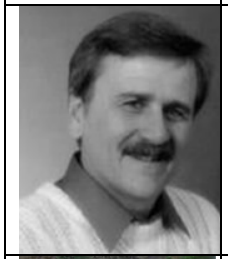
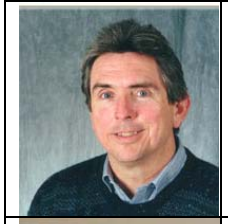
Western Region IPM Center Weather Systems Work Group

	Name	Affiliation	Expertise	Contact Information
	**Leonard Coop** **Len**	Integrated Plant Protection Center (IPPC), Oregon State University, OR	Entomologist; responsible for development of IPM decision support systems, weather data acquisition and phenological modeling. Originated and developed online insect and plant disease model delivery system for Oregon and the Pacific North West, that has now been expanded to national coverage. Use of GIS systems and online and development of GIS delivery systems. Development of interpolation methods and analytical routines	(541) 737-5523 coopl@science.oregonstate.edu
	**Christopher Daly** **Chris**	Director, Spatial Climate Analysis Service, OSU	Spatial climate analysis, agricultural decision support systems, climate data quality control. Developer of the PRISM climate interpolation technology. Produced the current official USDA precipitation and temperature maps for the US. Maintains a monthly time series of digital climate maps for the US, 1895-present. Maintains a web-based internet map server and agricultural decision support system to identify areas suitable for forage species and other crops in the US and China.	(541) 737-2531 daly@coas.oregonstate.edu
	**Alan Fox**	Director, Fox Weather LLC, Fortuna, CA	Operational weather forecasts for agriculture and water management focusing on weather forecast technique development, including rainfall forecasts, short and medium range agricultural forecasts and 30-day outlooks, local GIS-scale forecast models, and rain estimation from satellite data. Provides disease forecasting including powdery mildew of grapes and hops, botrytis for strawberries, xanthocast, tomato late blight, and lettuce downy mildew.	(805) 469-1368 alan@foxweather.com
	**Gary Grove**	Washington State University, Prosser, WA	Epidemiology and management of fungal diseases of tree and small fruits. Dr. Grove has developed predictive models for leather rot of strawberry, sprinkler rot of apple and pear, powdery mildew of cherry, and shothole disease of stone fruits. He has been associated with Washington's Publicly developing technology for the detection and quantification of airborne fungal inoculum and using this information to refine disease models and management programs.	(509) 786-9283 grove@wsu.edu
	**Douglas Gubler** **Doug**	Dept. of Plant Pathology, UC Davis, CA	Pathogen biology and disease epidemiology of fruit crops, with an emphasis on grapevine and strawberry. He has developed a risk assessment model for grapevine powdery mildew and has adapted that model to strawberry and cucurbit powdery mildews. He was instrumental in the development and implementation of the California weather network used to run the models on grape and strawberry.	(530) 752-0304 wgubler@ucdavis.edu
	**Paul Jepson**	Director, Integrated Plant Protection Center (IPPC), Oregon State University, OR	IPM coordination in Oregon and the development of biointensive and reduce-risk IPM regimes in Pacific Northwest crops. Dr. Jepson directs and participates in IPPC programs in biological control, development of tools for pest diagnosis and forecasting, pesticide management and risk mitigation, and information delivery and decision support. His research includes terrestrial and aquatic ecotoxicology and ecological risk assessment, in addition to pest biology and IPM program development.	(541) 737-9082 jepsonp@science.oregonstate.edu

	Name	Affiliation	Expertise	Contact Information
	**Dennis Johnson**	Dept. Plant Pathology, Washington State University, WA	IPM, disease forecasting and pathogen epidemiology. Dr. Johnson developed and implemented on a commercial scale, disease models to forecast epidemics of downy mildew in hop and late blight of potato in central Washington State.	(509) 335-3753 dajohn@wsu.edu
	**Walter Mahaffee** **Walt**	USDA-ARS-HCRL, Corvallis, OR	Disease forecasting, epidemiology, microbial ecology, and biological control. Developed and implemented a disease forecasting model for hop powdery mildew. Currently, developing a universal disease forecasting model for all powdery mildews and technology for the detection and quantification of airborne fungal inoculum and using this information to refine disease models and management programs.	(541) 738-4036 mahaffew@science.oregonstate.edu
	**William Pfender** **Bill**	USDA-ARS NFSPRC, Corvallis , OR	Epidemiology and management of stem rust and choke diseases of grass seed crops. He is developing a weather-based simulation model for stem rust epidemics. Also working on methods to interpolate relevant weather parameters (temperature and leaf wetness) to a finer geographic scale, using our network of existing weather stations. Collaborative project on local and regional spore dispersal.	(541) 738-4156 pfenderw@onid.orst.edu
	**Fran Pierce**	Director, Center for Precision Agricultural Systems, Washington State University, WA	Dr. Pierce is the Director of the Center for Precision Agricultural Systems and Director of Agweathernet (formerly PAWS) at Washington State University located at the WSU Prosser Irrigated Agriculture Research & Extension Center (IAREC). His expertise is in soil management and he has been involved in the development and evaluation of precision agriculture since 1991. As Center Director, Dr. Pierce has the mission to advance the science and practice of precision agriculture in Washington.	(509) 786 - 9212 fjpierce@wsu.edu
	**Joyce Strand**	Program Manager, University California Statewide IPM, Davis, CA	Agricultural meteorologist and information systems manager. Interests are applications of weather and climate to pest management systems, particularly their presentation to end users and education in their use and associated risks. Led California PestCast weather network/model validation project.	(530) 752-8350 jfstrand@ucdavis.edu
	**George Taylor**	Director, Oregon Climate Service (OCS), Oregon State University, OR	Expertise in meteorology and climatology with emphasis on using climatology for weather forecasting. George is the State Climatologist for Oregon and directs the Oregon Climate Service, the state repository for weather and climate information. He is a Certified Consulting Meteorologist and has been active in weather and climate services since 1971.	(541) 737-5705 taylor@coas.oregonstate.edu
	**Carla Thomas**	National Plant Diagnostic Network, Department of Plant Pathology, UC Davis, CA	Co-author of the Gubler-Thomas powdery mildew model and has been instrumental in weather network implementation of over 20 models for dozens of crops throughout the US and 9 other countries. An expert in development and implementation of weather based risk models for diseases, insects and weeds, also experienced in use of remote sensing imagery. She is Deputy Director of the Western Region of the National Plant Diagnostic Network and chair of epidemiology for the program and has served on national advisory panels for the Department of Homeland Security.	(530) 304-0689 cthomas@ucdavis.edu

Concept for Project to Develop a Collaborative Weather-based IPM Resource System

From the Western IPM Center Weather Systems Work Group

Draft September 30, 2005

PURPOSE OF THIS DOCUMENT

This document summarizes our thinking regarding approaches to address the goals of our work group. We include what we want as outcomes, how we approach achieving those outcomes, and our timeframe for accomplishing them. We'll use it to keep us on track, revising it as needed to incorporate new ideas or to modify old ones. We will use the Actions/Timeline/Milestones section (*not included in this version*) to guide us and to track our progress.

MISSION (draft statement)

To develop a science-based system that provides principles and procedures to access, synthesize, distribute, and use weather and climate data products to improve crop management decision-making abilities through the delivery of weather based information.

BACKGROUND

New weather driven, modeling technologies, if developed wisely, can address needs of decision makers regarding management and control of new, invasive, and established pests as well as irrigation and other horticultural practices. In particular, we will provide improved models and interpolation methods and outputs to advance the science and improve the adoption of IPM, which will reduce chemical usage and its costs to agriculture, and to society at large.

Building on successful systems that already exist in the Western USA, serving thousands of end users, our vision is to develop widespread access to a backbone network of physical stations while creating "virtual stations" that are based on advanced, validated interpolation of measured variables and model outputs. Weather data from the actual and virtual stations and forecasts are integrated with crop and pest models as decision tools for pest diagnostic, survey, area wide management, and local management programs. Included with the data and decision output will be information on the confidence associated with the data and results. Customized or customizable information will be delivered through the Web. Such a system may operate on regional scales, but the concept is consistent with building a national decision support system such as envisioned by the Pest Information Platform for Extension and Education (PIPE).

Philosophy/principles.

- We seek a public–private consensus concerning the highest quality, science-based principles and procedures related to weather data acquisition, synthesis, distribution, and use.
- We are open to contributions from outside the group and we'd like as much of our work as possible to be publicly available.
- While our primary focus is on IPM and much of our experience is in agriculture, we recognize that our work has applicability to croplands, rangeland, forests, urban settings, ornamental horticulture, and similar systems, and that in the long run, expanded partnerships in these areas and in applications beyond IPM are important to support a sustainable system.
- We would like to facilitate (assist groups to develop as viable business opportunity) access to

the highest quality science based products throughout the western region, whether it is from the private or public sector.

- IPM is local. A regional approach should include a consortium of local IPM efforts linked together. But some aspects of regional systems may be coordinated to provide a national platform for decision making.
- We need to balance benefits of competition and innovation against development of general standards that may suppress innovation.

Qualifications. This weather work group is well-positioned to develop the basic and detailed technical concepts and techniques for this project. We are the only group that is working on this subject from acquisition of weather data all the way through decision support. The group includes plant pathologists, entomologists, meteorologists, climatologists, programmers, and interpolation experts, all of whom are experienced with multiple aspects of data collection, application, and delivery.

Cooperation. We encourage participation from both public and private sectors and will expand our group or confer as needed to draw on the expertise required to accomplish our goals. We will work with end users to help to ensure that our products are usable and meet real needs.

Benefits. This project will put improved information into the hands of growers who are routinely faced with managing crop diseases and other pests. The techniques related to weather data, interpolation, forecasting, and disease modeling will be applicable not only to the western U.S., but also to many areas beyond the West. These public–private partnerships will provide a model for developing and sustaining this kind of system.

Funding. Long-term, stable funding would be needed to build and to maintain even a prototype network and applications development. Possible fund sources, most likely from the private sector, will need to be identified to maintain the network, applications development, and delivery.

ISSUES ADDRESSED, OBJECTIVES, and DESIRED OUTCOMES

1. Create an understanding in the public and private sectors of the impact of weather based information on reducing the economic and environmental costs associated with agricultural production.
2. Provide a forum for exchange of ideas, standards, technologies
3. Develop a community of users of all stages of products: weather data and added value products.
4. Build a public–private consensus of the highest quality, science-based principles and procedures related to weather data acquisition, synthesis, distribution, and use.

   Research objectives relate to
   a) interpolation of specific variables at necessary time and space resolutions
   b) appropriate forecast methods
   c) techniques to estimate difficult-to-measure variables from other measured variables need to be developed or refined, and validated

d) development of standardized modeling structures for specific types of pathogens to improve availability of disease models
e) quantification of uncertainties associated with the various data and computations so that a level of confidence can be placed on output and communicated to users

Operational objectives relate to

a) development of the networks of weather stations
b) data acquisition, quality control, storage, archiving, and delivery
c) focus on needs in accounting for and dealing with missing data
d) delivery of pest management applications
e) training
f) outreach
g) evaluation of overall effectiveness