperature. When condensation occurs, note the dew point temperature.



From *Principles of Frost Protection*, R. Snyder, UCD

Find humidity with psychrometers: measure wet bulb and dry bulb temperatures



When to turn on & off sprinklers

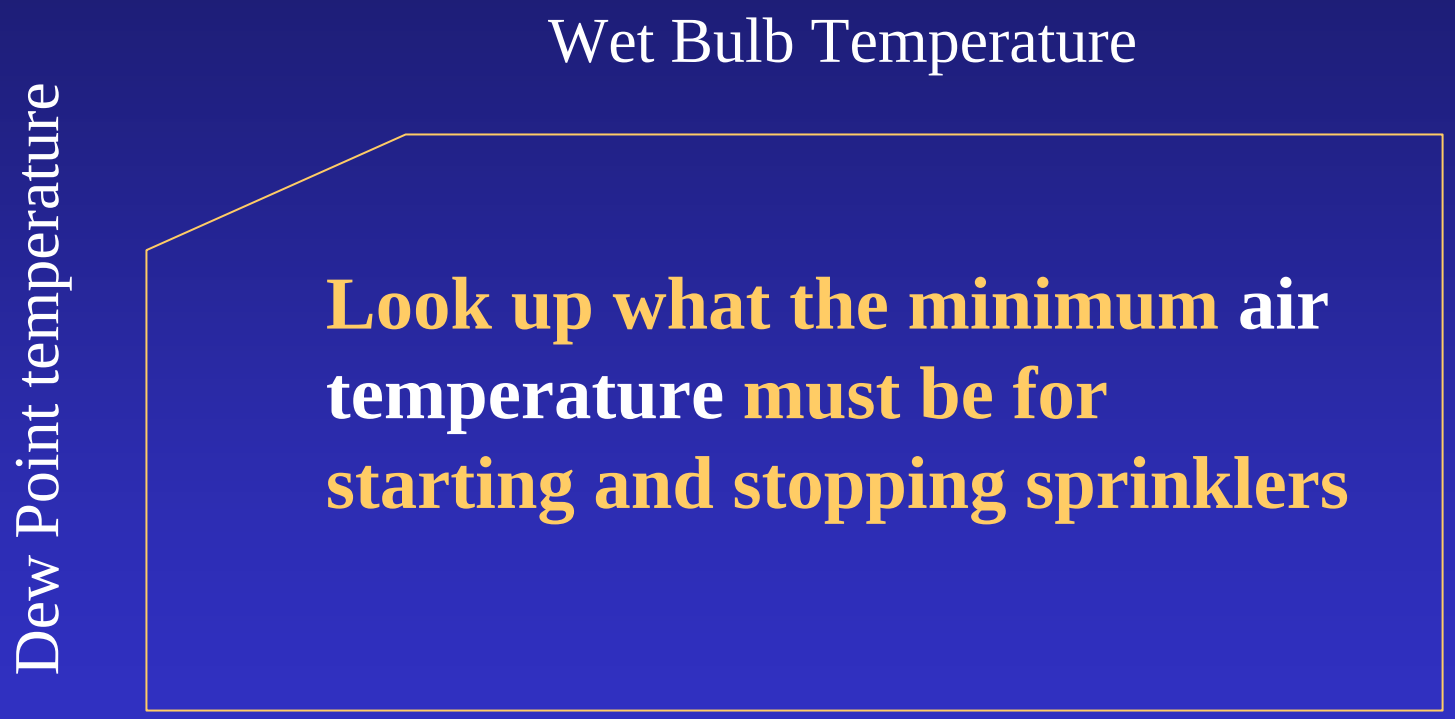
Turn ON sprinklers

- When wet bulb is above the critical temperature. All sprinklers should be operating before the wet bulb temperature drops to the critical temperature upwind from the crop .

Turn OFF sprinklers

- When the sun is shining on the crop and the wet bulb temperature upwind of the crop is higher than the critical temperature. In practice, wait until 32ºF. But if it is windy or if dew point is low, don't turn off just because the air temp is $\geq$ 32°F. Wait until at least 34°F.

Use this table to figure out when to turn on overhead sprinklers



Choose a wet bulb temperature above the critical temperature, then find the air temperature corresponding to the wet bulb and dew point in the table.

Minimum TURN ON and OFF temperatures in ^{o}F for sprinkler frost protection

Dew Point Temperature, ^{o}F \ Wet-Bulb Temperature, ^{o}F	28	29	30	31	32
32					32.0
31				31.0	32.7
30			30.0	31.7	33.3
29		29.0	30.6	32.3	34.0
28	28.0	29.6	31.2	32.9	34.6
27	28.6	30.2	31.8	33.5	35.2
26	29.2	30.8	32.4	34.0	35.7
25	29.7	31.3	32.9	34.6	36.3
24	30.2	31.8	33.5	35.1	36.8

R. Snyder

When water is applied, temperatures fall then rise

GIVEN: When a sprinkler system is first started, the plant temperature might drop to the WET BULB temperature.

GOOD: Temperature then increases as water freezes.

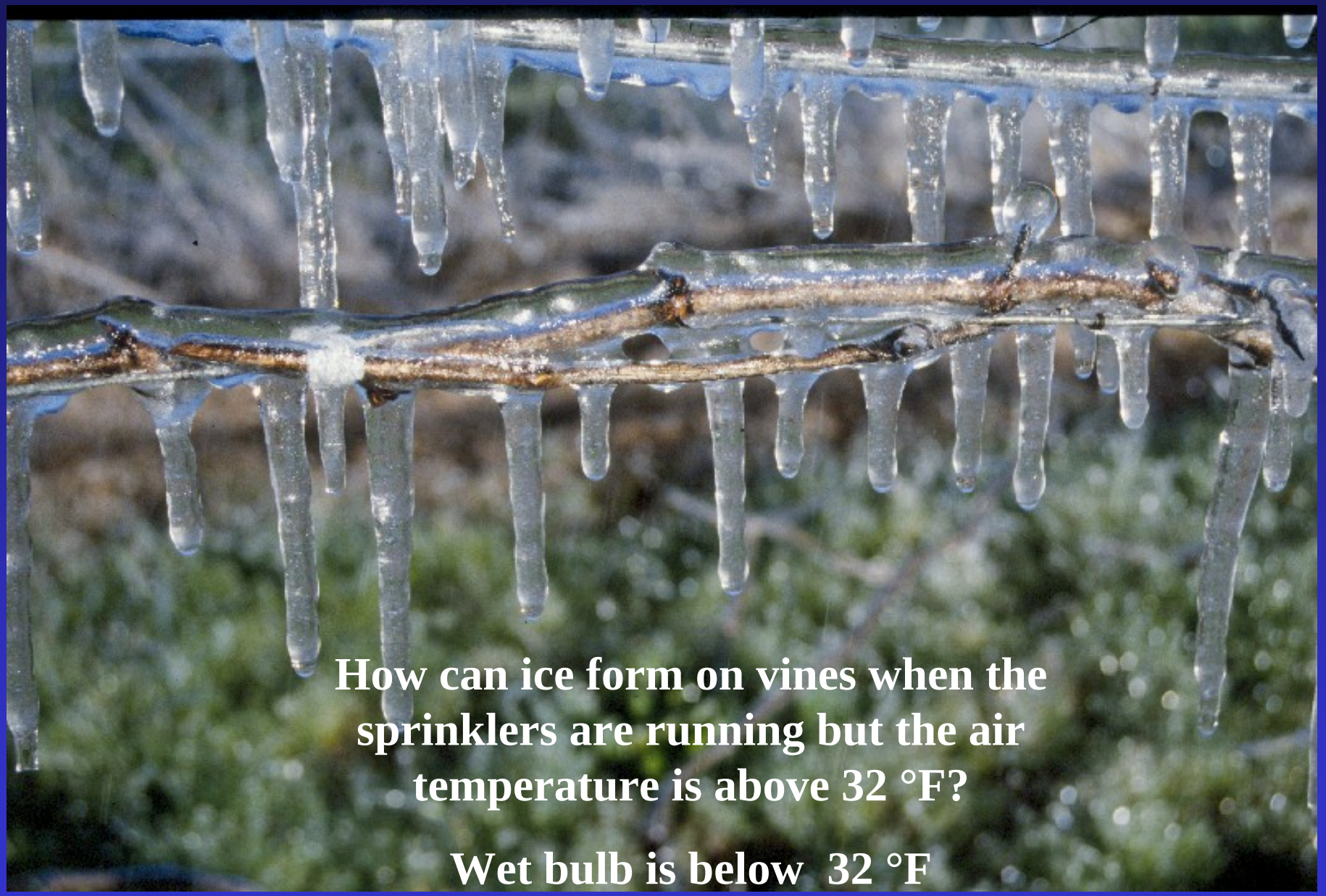
BAD: If the DEW POINT temperature is low, then the WET BULB is much lower then the air temperature and damage can occur if insufficient water is applied.

If the wet bulb temperature is **AT or BELOW** the critical temperature, then the air temperature can drop below the critical temperature and cause damage.

Beware of a Low Dew Point!

BASIC CONCEPT: Temperatures will drop lower when the air is dry. Turning on the sprinklers may initially bring the surface temperatures of the vines below the freezing point due to evaporative cooling.

WHAT TO DO: The drier the air, the sooner you must turn on the sprinklers


How can ice form on vines when the sprinklers are running but the air temperature is above 32 °F?
Wet bulb is below 32 °F

Pulsating microsprinklers

Features

- The only water frost protection system possible when there is little water available
- Can be operated from same well and pump as your drip system
- Will prevent damage at temperatures no less than 26 ºF ?????
- Horizontally divided systems will require 2 heads per vine.
- Much earlier turn on times than conventional sprinklers


Partial block protection


Thanks For Your Attention!
More Information:
http://biomet.ucdavis.edu

Wine & Vines
Wine Industry Headlines

04.30.2010

Grapevine Frost Protection Technology Tested

Vineland Innovation Centre and Raytheon collaborate on microwave tech in Ontario

by Hudson Cattell

Tempwave towers

Three Raytheon Tempwave towers ring a vineyard at Ontario's Vineland Research and Innovation Centre. The microwave technology is being trialed as a new method of frost and freeze protection.

Vineland, Ontario -- A prototype system using low-level microwave radiant heat to prevent freezing and frost damage to vineyards and orchards is now being tested in Ontario. The new system trademarked as Tempwave was developed by the Raytheon Co., and installed in early April at the Vineland Research and Innovation Centre in Vineland.

Tempwave microwave energy is transmitted from towers approximately 25 feet tall located in vineyards or orchards. The low-powered radio waves that are emitted are tuned specifically to water molecules, causing them to vibrate and heat up just enough to keep them from freezing, similar to a microwave oven. The energy is delivered directly to the crop without heating the intervening air. As temperatures drop to a critical point, the unit activates to change the energy balance and slow cooling to prevent freeze damage.

While preventing damage from frost is an important use for Tempwave, a major use may be in winter, when temperatures have dropped to the point where vines will suffer major damage. One purpose of the testing program now getting started is to determine the low temperatures at which Tempwave will be effective. Other factors to be evaluated will be the health and vigor of the vine and bud hardiness. Scientists at the Ontario Ministry of

Agriculture, Food and Rural Affairs at Vineland Station will be cooperating on the project.

Questions about safety are often asked. The main effect of radio frequency electromagnetic fields on humans is the heating of body tissues. Exposure standards for radiofrequency fields and microwaves have been established to prevent adverse health effects that could be caused by localized or whole-body heating. Scientists on the project say that human safety is ensured by compliance with Health Canada's limits on human exposure. Tempwave also must be in compliance with Canadian standards for radio-frequency equipment set by Industry Canada.

Dr. Jim Brandle, CEO of the Vineland Research and Innovation Centre, sees Tempwave technology as adding to the arsenal of wind machines, heaters, sprinklers and covers now available to manage frost and freezing threats. In comparing Tempwave to wind machines, he looks at the new technology as being able to work under a broader range of conditions, as having greater flexibility in covering up to an acre at a time, and without noise being a factor. The Tempwave tower will be comparable in price to a wind machine.

The agreement between the Centre and Raytheon, which is headquartered in Waltham, Mass., is a co-development/co-marketing partnership in which each party contributes its expertise to test and market the system worldwide. "This new technology will save crops," Brandle says. "Our partnership with Raytheon is a new chapter in Vineland's on-going research and innovation to protect Canada's food supply."

Wines & Vines Home 866.453.9701 | 415.453.9700 | Fax: 415.453.2517
info@winesandvines.com

Saving Water with the Cold Air Drain®

Protects against frost damage without water.
Frost protection using sprinklers uses **a lot** of water! Many areas have extremely stringent water usage restrictions, in which sprinklers for frost protection are often not a viable option. Conventional sprinklers use approximately 50 gallons/minute per acre. Microsprinklers may also be used for limited frost protection, but the crop must be irrigated simultaneously with a minimum flow rate of approximately 35-40 gallons/minute per acre[1], but requiring approximately 70-80 gallons/minute to be effective[2]. The Cold Air Drain® provides powerful frost protection without using any water!

Complies with water conservation regulations.
The Cold Air Drain® meets water conservation regulations by using moving air, not water, for frost protection. By not using water for frost protection, endangered species are saved, thereby avoiding regulatory penalties and maintaining the natural environment.

Safe to use in any type freeze.
The Cold Air Drain® is safe to use during any type freeze or weather condition. During nights with changing conditions, the use of water may actually cause damage.[3]

Makes sprinkler usage more efficient.
Shur Farms Cold Air Drain® is compatible with under vine/tree and over vine/tree sprinkler irrigation systems. When the Cold Air Drain® is used in conjunction with sprinklers, the water can be started later and shut off earlier by keeping the temperature in the field higher for a longer period of time.

Reduces risk of frost damage from sprinkler failure.
The Cold Air Drain® will reduce the dip in temperature when sprinklers are initially

turned on. The Cold Air Drain® also makes the failure of sprinklers less likely by removing the coldest air layer along the ground that can freeze water lines.

In the News:
Heimbuch, Jaymi. 18 June 2010. "New Water Reporting Requirements Have California Farmers on Edge". *Treehugger*.
McCallum, Kevin. 11 May 2010. "Feds Fine Healdsburg Grape Grower for Salmon Kill". *Press Democrat*.
Myers, Paul. 12 June 2010. "Farmers Fear 40% Water Cut would Force Them Off Land". *Sydney Morning Herald*.
Quackenbush, Jeff. 24 May 2010. "Division Remaining Over Direction of Frost Rules. *North Bay Business Journal*.

1. Schwankl, Larry, Prichard, Terry, Hanson, Blaine R. and Wellman, Irene. September-October 1999. "Costs of Pressurized Orchard Irrigation Vary with System Design". *California Agriculture* 53(5):14-20.
2. Pregler, Bill. 15 January 2010. "Product Review: Frost Protection--Managing the Air". *Wine Business Monthly*. Online. 18 August 2010. http://www.winebusiness.com/wbm/?go=getArticle&dataId=71304.
3. McGourtney, Glenn and Smith, Rhonda. "Frost Protection Considerations". UC Cooperative Extension, University of California, Division of Agricultural and Natural Resources. Online. 11 August 2010. http://sotoyomercd.org/UCCE-Frost-Slideshow.pdf.

Saving Energy with the Cold Air Drain®

http://www.shurfarms.com/savingfuel2010.html

Uses less fuel than wind machines and heaters.
The Cold Air Drain® #1550 uses approximately 1 gallon of fuel per hour to protect 6-9 acres. That's approximately 1/10 the amount of fuel needed to operate traditional wind machines and 1/400 the amount of fuel needed to operate heaters to protect 10 acres.

Significantly reduces fuel costs.
The Cold Air Drain® significantly reduces fuel costs because less fuel required to operate the Cold Air Drain®. See the Cost Comparison page for further fuel cost information.

Get the most out of every gallon of fuel.
The high efficiency Cold Air Drain® better utilizes every gallon of fuel than lower efficiency wind machines and heaters. See the Cost Comparison page for efficiency ratings.

Customized frost protection eliminates waste.
The Cold Air Drain® customized frost protection system provides targeted frost protection for your project area, thereby eliminating waste.

Publications

Reports: http://www.shurfarms.com/research&education2010.html

Sound Levels for the Shur Farms Cold Air Drain®
Exploratory Study Report

An exploratory study measuring the decibel levels for the Cold Air Drain® #1550 model with several available power options was conducted at the Shur Farms Frost Protection® manufacturing facility in Colton, California. Findings showed that as the distance from the Cold Air Drain® unit increased, the decibel level decreased. The decibel level for each power unit tested was highest at 5ft from the engine for both the engine side and the side opposite the engine. The decibel levels at 5ft from each power unit on the engine side were comparable to the level of city traffic from inside a car. The decibel levels at 5ft from each power unit on the side opposite of the engine were comparable to the levels of a telephone dial tone. At a distance of 100ft the decibel levels for both the engine side and opposite the engine approximated the level of normal conversation. The findings from this exploratory study suggested that the Cold Air Drain® #1550 with each power unit may be significantly quieter than traditional wind machines.

Full Report

Tablas Creek Vineyard
Paso Robles, CA

An initial study to evaluate the effectiveness of the Shur Farms Cold Air Drain® was conducted at Tablas Creek Vineyard during the spring 2003 frost season. The accumulation of cold air in the lowest areas of Tablas Creek Vineyard contributed substantially to annual frost damage. The Cold Air Drain® was expected to increase the temperature in the lower elevation areas, thereby reducing the natural temperature difference between the higher (non-accumulation) and lower (accumulation) areas. The Cold Air Drain® reduced the natural temperature difference by approximately 2.5°C (4.5 °F). No frost damage at Tablas Creek Vineyard was reported at the end of the spring 2003 frost season.

Full Report

Hammond's Buena Vista Vineyard
Paso Robles, CA

An initial study to evaluate the effectiveness of the Shur Farms Cold Air Drain® was conducted at Hammond's Buena Vista Vineyard from March-July 2004. The accumulation of cold air in the lowest area of Hammond's Buena Vista Vineyard contributed substantially to approximately annual frost damage. The Cold Air Drain® was expected to increase the temperature in the lower elevation area, thereby reducing the natural temperature difference between the higher (non-accumulation) and lower (accumulation) areas. The net temperature increment achieved by the Cold Air Drain® was approximately 1.5°C. No frost damage at Hammond's Buena Vista Vineyard was reported at the end of the spring

2004 frost season.

Full Report

Simpkins Family Vineyard
Napa, CA
An initial study to evaluate the effectiveness of the Shur Farms Cold Air Drain® was conducted at Simpkins Family Vineyard during the spring 2004 frost season. The accumulation of cold air in the lowest area of Simpkins Family Vineyard contributed substantially to annual frost damage. The Cold Air Drain® was expected to increase in the temperature in the lower elevation area, thereby reducing the natural temperature difference between the higher (non-accumulation) and lower (accumulation) areas. The net temperature increment achieved by the Cold Air Drain® was approximately 1°C. No frost damage at Simpkins Family Vineyard was reported at the end of the spring 2004 frost season.

Full Report

Three Amigos Vineyard
Napa, CA
An initial study to evaluate the effectiveness of the Shur Farms Cold Air Drain® was conducted at Three Amigos Vineyard during the spring 2004 frost season. The accumulation of cold air in the lowest area of Three Amigos Vineyard contributed substantially to approximately annual frost damage. The Cold Air Drain® was expected to increase in the temperature in the lower elevation area, thereby reducing the natural temperature difference between the higher (non-accumulation) and lower (accumulation) areas. The net temperature increment achieved by the Cold Air Drain® was approximately 3°C. No frost damage at Three Amigos Vineyard was reported at the end of the spring 2004 frost season.

Full Report

Newsletters:
Newsletters are available in the Newsletter Archive.

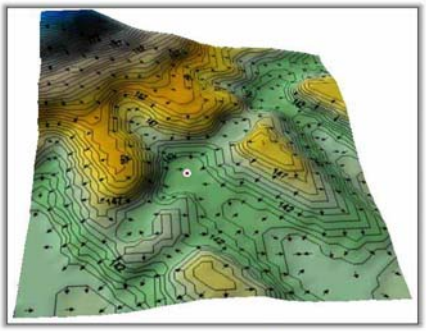
Articles:
Cavanaugh, Patrick. April 2002. "Frost Protection: A New Method of Frost Control is Appearing in Orchards". *Nut Producer Magazine*.
"Viticulture: New Twist on Frost Protection." 22 April 2004. *San Luis Obispo Tribune*.
McMullin, Eric. April 2005. "Innovative Frost Protection System Gets Rid of Cold Air". *Ag Aler*t. California Farm Bureau.
Franson, Paul. December 2009. "To Blow Up or Down? Inverted Sink Fans Offer Alternative Form of Frost Protection". *Wines & Vines Magazine*.
Frey, Nick. 2009. "Frost Protection Accumulation Areas". *Vine Times*. Sonoma County Vinegrape Commission.
Pregler, Bill. January 2010. "Frost Protection-Managing the Air". *Wine Business Monthly*.

Applications

Accumulation Area

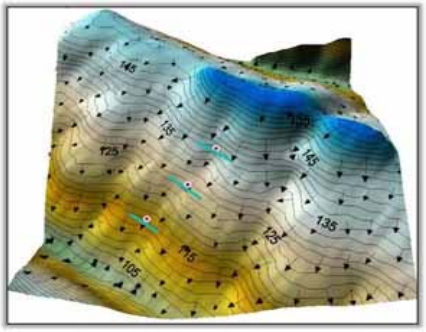
Accumulation Area Air Flow Map

COLD AIR "LAKES," FROST POCKETS, & ACCUMULATION AREAS: Without having any drainage, the freezing air fills an area, similar to a bowl or lake.

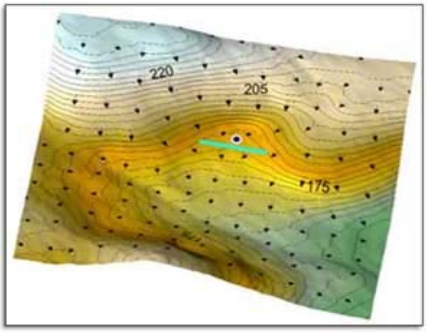


SWALES & CANYONS: A flow of freezing air is funneled into an area such as a swale or canyon causing a build-up of cold air.

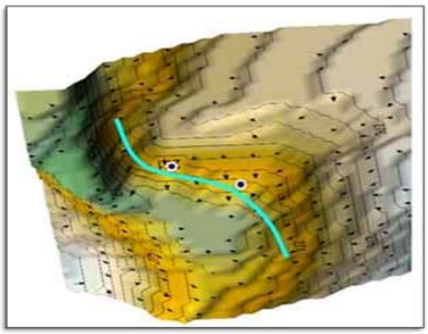
SLOPED AREAS: Freezing air moves downhill and builds up along a canal bank, reservoir bank, berm, elevated road, trees and shrubs, or other obstructions.



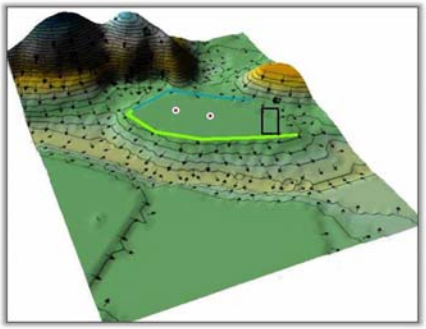
ROLLING HILLS: Frost settles in low areas creating numerous frost prone patches.



FLOODING: Flooding occurs when cold air accumulates below an orchard, builds up, and then overflows the contained area.



FLAT AREAS: To drain cold air from flat areas, artificial or natural barriers surrounding the growing area may be necessary. These contain the cold air and allows for its removal with the Shur Farms Cold Air Drain®.



http://www.shurfarms.com/applications2010.html

Benefits

CONVENIENT

✔CUSTOMIZED SYSTEMS! For each project area, a Computerized Frost Analysis is offered, thereby eliminating much of the guesswork and overspending that often accompanies the purchase of frost protection.

✔**VIRTUALLY MAINTENANCE FREE!** This aesthetic, low profile unit is easily owner-installed and maintained.

✔VERSATILE! Shur Farms Cold Air Drain® is stand alone frost protection, or may

be used in conjunction with water, wind machines, and heaters to enhance their benefits. The Cold Air Drain® is available in 3 sizes (covering approximately 2-16 acres) and has numerous power options (tractor PTO, gasoline engine, electric motor, temperature controlled auto-start).

✔DOESN'T CAUSE DAMAGE!
Unlike wind machines and sprinklers, the Cold Air Drain® can be run all night without causing damage during a winter freeze or changing weather conditions.

✔PORTABLE!
Integrated forklift/tractor brackets provide complete portability for easy unloading and transporting in and out of the field.

COST-EFFECTIVE

✔**LOW OPERATING COST!**
Shur Farms Cold Air Drain® has the lowest operating costs of any active frost protection method. Most systems will have a 100% payback in the first year of operation.

✔NO MAINTENANCE CONTRACTS!
The Cold Air Drain® is easily owner-maintained.

✔MINIMIAL SITE PREP!
All Cold Air Drain® units are built on a metal skid and are freestanding. No cement pad is needed.

✔**SIMPLE INSTALLATION!**
The Cold air Drain® arrives almost fully assembled and is easily put in place using a standard forklift or tractor.

✔**EVENS BUD BREAK!**
The Cold Air Drain® evens out temperatures and bud break.

SUSTAINABLE

✔**SAVES FUEL!**
The Cold Air Drain® #1550 uses

just approximately 1 gallon of fuel per hour.

✔**SAVES WATER!**
The Cold Air Drain® allows you to start frost protection irrigation systems later and turn off earlier, thereby saving water.

✔**QUIET OPERATION!**
Quiet enough to be used near residential areas, businesses, and roads. (Please see the Decibel Levels page for details.)

✔**ENVIRONMENTALLY FRIENDLY!**
Power units and fuel tanks are low emissions and Environmental Protection Agency (EPA)-certified.

✔**COMMITTED TO MAKING THE BEST PRODUCT!**
Ongoing research at the Shur Farms® facility and in the field is done to ensure quality products and services meet changing needs and regulations. Shur Farms Frost Protection® also works closely with growers, agricultural associations, academics, and government and nonprofit organizations to improve products, teach safe frost protection techniques, and help address local sustainability issues.

http://www.shurfarms.com/aboutproduct2010.html

About the Cold Air Drain®

Cold Air Drain® Overview

COVERAGE & DIMENSIONS:

#925 Cold Air Drain®	2-3 Acres*	Unit Size: 84in x 84in x 72in	875lb**
#1550 Cold Air Drain®	6-9 Acres*	Unit Size: 102in x 102in x 96in	1,100lb**
#3510 Cold Air Drain®	12-16 Acres*	Unit Size: 126in x 126in x 120in	2,000lb**

**Depending on severity of situation.*
***Weights are approximate.*

A. PROPELLER: All aluminum construction, balanced, jig-formed to provide complex contour needed for high aerodynamic efficiency.

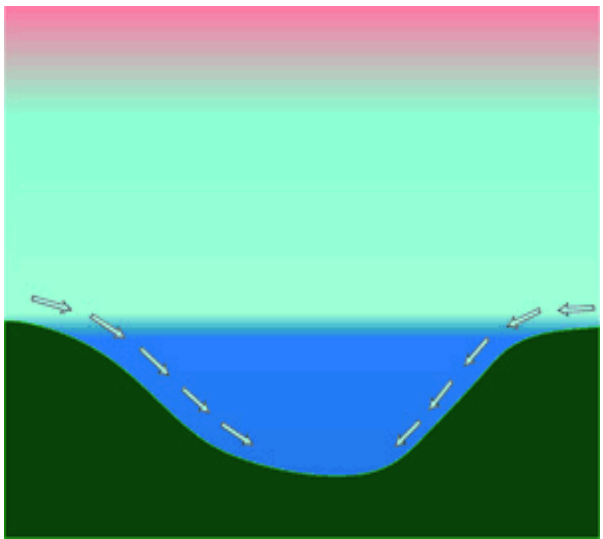
B. GEARBOX: ISO registered (International Organization for Standards), AGMA Rated (American Gear Manufacturers Association), high efficiency right angle bevel gearbox, cast iron housing, aluminum caps, carburized and case hardened gears.

C. WIND TUNNEL HOUSING: Computer-designed 8-panel model, CNC (Computer Numerically Controlled) manufacturing, all steel construction, bell inlet specially designed to deliver maximum thrust to propel cold air.

D. BASE: All steel freestanding base, precision engineered tower supports designed to reduce movement and vibration in tower, cold roll steel shafts with keyways, precision ball bearings with cast iron housings for quiet and smooth operation, quality industrial grade #5 fasteners, electrostatic spray powder coating.

E. LIFT BRACKETS: Integrated forklift/tractor brackets to provide complete portability for easy unloading and transporting in and out of the field.

F. DRIVELINE: Balanced 3-piece design, industrial universal joints, safety orange plastic guards, 1 3/8in spline standard tractor PTO yoke, stabilizer bearing, keyway, and set screw.



Technical Specifications

How the Cold Air Drain® Works

Radiation frosts occur during clear, cold nights with no wind. The ground loses heat stored during the day allowing an inversion layer to develop. In an inversion, the warmer air layer sits above

the cold air layer that is closest to the ground.

During a radiation frost night, the heaviest cold air molecules flow downhill, like water, due to gravity. This cold air settles in low elevation areas that do not allow for adequate drainage. As the cold air accumulates in an area, frost damage occurs.

The Cold Air Drain® thrusts the cold air upward to a height of nearly 300ft (91.44m). As the coldest air is being sent up, it collects and mixes with the warmer, lighter air from above. This helps to give the cold air continuous lift and allows it to rise higher, until it is dispersed into the upper inversion layer. The coldest air layer is drained and will not fall back down.

The Cold Air Drain® effect changes the temperature in the lower elevation, frost-prone areas to be more similar to the temperatures in the higher elevation, non-frost areas. The grower may expect a more consistent yield in the lower and higher elevation areas.

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December 2009 Issue of Wines & Vines

To Blow Up or Down?

Inverted sink fans offer alternative form of frost protection

by Paul Franson

SIS Rather than pulling warm air down to the vineyard floor, the Selective Inverted Sink whisks cold air away from susceptible vines.

Until global climate change warms things up a lot more, grapegrowers will still have to deal with frost. Certain techniques that growers once used are becoming difficult to implement, but alternative approaches are proving useful for many others. For example, some growers are enthusiastic about surface-mounted fans that blow cold air up and out of vineyards.

The oldest approach is to set fires in the vineyards, burning diesel fuel, old tires or wood to raise the temperature a few degrees before the heat escapes into the atmosphere. That technique is no longer allowed in some North American grapegrowing regions due to environmental worries, but it is still practiced in some areas. “A layer of smoke hangs over the valley when we get untimely frost,” says Bret Neal of Stoney Mesa Winery in Cedaredge, 50 miles south of Grand Junction in Western Colorado.

A second method, from the mid-20th century, uses wind machines on towers to blow warmer upper air down into the vines, but these devices are running into increasing resistance in some places, too, because of their noise—up to 97 decibels in some old equipment.

Modern wind machines are much quieter. Doug Riddle of manufacturer Orchard-Rite Ltd. Inc., says, “The wind machines vary in noise depending upon model. We have

models that will range from approximately 55 to 70 dB measured at 300 meters. These are approximate numbers and they may change with the atmospheric conditions."

The prices also depend on the model, engine type and location. They range from approximately $25,000 to $30,000.

Some vineyard owners are looking at alternative methods of frost protection, such as spraying copper sulfate, bacteria or lamp black, and laying down solar quilts that lie between vine rows, absorb solar radiation and reflect it back to the vines. While these have been tried with some success, ground-mounted fans may be most promising.

Surface fans

The fans, dubbed Selective Inverted Sink (SIS), were developed by Uruguayan hydro-mechanical engineer Rafael Guarga and are sold here as the Shur Farms Cold Air Drain. One unit will protect up to 10 acres, depending on the terrain and conditions.

Anthony Aellen of Linganore Wine Cellars in Mt. Airy, Md., uses a Shur fan, which blows cold air from ground level up to 300 feet into the air to protect his 60 acres of French hybrid grapes. His vineyard is a test site for Cornell University.

He's had the fans for about a decade, and is enthusiastic about their protection. "Think of it as a reverse drain," he says. "On a cold night, cold air flows down. We can't open a hole in the ground, but the fan blows it up and out."

He uses two of the machines in frost pockets, which he bought after hiring helicopters to try to protect his vineyard. "They flew from midnight to 7 a.m. at a cost of $850 per hour, but we still lost 80% of our buds."

He looked at wind machines, but was discouraged by the loud noise, cost and the need for an 8 x 8 x 8-foot cube of concrete required for anchoring them.

He estimates the wind machines at $30,000 to $40,000, and they use much more fuel. His cold air drains cost $5,000 and get by with 5 gallons of gas for a whole night. "You can hardly hear them," he claims. They're movable with a forklift.

At the vineyard, 30 miles west of Baltimore, fans protect half of the 60 acres. They protect vineyards that slope down to a hill, but his other acreage is flatter, so he would have to build drapes or barriers to keep from trying to suck all the cold air in the area out.

Aellen is adding another 55 acres of grapes, and he plans to add Shur fans to protect them, too.

Bret Neal at Stoney Mesa Winery in Colorado has both a wind machine and a Shur fan—or SIS, as he calls it. Neal says, "If you grow grapes in Colorado, you have to have frost protection." He's h ad the SIS for six years and the wind machine for eight. Neal says they work together to protect his 8 acres. "We run the SIS first," he says, "and if the temperature continues to drop, we use the wind machine."

Neal operates the SIS from a tractor PTO, though many are supplied with self-contained gas, diesel or electric engines. He says the fans have proven that they work, but he feels he needs more protection and is looking at adding heat.

Nick Ferrante of Ferrante winery near Cleveland, Ohio, uses four conventional wind machines from Orchard-Rite, powered by propane. He first installed two wind machines—one for each of his 15-acre vineyards—in 2004, after the devastating winter of 2003. He then realized that he needed more coverage and installed two more. He has since repositioned the wind machines.

He finds they're useful, but do have significant limitations. For one thing, they can't be used when the wind is blowing more than 5 mph.

Ferrante says he finds them effective in fighting winter bud kill if it isn't too cold, and in spring, down to about 28°F. Unfortunately, they're somewhat dependent on the state of the inversion layer. "They're limited for preventing killer frosts," Ferrante says.

Limitations on sprinklers

The other popular method of frost protection—sprinkling vines with water—is under pressure in California.

According to Nick Frey, president of the Sonoma County Winegrape Commission, the National Marine Fisheries Services sent a letter to the California Water Resources Control Board asking for an emergency ruling to ban the use of water from the Russian River for frost protection in the Russian River Valley basin. This request was made because of fish kills in the Russian River in 2008.

The Water Board denied the request for enforcement this year, and gave the industry one year to develop a plan for frost protection.

Penalties are severe and may include criminal or civil charges. Criminal charges are $50,000 per incident and/or up to a year in jail. Civil charges are $25,000 per incident.

Many growers will continue to have adequate water from ponds or other sources, but droughts and continuing pressure on water will surely impact growers in water-short areas such as most of California and Washington.

Another method, using **microsprayers** that create a mist, was examined and endorsed in "Microsprayer Frost Protection in Vineyards" by G. Jorgensen, B.M. Escalera, D.R. Wineman,?R.K. Striegler, D. Zoldoske and C. Krauter of the Center for Irrigation Technology at California State University, Fresno, in 1996.

Brent Edwards, an expert in water uses in the vineyard, says that these sprinklers' main benefit is restricting water to the vine rows rather than covering the whole vineyard. He says they can operate with 15 to 16 gallons per minute per acre, rather than 60.

He warns, however, that they must be turned on a little sooner and run longer. And they tend to freeze up due to the lower flow. In addition, they require a lot of labor to maintain the typically 350 to 400 sprayers per acre instead of 25. A commercial product called the Pulseator was developed for this purpose, but it doesn't seem to be on the market at present, due to a dispute between the patent holder and former manufacturer. The patent holder is apparently trying to arrange manufacturing for the unit.

None of the growers who spoke to Wines & Vines believed their frost protection equipment to be foolproof. Weather events like the Easter massacre freeze of 2007 in the central and eastern states can be so severe that nothing truly protects a vine's new growth. For those many other occasions, however, when a couple of degrees Fahrenheit determine the difference between a good harvest and a marginal one, many growers believe that frost protection is a good investment.

Sidebar:

Neighbors vs. wind machine In Napa Valley, where home buyers in rural areas have to sign "right to farm" papers acknowledging nearby farming activities, at least some neighbors are protesting an unusually loud wind machine on a 4-acre vineyard owned by John Bierylo near Silverado Resort. neighbor fan According to a county report, the 50-year-old machine hits 97 decibels from across the street. The average frost fan is 70 to 80 decibels; because this is a logarithmic measure, 97 dB is far louder—comparable to an aircraft landing a mile away—four times as loud as 70 dB. Neighbors have begged Bierylo to replace his fan with something quieter, but he has refused, citing the widely accepted tenet that property owners in Napa County have the right to farm their land. County agencies and local vintner organizations tried to broker a deal, but they reached no solution. Bierylo reportedly has even been offered a quieter fan for free if he'd pay to install it. Now, after a two-year stalemate, the Napa County Board of Supervisors is considering a county ordinance aimed at quieting Bierylo's fan. The catch: It will also affect 39 other properties, though only eight of them have wind machines. The ordinance would limit fans on small parcels in non-agriculturally zoned areas of the unincorporated county to 85 decibels. Grower groups including the Farm Bureau are fighting the ordinance while they try to persuade Bierylo to replace the fan. P.F.

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January 2011 Issue of Wines & Vines \

Choosing Crop Insurance

Wild 2010 growing season underlines the benefits of coverage

by Stephen Yafa

One Sonoma County vineyard owner summed up the situation in six words: “All that was missing were locusts.” He was speaking, of course, about the 2010 California growing season, labeled by The (Santa Rosa, Calif.) Press Democrat as “the worst harvest ever.” Early anecdotal reports indicated that crop yields in Mendocino, Lake County, Napa and especially Sonoma were down by 35% or more.

Battered by perverse weather—copious spring rains lasting until early summer, a frigid July and August that saw chilly nights and days suddenly yielding blistering heat—grape clusters suffered severely from mildew at one extreme and sunburn at the other.

Winemaker Greg La Follette of La Follette Wines explains that during an ideal summer, a grape’s skin slowly “tans,” just as ours does, and gradually builds up protection against sunburn. Since cold weather prevented grapes from becoming properly acclimated, their skins lacked the pigmentation compounds needed to defend against the fierce sun and 108°F temperatures of late August and September. They fried, melted and shriveled.

“It’s like me with my white skin suddenly ripping off my shirt on the hottest day of the year. I’d blister and be seared beet red,” LaFollette says.

When such calamities befall vineyard owners, whom do they call? Not Grapebusters. No, they call their insurance agents, and they try to remember whether they elected for full crop coverage—now up to 85%—at contract varietal prices for a higher premium; lower county average grape prices for less money; or if they took the cheapest option, Catastrophic Coverage (CAT for short), for a $300 flat fee per variety per vineyard, independent of acreage. A grower with three varieties planted in a 3-acre vineyard pays $900 total, and another grower with three varieties planted in a 30-acre vineyard also pays $900 total. CAT is a safety valve during good years and proved to be a costly mistake for many in 2010, when flat-fee coverage penciled out to reimburse barely half of growers’ real losses. (Some growers purchase CAT insurance primarily to qualify for USDA supplemental disaster insurance under the SURE program; they hope to recoup losses from a devastating event like the 2008 spring frost.) These coverage levels and conditions are determined and strictly regulated by the federal government’s Risk Management Agency. RMA contracts with crop insurance companies (approved insurance providers), who in turn contract with property casualty licensed agents.

Mitigate nature’s effects

In essence, crop insurance has one objective: to mitigate the effects of nature. When locusts shear tall stands of corn to their nubs in minutes, when spiraling tornadoes fell entire orchards of cherries or walnuts, crop insurance helps mop up the mess. Many years

back, federally subsidized crop insurance was instituted to protect farmers against such natural disasters—"acts of God" in the parlance of the trade. California crop insurers like Rain & Hail, NAU Country, ProAg and ARMTech are required to write policies that follow federal guidelines to the letter. For winegrape growers, vines must mature to their fourth growing season or third year after grafting, and there must be a minimum yield of two tons per acre in one of the past three years. Maximum coverage cannot exceed 85% of average yield.

From personal experience leasing an acre of Pinot Noir in Sebastopol, Calif., that delivered no grapes worth picking in 2010—after producing nearly four tons of delicious berries in 2009—I learned that filing an insurance claim goes well beyond a simple recitation of the facts. It entails consultating with your agent and making a wise decision about available options long before bud break. The deadline for filing a new policy is Jan. 31 of the insured year. Growing Russian River Valley fruit exclusively for my Segue Cellars label, nobody was less informed than I about how to protect my investment. I sought out Chris Maloney and her staff at Chris Maloney Crop Insurance Services in Petaluma, Calif., and trusted her counsel.

Maloney dispelled a few common misconceptions. There are no specific irrigation requirements, she explained. As a grower, your best-practices obligation is to employ farming methods that promise to bring your fruit to full ripening. You can dry farm if you choose. Also, you don't need to have a contract for your grapes in place before you file a claim. Another agent, Greg Merrill, director of crop insurance services for Pan American, who handles the crop insurance program for the California Association of Winegrape Growers, added that premium rates do not rise or fall based on whether or not you've filed claims. And they both pointed out that RMA insurance rates for grapegrowers dropped dramatically in 2010—25%-65% in California, with variations driven by location—and that they will drop an estimated 9%-10% on average for 2011. Those lowered costs strengthen the argument for buying up—that is, paying for more than basic CAT coverage at 50%, and 55% of maximum price election. Federal subsidies cover a major portion of grower premiums, but they vary depending on the coverage level selected. That makes crop insurance a terrific deal, whether you're buying coverage from 50% or 85% of your approved average yield.

Maloney suggested that I buy coverage based on the contract price for my Pinot Noir: $4,525 per ton. It's capped at 200% above county average (in this instance, $2,650 per ton). That added about a 20% increase to my premium, but with federal subsidies picking up more than half the cost, the policy came to $210 at 70% coverage. My grapes were conventionally grown; if the vineyard happened to be certified organic or in transition, there would have been a 5% surcharge. And if I had an organic vineyard but didn't specify that on my policy and later filed a claim, the insurance would not pay out damage from insects, weed infestation or plant disease.

Set the process in motion

So much for clauses, subparagraphs and boilerplate fine print. Like marriage vows, insurance contracts bear a well-intentioned but sketchy relationship to what transpires in

the real world. The rudder that actually steers any crop insurance claim isn't the policy on paper, it's often the personal connection between grower and insurance adjustor. One man's rotting worthless fruit can be another man's select late-harvest Zin. As a grower, you don't get to make the call. That's the adjustor's job. Yours is to set the process in motion earlier than later by contacting your agent when things begin to go awry, and to assemble all the required information—weight tags and so forth—in a neat, accessible package. "Handing in a stack of tags that are crumpled, oddly sized and occasionally illegible, that's going to delay the process for sure," Merrill says. He suggests "scanning every document into your computer, and keeping up with technology by creating PDFs of relevant data. Practically all crop carriers seem to operate best with electronic records vs. hard copies."

"What growers don't often understand," said my adjuster, C.J. Jensen, who was hired by Rain & Hail Insurance Service in Fresno, Calif., "is that I'm on the side of the grower." He was affable, helpful and in no way obstreperous, but seriously overworked. I soon saw that my job was simply to make sure Jensen didn't slough off my tiny vineyard while trying to cope with his enormous workload. He didn't. He visited the vineyard three times from early September through mid-October. As part of the process he was required to pull sample clusters from various blocks to submit with his appraisal to the claims department. "I could barely find any," he told me. "Yours is about the worst vineyard I've seen. Maybe you could get a third of a ton out of there, maybe, but I'm appraising it as zero."

There was one incident that crystallized the humungous volume of wine-grape crop insurance claims filed during the 2010 harvest. Jensen asked me by e-mail for a letter under my Segue Cellars letterhead explaining that, as both grower and buyer, the grapes were intended to go into my own label's Pinot Noir program. Not a problem, but I'd already responded to this same request by e-mailing him that letter two weeks earlier. When I said this during a phone call, Jensen replied, "Steve, mind sending me it again and this time I'll stay on it? At my house right now I've got five rooms filled to the brim with claim reports and all the paperwork that goes with them."

In my mind's eye I walked through the front door of C.J. Jensen's house and immediately bumped into towering columns of thick manila folders stretching off to the horizon, wall to wall and floor to ceiling, with barely any room to squeeze past. Grapevines may grow in neatly pruned rows, but insurance claims aren't always so well organized and deftly managed. If not properly shepherded, they can potentially collapse under their own weight and disappear into a sinkhole. By law your agent isn't allowed to intrude on the interaction between grower and adjuster unless there's a significant discrepancy. "We look down from 30,000 feet and come in for a landing to keep the process moving or mediate if there's a problem," Merrill says. Due to this regulation, you can't assume your agent will be involved on a daily basis as your claim unfolds.

All of this focuses attention on making the right choice in choosing an agent and carrier. There are no differences in rates or rules, those are all set by the RMA. So, too, is the range of coverage that is offered, whether you're growing corn or Cabernet Sauvignon.

What’s left is the level of personal service, and that can vary. “I treat all my growers the same, whether it’s a half-acre grower or a 200,000-acre grower. The time I spend may not be equal,” says Shannon Antonini from the Chris Maloney Agency, “but they have the same importance. We go out and see our growers every year and hand-deliver checks when there’s a need.”

In the wake of one of the most difficult harvests in recent memory, many growers have experienced that need. While recouping vineyard costs, don’t supplant lost revenues from wine sales; insurance payments at the very least ensure that there’s cash on hand for the coming year. “You may not come out ahead,” Maloney says, “but with the right policy, you’ll still come out whole. And that’s exactly what the government wants to guarantee with its RMA program.”

Stephen Yafa produces limited release Pinot Noir in the Russian River Valley for his winery, Segue Cellars, seguecellars.com.

Sidebar:

Panicky Pinot Noir grower Your crop insurance agent is in a position to be a valuable asset. Jordan Roach, vice president of Mary Roach Insurance Agency in Fresno, Calif., which provides crop insurance for about 40 winegrape growers in Sonoma and Napa counties, recalls a crisis last September in Santa Barbara County that illustrates the role an agent can play. His Pinot Noir grower panicked when Brix levels shot up from 23° to 28° Brix over three days during the late September heat spell. Roach was able to get the ProAg adjuster out to the vineyard quickly--just in time for the torrential downpour that soon followed. To save his crop, the grower began harvesting at 2 a.m. in the rain. Roach and the adjustor showed up again at 8 a.m. "Getting all the stakeholders in the same place at the right time made it much easier for us to work together," Roach recalls. By law, Roach couldn't be on hand when the adjuster did his appraisal, but he could facilitate the process. "That's my job, to keep the conversation moving along." This claim was settled without incident. —S.Y.

Sonoma Wine Industry Freezes Out the Public

By David Keller,
Bay Area Director, Friends of the Eel River: *Eel River Reporter- Spring 2011*

Over the past 50 years, grapes for the burgeoning premium wine industry in Sonoma County have increasingly been planted in frost-prone areas. Historically-avoided bottom lands have been planted with thousands of acres of new vineyards. They are more likely to freeze earlier as cold air settles (sinks) into them than are traditionally favored slopes and upland vineyards. The advent of large-scale water use for frost-control spraying has helped make this practice of lowland planting profitable.

However, this comes with significant risks both to the crops and to the salmon and steelhead that inhabit, spawn and grow in the tributaries and streams of the Russian River basin.

During March, April and early May, significant frost periods can coincide with the emergence of grape buds and new leaves when they are most vulnerable. Pumps for vineyard overhead irrigation sprinklers are turned on at about 34 degrees as the temperature falls towards or below freezing, coating the buds with a layer of insulating ice. This helps protect against further drops in temperature and desiccation of tender plant growth. Spraying is not particularly effective below 26 degrees, when permanent damage to new vine growth and buds occurs.

Frost irrigation has been touted by the industry as more effective against frost damages over a wider temperature range than wind machines or Cold Air Drain™ and far less air-polluting than smudge pots. But pumping uses huge amounts of water: around 50 gallons/minute/acre. Over the course of several hours of pumping during one night, a single 100-acre vineyard can use 4 to 6 acre-feet of water. Since freezing temperatures can run on for 2 to 14 nights over multiple watersheds during bud break, thousands of acre-feet of water can be used in a very short period of time. There are approximately 15,581 acres in Sonoma County and 16,400 acres in Mendocino County in 2010 that currently use water for frost protection, according to an industry attorney.

Where does "frost protection" water come from?

Water sprayed for frost protection is pumped from diversions from tributaries and the Russian River, ponds, and groundwater wells. To supply massive pumping quickly, growers are increasingly installing ponds, both on- and off-stream. The Russian River watershed has more unpermitted and illegal storage ponds than any other watershed in California. They all require permits from the State Water Resources Control Board (SWRCB), which issues and regulates permits to use or store surface water. Ponds or tanks filled from groundwater are not currently regulated by California water law. However, these diversions often have a direct impact on surface flows, fish habitat, spawning grounds, rearing and passage. In 2009, Sonoma County Water Agency

(SCWA) estimated that 30,000 acre-feet/year was being illegally diverted from the Russian River for all purposes. During frost-pumping periods alone, Russian River flows can decrease by 50���80 cubic ft/second, suddenly dropping water levels and exposing the riverbed as multiple growers try to protect vines.

This strands and kills juvenile salmonids, dewaters redds, and prevents passage of spawning coho and steelhead. National Marine Fisheries Service (NMFS) documented fish kills in 2008 and 2009, considered illegal "takes" under the Endangered Species Act. SWRCB has recognized this as well.

Where's the law when you need them?

Who is going to step in to protect salmon and steelhead, and get effective controls on the wine grape industry members who don't agree or care?

At multiple SWRCB hearings, the industry, Sonoma County Farm Bureau, their lobbyists, lawyers, allies including the Association of California Water Agencies, and politicians all made a concerted effort to prevent any formal regulation of their frost-control practices. They minimized and denied any impacts, and insisted on voluntarily self-monitoring. They railed against NMFS and SWRCB threats of enforcement. Under pressure, SWRCB gave the industry repeated opportunities to demonstrate better stewardship, but to no avail.

In one long stretch of frost events in spring 2009, enough water was simultaneously diverted for frost protection that SCWA had to release extra water from Lake Mendocino to keep the legally required minimum flows in the Russian River. This was from the critical water supply pool needed to sustain summer municipal demands and instream flows of the river. Storage in Lake Mendocino had to be backfilled with diversions of water from the Eel River through the Potter Valley Project.

NMFS and SWRCB were compelled to take action. Strong protests came from fisheries advocates, environmental and watershed groups and downstream water rights holders. It became clear to the wine grape industry, SWRCB, NMFS, Sonoma County and SCWA that dewatering streams for frost control had to stop.

AB 2121 provided a regulatory framework finally adopted in 2010 by SWRCB. It's California's law for maintaining instream flows in Northern California coastal streams, requiring that enough water be left to provide for safe passage, survival and growth of listed fish, and to maintain habitat. SWRCB's policies include the use of continuous monitoring of flows and diversions, and installation of real-time stream flow gauges in the Russian River watershed.

SWRCB had to develop regional standards and regulations for irrigation practices, including frost-control pumping and water storage, instead of direct diversions from watercourses.

Freezing the public out of proposed frost-protection regulations

In an attempt to preempt or undercut political will for upcoming SWRCB regulations on frost-control irrigation, a number of grape growers and allies in April 2010 formed a private, mutual benefit corporation, the Russian River Water Conservation Council (RRWCC). They decided to secretly develop policies, regulations, permits and best management policies for adoption by Sonoma County, aided by former Supervisor Paul Kelley. Sonoma County would contract with RRWCC to run a grower oversight program, including best management practices, and to own stream gauge monitoring data privately.

All growers using frost control would require a County permit by March 2011, and become a dues-paying member of RRWCC. This was intended to ensure 100% participation and to amply fund RRWCC. There would be a so-called "independent science review panel" to review and report monitoring data, but no public agency or environmental interests were allowed on the panel. Mysteriously, RRWCC named Professor Matt Kondolf of UC Berkeley to chair this secretive panel. All data, monitoring sites and incidents of stream de-watering would be aggregated until after the frost season, then released by the panel to NMFS, CDFG, SWRCB and the public.

No real-time monitoring data would be released during the actual frost season. The County refused to ask if (nor require that) any permit applicants actually held legal water rights for diversion or storage. As a result, no enforcement of stream flow violations or take of protected species would come from information gathered by RRWCC. Sonoma County also claimed that the legislation, program and practices were exempt from the California Environmental Quality Act, requiring no environmental impact report.
No other stakeholders were invited into the process to develop the County's legislation. No downstream water rights holders, no other agricultural water users, no fisheries or environmental organizations, no tribes or other governments were even notified. Staff at SWRCB and CDFG were excluded. Several people from Trout Unlimited and NMFS were invited as the legislation progressed.

The legislation was written primarily by grape industry attorneys in Sacramento, including Jesse Barton, hired by Williams-Selyem Winery and its co-owner John Dyson, a wealthy New York politico. Other select industry insiders involved early on included Janet Pauli (Mendocino Inland Water and Power Comm., Potter Valley), Sean White (Mendocino County Russian River Flood District), Laurel Marcus (consultant), Jack Rice (California Farm Bureau), Bob Anderson (United Winegrowers Sonoma), Doug McIlroy (Rodney Strong Wine), Pete Opatz (Silverado Premium Properties), Keith Horn (Clos du Bois/Constellation Wines), Scott Johnson (Gallo), Peter Kiel (water rights attorney), Nick Frey (So.Co. Winegrape Commission), County Counsels Steve Shupe and Dave Hurst, County Ag Commissioner Cathy Neville, Pam Jeane (SCWA) and County Administrative Assistant Peter Rumble. The County put adoption of the entire scheme on a fast track for approval before Supervisors Kelley (also president of the Association of

California Water Agencies or ACWA) and Kerns left office at the end of December 2010.

In late October, Williams-Selyem and Dyson released a study they commissioned from Sonoma State University economist Robert Eyler. With much industry fanfare, the study claimed that limiting frost-control irrigation would cost the grape industry over $2 billion per year and at least 8,000 jobs. Critics easily pointed out fundamental flaws in Eyler's study, which grossly overstated predicted losses. As SWRCB board spokesman William Rukeyser stated, "It's garbage in, garbage out."

Fortunately, someone tipped us off in early September about RRWCC's proposed ordinance. The County refused to reveal any information, even in response to a California Public Records Act request submitted by members of the Sonoma County Water Coalition in early October.

After criticism in the press, to Supervisors, SWRCB, NMFS, CDFG and others, the County allowed us to discuss the final draft ordinance at a meeting on October 14. However, no changes were permitted, since it was scheduled for Supervisors' approval on November 7.

SWRCB takes the driver's seat

On October 27, SWRCB sent out a Notice of Preparation for an EIR for their Russian River Frost-Protection Regulation in Mendocino and Sonoma Counties. This was the very kind of regulatory framework that we wanted, but astonishingly SWRCB staff claimed no knowledge of Sonoma County's frost ordinance, and Sonoma County staff claimed no knowledge of SWRCB's proposed regulations and EIR!

SWRCB noted that NMFS required them to take "immediate action to address concerns that water diversions for purposes of frost protection will cause significant salmonid mortality."

SWRCB also stated that it has "a duty to protect, where feasible, the State's public trust resources, including fisheries." The State Water Board also has the authority under article X, section 2 of the California Constitution and Water Code section 100 "to prevent the waste or unreasonable use, unreasonable method of use, or the unreasonable method of diversion of all waters of the State." ĢĶ "The premise underlying the proposed Regulation is that a diversion of water that is harmful to salmonids is an unreasonable use of water if the diversion can be managed to avoid the harm."

SWRCB put its foot down. Their proposal stated that unless diversions of surface water and of hydraulically connected groundwater for frost protection from March 15 through May 15 were in accordance with a SWRCB Water Demand Management Program, they would be prohibited. Instantaneous cumulative diversion rates cannot result in reductions of stream stage that is harmful to salmonids, and require stream and diversion monitoring

and reporting. These regulations are being developed.

The growers involved in the Sonoma County sham regulations pressed forward, believing that they could preempt the state's wrath or more stringent controls if they enacted local legislation first.

The County's Permit Ordinance collapses

Fortunately, the efforts to craft an industry-cozy legislative and permitting package collapsed and failed. On October 19, 2010, Steve Edmundson, NMFS Southwest Regional Habitat Manager, wrote to the Board of Supervisors:

"it is evident that the goal of ordinance language agreeable to all interested parties is not being met. For our part, we cannot endorse a vineyard frost protection ordinance that lacks the means to establish a meaningful monitoring program and a transparent process.

"Essential components of transparency would include the tracking and verification of conservation actions, the full disclosure of operations (including the spatial extent, timing, frequency, and method of irrigation), complete accounting of water rights and actual diversions, as well as third-party handling and reporting of stream flow and diversion monitoring data.

"Groundwater use (including the location, number, depth, maximum rate, water quality, and log records for wells) is also important to disclose as it may affect streamflows in some situations. Finally, transparent decision processes associated with oversight activities would also provide assurances that decisions and actions are legitimate and appropriate. "We strongly prefer to work constructively with the wine grape growing industry to identify and resolve impacts to salmonid habitats where they occur, but accurate monitoring, transparency, and accountability are essential foundations for such a relationship."

Nevertheless, the Supervisors unanimously approved the Vineyard Frost Control Ordinance on December 14, 2010. The permitting process details and management practices were to be brought back for final approval on February 8, 2011.

However, days before February 8, the negotiations and legislation collapsed in a major disagreement between growers and the County.

County Counsel told growers they wanted an indemnification of the County for any possible legal or financial costs, with RRWCC carrying insurance to cover the indemnification. The growers were furious. The growers refused to agree to transparency of data collection and release of real-time stream-flow monitoring data, and demanded anonymity in growers' reports on water used for frost protection.

With consensual hubris, the wine grape industry and the County had insisted on secrecy and reaped disdain.

Supervisors "were 'perplexed,' 'frustrated,' and 'blown away' by opposition from the growers" to the program's previously approved essential parts, according to the Press Democrat. "We negotiated in good faith, (the growers) agreed to it and the Board of Supervisors voted on it. This is kind of a breach of trust," said NMFS biologist David Hines. While some scorn was directed to Williams-Selyem's Dyson, who reportedly took a lead role in the turnabout, it was clear that the wine grape industry's rejection of the previously approved deal came with substantial support from many of its members, not just some lone cowboy.

As a result, the Supervisors agreed to require only a $64/year registration for frost-control irrigators. No monitoring, no stream gauges, no reporting is currently required.
Instead, the SWRCB's Russian River Frost Protection Regulation should take its proper place in the frontlines for the battle to prevent harm to Russian River salmonids.
Proposed rules, including the framework of Water Demand Management Programs, were drafted and comments taken at a SWRCB workshop on April 6, 2011. See: www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/russian_river_frost/.

As expected, many grape growers argued that the regulations were unneeded, intrusive, that there was no continuing evidence of fish kills, and returning salmon numbers were up this year. Some claimed that SWRCB was overstepping by constraining the "reasonable and beneficial use" requirement for water rights and permit holders, and by extending controls to hydraulically connected groundwater. We are concerned that public access to real-time stream stage monitoring data is not required yet; that Lake Mendocino is seen as a source for more water to make up for overdrafting by frost-water irrigation; and that Sonoma County would not be an unbiased, effective overseer of the WDMP requirements.

The Draft EIR and final regulations will be released by May 15, 2011, with expected adoption by the end of this year.

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Frustrated supervisors blindsided over frost plan for grapes.

By BRETT WILKISON
THE PRESS DEMOCRAT

Published: Tuesday, February 8, 2011 at 8:20 p.m.

Sonoma County supervisors on Tuesday issued a clear warning to local grape growers over the recent breakdown in talks about the county's program to oversee frost water use in the Russian River watershed.

Supervisors said they were “perplexed,” “frustrated” and “blown away” by opposition from growers to a major part of the program — the water monitoring and data reporting work seen as crucial to fixing water diversions that some say harm endangered salmon and threatened steelhead.

In contract talks that stalled last week, a group representing growers would not agree to that work because they did not want it to identify individual property owners and their water usage.

The three current supervisors who were on the board during the last year of planning said they were blindsided by the shift.

“The change of direction here has been somewhat troublesome,” said Board Chairman Efren Carrillo.

In December, when the program was approved unanimously by supervisors, it appeared to have wide support from growers and had tentative buy-in from state and federal regulators and fish advocates.

“I'm so disappointed we're here today because I know how much work was put into this,” said Supervisor Shirlee Zane.

Supervisor Valerie Brown struck the hardest. She wondered if growers would prefer the county abandon the effort and let more stringent state rules on frost water, expected out in a year or two, take its place.

“Should we still be investing in this process?” she asked.

Though unapologetic, growers appeared chagrined and said they were committed to building a full-scale frost program with the county.

“We are continuing to move forward,” said Pete Opatz, a viticulturist who led the talks for the Russian River Water Conservation Council, the growers' group.

Supervisors later agreed to dedicate another year to working toward a monitoring and reporting protocol.

In the meantime, a less extensive effort will begin, requiring growers to detail only the types of water diversions they operate, including from streams and wells, and the amount of acreage they protect from frost. Supervisors approved a per-grower annual fee of $64 for that effort, which does not require details on water volume or timing of frost diversions.

The program's most vocal critics are environmentalists who say it shelters growers and fails to protect fish. They called again for the effort to be abandoned. Federal fisheries regulators said they could not support the simplified program long-term but would participate in talks about restoring the monitoring and reporting work.

Given more time this year, both county staff and growers said they saw a better chance to reach an agreement.

But supervisors also pressed growers to concede that they have a small, hard-line group in their midst who have held up the full frost program.

John Dyson, the New York-based owner of Williams Selyem winery in Healdsburg, has funded a private study critical of frost water rules. He is said to be the leader of that faction.

Opatz, the grower representative, all but acknowledged Dyson's strong-arm role among growers Tuesday. He told supervisors he had called “a gentleman” and asked him, “Are you going to torpedo this program if it goes forward?”

“He said no,” Opatz said, without revealing the man's name. Other growers on hand said he was referring to Dyson.

Getting all growers on board — a step needed for any state or federal sign-off — will be the next challenge, supervisors said.

“It's a hard nut to swallow where we are today,” said Supervisor Brown. “I want to thank all those who have shown up in this process. There's a year in which to move this forward.”

Key element of Russian River frost plan withdrawn

By BRETT WILKISON
THE PRESS DEMOCRAT

Published: Monday, February 7, 2011 at 3:00 a.m.

A key part of Sonoma County's recently approved program to oversee agricultural frost operations in the Russian River watershed has been derailed after contract negotiations between the county and grape growers broke down last week.

The disagreement centers on grower concerns about the water monitoring and reporting work seen as central to the overall program, which aims to allow water diversions for frost control while protecting stream flows for endangered salmon and threatened steelhead.

Among the hundreds of growers who would be affected by the program, a small group including John Dyson, a high-powered Healdsburg vintner, objected to any reports that would identify how much water is being taken from the river by individual growers, sources involved in the talks said.

The negotiations fizzled after the nonprofit group representing growers, the Russian River Water Conservation Council, endorsed those objections and proposed a contract revision that would have withheld growers' names from reports, sources said.

County negotiators rejected that proposal, which would have changed the policy endorsed by the Board of Supervisors when it unanimously approved the program in December.

The growers' group also balked at a last-minute county request for legal protection from any lawsuits from growers on fees associated with the program. Growers said they can't afford to indemnify the county.

The breakdown raises the likelihood of growers next year facing more stringent state rules on frost water, a scenario they'd hoped to avoid through tighter local oversight.

Both sides expressed disappointment with the outcome last week but downplayed the failure.

"We just flat ran out of time," said Doug McIlroy, director of winegrowing at Rodney Strong Wine Estates and one of two grower representatives who participated in contract talks.

However, a federal fisheries official who lent his tentative support for the program last year said that growers had reneged on their earlier support for the monitoring and reporting.

“We negotiated in good faith, (growers) agreed to it and the Board of Supervisors voted on it. This is kind of a breach of trust,” said David Hines, a Santa Rosa-based water policy coordinator for the National Marine Fisheries Service, which oversees salmon and steelhead stocks.

Pete Opatz, the other grower representative, said the local effort was not losing any steam.

“What we lost this year, it’s unfortunate, but we still have a (program) moving forward,” said Opatz, a aviculturist with Silverado Premium Properties.

Starting March 1, growers will be required to detail the type of their water diversions, including those from streams and wells, and the crop acreage they protect from frost. But they will not be required to disclose real-time details about the timing and the volume of diversions.

A monitoring and reporting program could be added by next year, county and ag representatives said.

“The phased approach is going to give us the opportunity to work out those tweaks,” said Board of Supervisors Chairman Efren Carrillo.

Yet critics described the impasse as a fatal blow that warrants abandoning the program. They’ve accused the county and growers of closed-door collusion and said their efforts would fail to protect fish.

“The whole thing has been a sham to begin with,” said David Keller, a Petaluma environmentalist and river advocate.

The Board of Supervisors is set to approve fees connected to the program in an afternoon hearing today. It has put off any action on the contract with the growers’ group.

The change is a abrupt turnabout for a program that appeared to have wide support from the ag community as well as buy-in last year from state and federal regulators and the group Trout Unlimited.

The removal, even temporary, of the monitoring and reporting work, makes that support shaky, some of those stakeholders said.

“If this cannot be resolved, it will be an issue with us,” said Dave Clegern, spokesman for the state Water Quality Control Board.

The agency expects to issue new rules on frost water use next year. Growers had hoped a county program could stand in for those regulations locally.

But the current package, without details on individual growers' water use — seen by regulators as the key tool in fixing diversions they claim stranded and killed salmon and steelhead in the Russian River watershed in 2008 and 2009 — won't suffice, state and federal officials said.

"The writing is on the wall. They're going to have to start reporting water use," said Hines, the federal fisheries official.

The eleventh-hour change could affect talks with growers down the road, he said.

Those familiar with the contract negotiations and talks among growers said the catalyst behind the shift on water diversion studies was Dyson, owner of Williams Selyem winery in Healdsburg.

He and his Sacramento-based attorney, Jesse Barton, threatened to shut down any program if it went forward with studies reporting on individual growers water use, they said. The sources spoke only on condition of anonymity because they said they did not want to harm future negotiations on the frost program.

Dyson, a former deputy mayor of New York City who also served as an appointee in New York state posts overseeing commerce and agriculture, refuted the claims in an phone interview from New York on Monday.

"I don't think there's any divergence of opinion on this," he said about the growers' new stance. "We're unanimous in this."

The eldest son of a successful businessman and philanthropist, Dyson has been a behind-the-scenes force in questioning frost water rules.

He bankrolled a private study by a Sonoma State University professor last year who concluded state regulation of frost measures would cost the California economy $2 billion annually. State water officials and fish advocates said the study overestimated the reach of regulations and their impact on crop yields.

Dyson said he was not opposed to monitoring stream diversions but said reports on those findings should not include growers names without their consent.

"It's so you don't give growers the impression that it's a witch hunt," he said. "I think I know something about public policy . . . If this is a voluntary program, it has to be voluntary."

County officials said they would work with growers to reach some agreement over the next year. But any county program will have to make public the data collected and growers names, officials said.

“We can’t hide information,” said Peter Rumble, an county administrative analyst who has overseen planning for the frost program. “It’s the county’s position that that information must be publicly available. That’s always been our position.”
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http://www.pressdemocrat.com/article/20110207/ARTICLES/110209546/1033/news?p=1&tc=pg
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FRIENDS OF THE EEL RIVER

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November 30, 2010

Via Email and U.S. Mail

California State Water Resources Control Board
Attn: Bill Cowan
PO Box 2000
Sacramento, CA 95812-2000
rrfrostregulation@waterboards.ca.gov

Comments on the Notice of Preparation for the Russian River Frost Protection Regulation EIR

Dear Mr. Cowan:

This letter is submitted by Friends of the Eel River (FOER) as comments on the NOP for the Russian River Frost Protection Regulation Environmental Impact Report ("Project"). I have attended the Scoping Meeting for this Project held by SWRCB in Santa Rosa on Wednesday, November 17, 2010, and my oral comments submitted at that time are supplemented with this letter.

Project Description and Environmental Setting

The NOP states that

"The primary objective of the proposed project is to develop a State Water Board regulation by adding Section 862, Russian River, Special to division 3 of title 23, California Code of Regulations. The proposed Regulation would prohibit diversions from the Russian River stream system for purposes of frost protection from March 15 through May 15, unless they are in accordance with a WDMP approved by the State Water Board. The proposed Regulation would apply to all diversions, including hydraulically connected groundwater, regardless of the diverter's basis of right, unless a diversion is exempted by the Board. In order to be approved, a WDMP would be required to ensure that the instantaneous cumulative diversion rate does not result in a reduction in stream stage that is harmful to salmonids and would be required to include stream and diversion monitoring and reporting requirements. The number and location of stream stage monitoring gages would be required to be established in consultation with the NOAA Fisheries Service and the California Department of Fish and Game. The WDMP would be required to be administered by a governing body capable of ensuring the goals of the program are met."

The EIR must provide the actual proposed regulatory language, conditions, assumptions as well as the contents of a proposed WDMP to allow for informed review of the Project and comments by the public and stakeholders.

The EIR must carefully consider and describe the existing environmental setting for the Project. The EIR should contain a full description and discussion of existing water rights, diversions (legal and illegal), pumping and storage (legal, permitted as well as illegal or unpermitted) within the Russian River watershed, including its tributaries, which are used for sources of the frost protection water supplies. The segments and seasonality of any overdrafted portions of the Russian River must be identified clearly.

The EIR must also have a full description and discussion of any reasonably foreseeable changes of flows within the Russian River. This includes changes in River and tributary base flows and seasonal flows, and tributary connectivity due to existing and newly approved gravel and sand mining of the Russian River and its tributaries, as well as timber harvest practices and land conversions that impact erosion, soil stability, loss of groundwater and other impacts to River and tributary flows.

The EIR must also include changes in flows due to compliance with AB2121 requirements, NMFS Russian River Biological Opinion requirements, revisions proposed for D.1610 (including a change in hydrologic index from the upper Eel River watershed to the Lake Mendocino watershed) and any proposed changes in municipal and/or agricultural water demands and River or groundwater extraction from Sonoma County Water Agency and any other municipal or agricultural water rights holders.

In addition, the EIR must describe clearly the inflows to the East Branch Russian River derived from diversions from the Eel River through the Potter Valley Project. Inasmuch as water stored in Lake Mendocino is used to provide any elements of a water balance and flow regime for the Russian River and its listed salmonids, the conditions of the Eel River diversions must be included in the environmental setting for this Project's EIR. Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 870-71. The Project is proposing to provide a revised and improved regulatory setting and practices for the Russian River. It is likely that the Eel River flows through the Potter Valley Project will change again in the future as the new FERC relicensing process begins. Hence, the EIR should include a scenario in which ***no*** flows from the Eel River are diverted to the Russian River.

In addition, the EIR must describe and discuss the proposed Sonoma County Vineyard Frost Protection Ordinance(s) and Best Management Practices guidelines, as currently proposed, and likely to be soon adopted by the Sonoma County Board of Supervisors and Agricultural Commissioner, and any parallel efforts being undertaken in Mendocino County.

Environmental Impacts

The EIR must not understate the severity or extent of the impacts associated with the proposed Project.

The EIR should be able to demonstrate through predictive modeling of the subject tributaries and Russian River that the flows remaining in the Russian River and tributaries following approval and adoption of the Project's regulations and WDMP will indeed not be harmful to the protected species of salmonids and other public trust resources.

Any continued dependence upon water stored and released from Lake Mendocino for providing adequate flows in the Russian River requires a complete description in the EIR of the impacts of continued diversions from the Eel River through the PG&E Potter Valley Project which flow into Lake Mendocino. Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 870-71. The EIR must describe the impacts of any potential water storage, releases or permitting regimes for supplementing inadequate Russian River mainstem flows with water derived from the Eel River diversions and released from Lake Mendocino.

Alternatives

The EIR must analyze a reasonable range of feasible alternatives that would lessen the environmental impacts of the proposed Project.

In addition to the regulatory language and Water Demand Management Program ("WDMP") of the proposed Project, the EIR should evaluate other alternative means of reducing or avoiding the risks of fish stranding mortality and other damages to protected species and public trust resources associated with the use of water

diversions for purposes of frost protection. Such alternatives can be used in conjunction with a regulatory and WDMP framework to help reduce water demands in the first place, while still reaching the goal of achieving reasonably effective frost protection for economically viable crops.

Alternative means of achieving of protecting listed salmonids with reasonably effective frost protection should include, at a mimimum:

- avoidance of planting grapes and other crops in known frost-prone areas and topography
- use of varieties that are more resistant to frost damage
- use of wind and heating options for vineyards at risk
- use of devices and methods such as Shur Farms Frost Protection Cold Air Drain which utilizes air movement, not water, to protect crops from frost damage (www.shurfarms.com)

Given the simultaneous listing and protections for three salmonid species in the Eel River, and given the likelihood of reductions in flows from the Eel River through the Potter Valley Project, it is important that the EIR evaluate thoroughly an alternative that does not rely on any continued diversions from the Eel River. This would include any prospective changes in water sources for storage and release from Lake Mendocino. This includes raising Coyote Dam, removing sediments within the reservoir, and other means of re-managing the water supply pool and flood storage pool at Lake Mendocino.

We appreciate this opportunity to comment on the Russian River Frost Protection Regulation EIR NOP. We reserve our right to raise other issues and comments during the environmental review process.

Please send a copy of the Draft EIR when available to:

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Sincerely,

David Keller
Bay Area Director, Friends of the Eel River

Cc: Ellison Folk; Nadananda