Project ID: 21016

Title: Accelerate the Application of Integrated Fruit Management to Reduce the Risk of Pesticide Pollution in Fifteenmile Sub-basin Orchards

Section 9 of 10. Project description

a. Abstract.

A project to prevent pesticide pollution from orchard operations in the Fifteenmile Sub-basin, 17070105. The Wasco County Fruit and Produce League orchard growers objective is to implement Integrated Fruit Management (IFP) practices with special attention on pest management. Growers will reduce the use of broad-spectrum pesticides replaced with new generation less toxic pesticides. The new generation pesticides reduce the risk of pollution to land and aquatic resources affecting salmon and other endangered species. The use of less toxic pesticides requires growers to be more precise in the timing of the application of these pesticides because they don't persist in the environment like broad-spectrum pesticides. Growers will use a network of remote weather station in orchards to collect precise weather data to calculate pest and disease degree-day models for specific orchard sites. Orchard growers will use the degree-day models and data to make better decisions to make precise timed application of new generation pesticides. A second component of the project will conduct research at Mid-Columbia Agriculture Research and Extension Center to reduce spray drift utilize low-volume applications of pesticides for insect and disease control in older tree fruit orchards.

The benefit to salmonid species is the new generation of pesticides are environmentally safer because they are more pest specific and less toxic. These new pesticides require precise timing of application to be effective. The new generation pesticides are less toxic and will replace broad-spectrum products currently in use. There is a potential to significantly reduce the amount of broad-spectrum pesticides applied. This project implements the commitment of local orchard growers to reduce the risk of pesticide pollution to salmonid species in the Fifteenmile sub-basin.

b. Technical and/or scientific background

Orchard growers plan to accelerate the application of Integrated Fruit Production, targeting pest management. They plan to reduce the use of broad-spectrum pesticides currently used in conventional pest management today. This project provides the tools so growers can accelerate advanced methods of pest management using new generations pesticides.

Not only reducing the amount of pesticides applied but reducing or eliminating the spray drift from orchard sprayers will be researched. The Mid-Columbia Agricultural Research and Extension Center (MCAREC), proposes research to evaluate orchard tower sprayers in the Columbia Gorge. The data collected will evaluate if tower sprayers are an

effective alternative for reducing spray drift and utilizing low-volume applications of pesticides for insect and disease control in older pear orchards

In order for the new generation pesticides to be effective, the pesticides must be applied in a narrow window with favorable environmental conditions coincidental with the life stage of the targeted pest. The technology to do this is available now. The use of these new generation pesticides requires precise weather data used in degree-day models to calculate the life stage of pests. To obtain the weather data, growers need to establish a network of remote weather stations placed in the orchards. Investment in this technology will enable orchard growers to make the transition away from broad-spectrum pesticides suspected to have adverse impacts on salmonids and other species. The benefit to salmonids is the reduction of the amount of potentially toxic pesticides that could pollute aquatic habitat.

Location

The proposed watershed treatment area is part of Fifteenmile Sub-basin, 17070105. The project covers four sub-watersheds that includes; Threemile, Dry Hollow, Mill Creek, and Chenowith Creek, located in northern Wasco County, east of the Cascade Mountains in the north-central part of Oregon: see the map on page 3. There are about 6,000 acres of orchard in the watershed: see the map on the following page. There are 150 orchard landowners and 75 orchard operating units.

Background

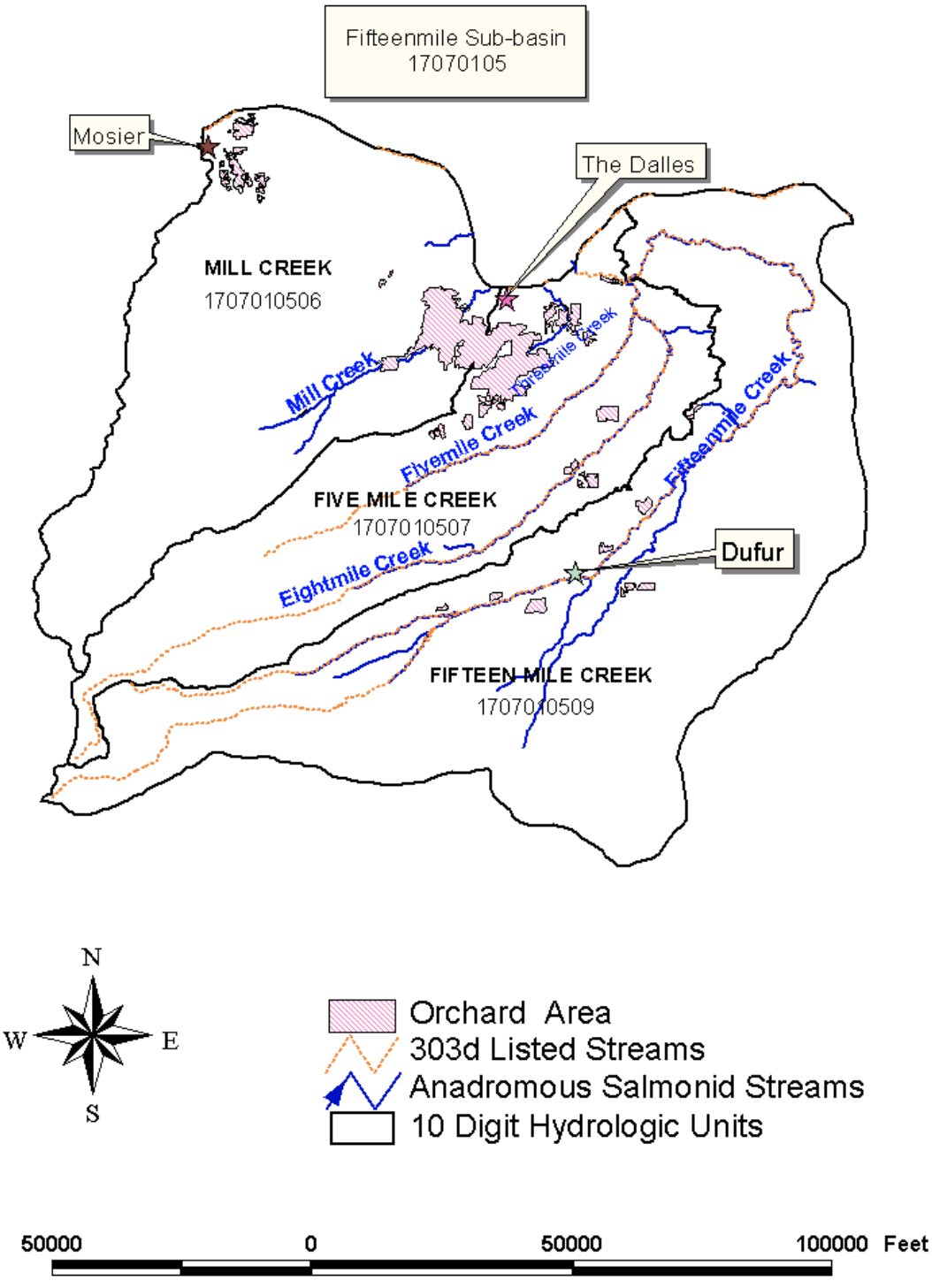
The publics concern over pesticide residues on food, exposure of farm workers, and contamination of the environment are issues of increasing importance, particularly their effects on watersheds and salmonid species.

The U.S. Geological Survey sampled 58 rivers nationwide for pesticides. Results showed pesticides were present in 10 percent of the samples. Frequently areas dominated by orchards and vegetables have higher concentrations. In wheat growing areas, detection is lower. While concentrations of pesticides generally did not exceed drinking water standards, standards for aquatic life are commonly exceeded (Larson, Gilliom, and Capel, 1999).

Another USGS report summarizing major issues and findings for the Willamette Basin in Oregon stated that: "Fifty pesticides were detected in streams and 10 exceeded criteria established by the USEPA for the protection of freshwater aquatic life from chronic toxicity". The report went on to say "Forty-nine pesticides were detected in streams draining predominantly agricultural land, whereas 25 pesticides were detected in streams draining mostly urban areas. The highest pesticide concentrations generally occurred in streams draining predominantly from agricultural land" (Wentz etal. 1998).

Quantified water quality data is not available for Fifteenmile Sub-basin; however, similar data from Hood River Sub-basin orchard area has identified a pesticide pollution problem. OP pesticides are used in Hood River basin orchards to control insects in late winter, spring, and early summer.

The Oregon Department of Environmental Quality, in cooperation with the Hood River Watershed Group and the Hood River Growers-Shippers Association (HRGSA) initiated a water quality monitoring program in 1999 in the Hood River sub-basin because of concerns about possible pesticide pollution.


Fifteenmile Sub-basin
17070105
Mosier
The Dalles
MILL CREEK
1707010506
Mill Creek
Threemile Creek
Fivemile Creek
FIVE MILE CREEK
1707010507
Eightmile Creek
Fifteenmile Creek
Dufur
FIFTEEN MILE CREEK
1707010509
N
W
E
S
Orchard Area
303d Listed Streams
Anadromous Salmonid Streams
10 Digit Hydrologic Units
50000
0
50000
100000 Feet

In June 1999, water samples were collected in six locations in the Hood River Basin and analyzed for OP pesticides. Chlorpyrifos, the primary pesticide being applied by orchard growers in March and April, was detected in some locations, but not in all samples. Average chlorpyrifos concentrations in two creeks were above state water quality standards and some concentrations may have been high enough to cause toxicity to aquatic life. Azinphos-methyl, the primary pesticide being applied by growers in June, had concentrations exceeding state water quality standards (Jenkins).

A result of the 1999 monitoring study showed pesticides were present in the Hood River Basin at concentrations that could be toxic to aquatic organisms. It was determined that further study was needed to define the mechanisms by which OPs enter surface waters and OP the exposure patterns for salmonids in the basin. There was little data available on the sublethal effects of intermittent exposures of OP to salmonids. In the spring of 2000, OSU Extension, Oregon Department of Environmental Quality, and the Hood River Grower-Shipper Association (HRGSA) initiated a more detailed monitoring study of the Hood River Basin. The study was designed to monitor surface water for azinphos-methyl and phosmet during late May and June 2000 and for chlorpyrifos during March and April 2000 to assess possible toxic effects on salmonids and other aquatic life (Jenkins).

While results from the 2000 sampling have not yet been released, preliminary results from this year suggest that chlorpyrifos was detected at lower levels and less frequently than in 1999. The sampling results indicate that efforts by growers to reduce in-stream loading of pesticides are working. Beginning in the 2000 season, growers participated in voluntary pesticide management programs designed to reduce possible contamination of streams by OP's. Special attention was given to practices that have the greatest potential to impact water quality, including alternative spray programs, mixing-loading operations, disposal of spray tank material, and spray application techniques designed to reduce off-site movement into riparian area. Many growers had already been practicing Integrated Fruit Production (IFP) techniques with a strong pest management component (Jenkins).

Since the Hood River growers began using IFP, significant results have occurred in pest management practices. Codling moth mating disruption is now used on approximately 25% of Hood River orchards, resulting in a significant reduction of summer use of OP pesticides. Growers and the Mid-Columbia Agricultural Research and Extension Center have established a network of eight weathers stations to use in degree-day models to predict growth stage of pests. Overall, growers have reduced the use of OP pesticides.

In another reference, Diminishing Returns: Salmon Decline and Pesticides brings to light scientific literature describing the impact of pesticides on salmonid habitats (Ewing).

There are also concerns that pesticides applied with standard blast sprayers along residential areas, roads and highways create environmental hazards when the pesticides enter streams. Observers can see spray residues plums above the tops of trees during the spring spray season.

Conclusion

What does this all mean to salmonid habitat in the Fifteenmile Sub-basin? Pesticides certainly can enter aquatic habitat and potentially impact the salmonid survivability. Growers in the Hood River Basin have been successful in using technology to reduce the use of OP in IFP strategy. Knowing this, orchard growers are taking a proactive approach to reduce the risk of pesticide pollution by accelerating the application of Integrated Fruit Production (IFP) practices in area orchards. They plan to do this by setting up remote weather stations and using tower sprayers to minimize spray drift.

Integrated Fruit Production

Vital to Wasco County orchard industry is the ability to make good management decisions using Integrated Fruit Production (IFP). IFP is the economical production of high quality fruit in an environmentally sound manner. Elements of a IFP system include these factors: orchard floor management, soil-water relationships, information systems, post-harvest, labor, public perception, farm stewardship, economic sustainability, marketing, profitability and integrated pest management. *This proposal focuses primarily on Integrated Pest Management (IPM) or pest management element of an IFP system.*

Integrated Pest Management (IPM) is a strategy for control founded on the principles of ecology. The orchard manager must make timely decisions to apply pest control measures to the orchard crop. The complexity, costs and potential impact on crop yield and environmental impact requires growers to use technology incorporated into IPM to make good business decisions, protect the environment and provide safe food products to consumers.

In practice, IPM utilizes several control tactics based on knowledge of the crop, pests and diseases, and associated natural enemies to avoid crop loss and minimize harmful effects on the environment. A successful IPM program incorporates a variety of compatible tactics such as biological control, cultural control, judicious use of insecticides, and state-of-the-art techniques such as pest and disease modeling and mating disruption. IPM practitioners recognize that insecticides are one of many tools available for managing pests and disease.

This project will use remote weather stations placed in orchards to collect basic weather data. Computer models use this data to determine the precise timing of low-toxicity pest control treatments to the orchard crop. Today, many growers make pest management decisions based on experience and traditional calendar dates to control pests and minimize risk. Because this calendar method of spraying does not accuratley time pest control measures, broad-spectrum pesticides with long residual activity are used. Moving growers to an IFP management system that allows for the timely application of low toxicity pest control measures based on accurate weather data, will keep the local orchard industry competitive while protecting the environment. Pest control models calculate accurate degree-days based on weather data from the remote weather stations. Using this information a grower can make decisions as to when he can expect to obtain the

maximum benefit for the pesticide control used. Better environmental stewardship requires additional data to be used in pest management decisions. Applying the right pest control at the right time reduces the need for follow-up applications, reducing the possibility of pollution and makes for a healthy environment.

What are degree-days? Degree-days are commonly used in agriculture and natural resources management to predict events and time management activities, such as when to sample or control a pest problem. Degree-days are often known as heat units or thermal units; they are the summation of temperature over time. Usually degree-days are only counted above a lower temperature threshold; sometimes an upper threshold is also used.

Weather has a major influence on the development of pests and disease. Temperature controls the rate at which insects, mites, and diseases develop. Rainfall, leaf wetness, and humidity are major climate factors affecting fruit and foliar diseases. A reliable source of weather information is critical in all pest and disease management models. These models are a critical component of any IPM program. Daily high and low temperatures are used in degree-day models to schedule the monitoring and management activities of insect pests. Hourly temperatures and leaf wetness predict the reproduction rate of diseases such as powdery mildew. Evapotransporation and rainfall data are used to schedule irrigation applications and calculate water requirements. In addition, real-time temperature data is critical in frost protection.

The rough topography of the orchard growing areas of the Fifteenmile Sub-basin creates drastic variations in slope, aspect, and elevation over a realativley small geographic area. These stark variations create a complicated network of microclimates. Two orchards located within one mile of each other often have very different temperatures, humidity, and wind conditions. High resolution weather data must be recorded if degree-day models are to accurately reflect the pest and disease conditions in an orchard. Growers must have full confidence in the weather station network if IFP practices are to be widley adopted. Therefore, the network requires a large numbers of stations to provide high resolution climatic data.

Soft pesticides only target pest species and not beneficial insects and are a critical component in IPM programs. Conventional, or “hard”, pesticides are broad spectrum, and kill all insects in the orchard. Without soft pesticides, there is no possibility for biological control of pest species. Soft pesticides, such as B.t., do not have a long period of activity characteristic of hard pesticides. Although soft pesticides can provide effective control of orchard pests, they must be used at very specific times if control is to be achieved. Refer to Table 1: Conventional (hard) Pesticides Used Against OBLR and their IPM Alternatives. Degree-day models are used to accurately time the application of soft, IPM-friendly, pesticides. Site-specific weather data is needed to accurately model pest development throughout the orchard district. The weather station network will provide local growers and pest managers with the data they need to effectively use soft pesticides and implement an IPM program in local orchards.

Table 1: Conventional (hard) Pesticides Used Against OBLR and their IPM Alternatives						
Conven-tional Insecticide	**Toxicity Rating for Fish**	**Timing and No. of Applications**	**IPM - Soft Alternative (a.i.)**	**Toxicity Rating for Fish**	**Timing and No. of Applications**	**How the network will help**
Guthion (azinphos-methyl)	Extra High[1]	Every two weeks starting at Bing harvest (2-3)	B.t. Toxins (*Bacillus thuringiensis*)	Practically non toxic[2]	Based upon degree-day models (1-2)	Models allow for accurate timing against pests (i.e. obliquebanded leafroller)
Sevin (carbaryl)	Extra High[1]					
Asana (esfenvalerate)	Extra High[1]		Success (spinosad)	Very Low[1]		
Pounce (permethrin)	Extra High[1]					
Chlorpyrifos	Extra High[1]	Delayed Dormant (1)				

[1] USDA, Natural Resources Conservation Service, Windows Pesticide Screening Tool, April 21, 2000. http://www.wcc.nrcs.usda.gov/water/quality/common/pestmgt/winpst.htm#DESCRIPTION

[2] The Extension Toxicology Network, URL http://ace.orst.edu/info/extoxnet/, June 7, 2000.

Spray Drift Reduction

Washington State University, Michigan State University and other institutions have researched the effectiveness of orchard tower sprayers, a technology that has the potential to reduce the amount of pesticides applied and significantly reduce spray drift. Many of these trials have been conducted in high-density apple orchards where tree-height is restricted and tree canopies open. There are approximately 26,440 acres of pear trees in the Pacific Northwest planted before 1971 (1993 Washington and Oregon Tree Fruit Survey). It is assumed most are the large, closed canopy pear trees that are typical of Oregon and Washington orchards. It may be that orchards will need to implement a more intensive pruning program to accommodate the three to five feet of open space required to transport the tower sprayers through an orchard and apply chemicals more efficiently.

Bio-System Engineers and orchard sprayer manufacturers have stated that no commercial orchard tower sprayers are available on the market that are tall enough to reach the top of these older orchards which are estimated to be at least 18' tall. Thereby, they are unable to spray the chemicals down to eliminate or reduce spray drift. A manufactures has agreed to re-design their current orchard tower sprayer to reach the height necessary with adequate stability for operation on hillsides: Blue Line Manufacturing 'Columbia Proptec sprayer.

This research will benefit not only the Orchard growers in the Fifteenmile and Hood River Sub-basins, but the entire Columbia Basin, by providing a means to reduce the amount of pesticide applied and eliminate spray drift that could ends up in streams.

c. Rationale and significance to Regional Programs

This section describes the relationship of this project to the Fifteenmile Creek Sub-basin Summary and to the goals and objectives of the 1994 Fish and Wildlife Program (FWP), NMFS Biological Opinion, and Lower Deschutes Agricultural Water Quality Management Area Plan

Fifteenmile Creek Subbasin Summary *(including Oregon Tributaries between Hood River and the Dalles Dam)*, June 30, 2000, http://www.cbfwf.org/files/province/subsum.htm, makes an assessment of the Fifteenmile Sub-basin and lists goals, objectives and strategies to restore the health and function of the ecosystem. Taken from the subbasin summary are relevant sections that apply to this project.

> Objective 2. Maintain natural populations of other resident and anadromous salmonids and lamprey in the fifteenmile Creek subbasin. *(page 30)*
>
> Strategy 3. Protect, enhance, and restore upland watershed habitat in the subbasin.
>
> > Action 3.1. Implement and enforce provisions of the Fifteenmile Creek subbasin component of the Lower Deschutes Agricultural Water Quality Plan.
> >
> > Action 3.4. Develop and implement other land and resource management plans that will result in improved water quality and stream habitat in the subbasin. *(page 31)*

The Fifteenmile Creek Subbasin Summary plan strategy targets the stream corridor with the exception of Strategy 3 and Actions 3.1 and 3.2 described above. This project proposes a strategy to reduce the risk of water pollution from pesticides using a voluntary approach rather than "enforcement" actions called for in Action 3.1. This proposal implements Action 3.4 because orchard growers will implement a "resource management plan" through Integrated Fruit Production practices that improves water quality and keeps pesticides from entering stream habitat. The reduction of sediment carrying pesticide residue into the streams will reduce the potential pollution of stream habitat from pesticides. Orchard growers applying less toxic pesticides and minimizing spray drift reduce the potential for pollution into aquatic habitat.

National Marine Fisheries Service (NMFS). The Fifteenmile Sub-basin supports the easternmost stock of winter steelhead endemic to the Columbia Basin. In March of 1999, The National Marine Fisheries Service (NMFS) listed steelhead stocks in the Mid Columbia River Evolutionary Significant Unit (ESU) as a threatened species under the Endangered Species Act. The Fifteenmile Sub-basin steelhead population is included in the Mid Columbia River ESU.

Under section 4(d) of the Endangered Species Act (ESA) NMFS issued its final 4(d) rule to adopt regulations for the conservation of fourteen listed salmonid species including steelhead in Fifteenmile Sub-basin. These final rules become effective September 8, 2000 (Federal Register, 2000). These rules describe pesticide use and what constitutes likely harm to listed populations and a violation of the 4(d) rule.

When then project objectives are implemented orchard growers will have helped to limit their impact on endangered species by reducing the use of broad-spectrum pesticides and using new generation pesticides that are less toxic. If they do enter the aquatic habitat the impact on salmon and steelhead is reduced.

Lower Deschutes Agricultural Water Quality Management Area Plan (Lower Deschutes Local Advisory Committee) provides guidance for addressing agricultural water quality issues in the Lower Deschutes area. The Fifteenmile Sub-basin falls within the watershed boundaries of the plan area. The purpose of the plan identifies strategies to reduce water pollution from agricutural lands through a combination of education, land treatments and monitoring. Enforcement authority comes from the Oregon Department of Agriculture. The Clean Water Act section 303(d) requires Oregon to compile a list of water quality limited streams and lakes, determine parameters to measure whether beneficial uses are being met, and set water quality standards based on the beneficial uses and parameters. The map of the Fifteenmile sub-basin on page 3 identifies 303(d) listed streams.

If our proposed project is implemented it will further the goal and strategies of the Lower Deschutes Agricultural Water Quality Management Area Plan. Taken from the plan are relevant sections that apply to this project proposal.

> The goal states, *"The goal of this Area Plan is to prevent or control water pollution from agricultural activities and to achieve applicable water quality standards"*.
>
> Strategies to achieve the goals include:
>
> 1. Work to improve the quality of water in the Management Area through planning and implementation of technically sound and economically feasible conservation practices the contribute to meeting Area Plan objectives.
> 2. Create a high level of awareness and understanding of water quality issues among the agricultural community and rural public in a manner that minimizes conflict and encourages cooperative efforts through education and technical assistance activities.
> 3. Encourage active participation by the agricultural community and rural public in the process of solving our water quality problems.
> 4. Encourage adequate funding and administration of the program to achieve Area Plan goals and objectives by systematic, long range planning and focusing of coordinated efforts on full-scale, watershed-based approaches, identifying needs, developing projects, actively seeking funding, and ensuring successful implementation of funded projects.

The Area plan did not identify pesticide pollution as a 303(d) limitation. Because of the water quality issues identified in the Hood River Sub-basin associated with pesticides and the orchards has heightened the awareness this limitation needs data to support inclusion in the next version the Area Plan. In the "Monitoring and Assessment " section states the Wasco County Soil and Water Conservation District will identify priority areas and refine strategies for Area Plan implementation.

This project addresses the Area Plan goal and the four strategies listed above. This projects when implemented applies Integrated Fruit Production practices that are "technically sound and economically feasible". Through the projects outreach objective orchard growers will gain better "awareness" of how they manage their orchard does make a difference to water quality and aquatic habitat. Because orchard growers have initiated this project they have "active participation" in planning and "solving water

quality problems". This project if funded will accelerate the implementation of the Area Plan.

d. Relationships to other projects

The following ongoing Integrated Fruit Production (IFP) projects in the Fifteenmile Sub-basin.

Wasco County Fruit and Produce League have already invested considerable time and effort in the last two years to develop a remote weather station system that uses data to give orchard managers weather data to input into pest models. Eight growers have purchased weather stations for their orchards. These weather stations have been placed in their respective orchards giving the orchard manager valuable weather data but only from the one weather station. Degree-day models have not been incorporated into the sites. Because these remote stations are not net-worked the orchard manager only gets part of the information needed to make good management decisions. We will integrate the eight stations into the new network. This project will make it a more comprehensive IFP project beneficial to everyone.

Orchard Managers Meetings are an ongoing network of orchard growers and others that meet from February through May each year. The purpose is to network on subjects of interests to growers that includes recent research on IFP. About 30 growers regularly attend these weekly meetings.

Mid-Columbia Agricultural Research & Extension Center (MCAREC) is a branch of the Oregon Agricultural Experiment Station of Oregon State University's College of Agricultural Sciences. Scientists at MCARCE specialize in research on pears, apples, and cherries. The station has pioneered research, demonstration and implementation of IFP on pears in northern Oregon making available the latest research results through the station and Extension Service (Seavert, 2000).

The Extension Service in The Dalles provides horticultural technical assistance to orchard producers through IFP. Producers receive assistance through the local horticultural agent and have access to the web site at http://osu.orst.edu/extension/wasco . Another source of information growers use is Orchardnet at http://osu.orst.edu/dept/hort/orchardnet.

e. Project history (for ongoing projects)
New project - no response

f. Proposal objectives, tasks and methods

What we want to do.
We propose to construct sixteen new remote weather stations networked to the eight currently installed, throughout Wasco County area orchards to provide online detailed weather information. This information improves the orchard manager's ability to manage orchards for maximum benefit of Integrated Fruit Management practices with special

attention to pest management. This network of twenty-four solar powered weather stations will use radio telemetry to transmit all weather data to a central computer server. The server will post on the internet web site current weather conditions at all stations in real time. Data collected from each weather station includes: high and low temperature, rainfall, crop water use, hours of leaf wetness, average temperature, humidity, wind speed and direction and dew point during the time when leaves are wet. In addition to pest and disease modeling, data from the stations will be used to calculate evaoptrasportation for the timing of irrigation. The pest management model and weather data would be available on the web site to all growers, packing house field staff, crop consultants, chemical company field staff, OSU extension agents, and the general public. Pest management models calculate degree hours or days for fireblight, leafrollers, leafminer, cherry fruit fly, apple scab, codling moth, and cherry powdery mildew pressure. We believe we can achieve better pest management by sharing information among all stakeholders because pests are an area wide problem.

Through the growers and other stakeholders, we will make the network user friendly by incorporating the needs of growers into the information they use to implement IFP in the orchards. Validate degree-day models used to calculate pests and diseases affecting orchard crops. Provide training and technical assistance to growers and crop advisors to increase grower confidence in this IFP approach. Increase the awareness and understanding of pesticide issues that relate fish and wildlife by outreach to orchard growers and community groups. Because no water quality for pesticides has occurred a monitoring plan and implementation strategy is scheduled.

A second component of the project will conduct research at Mid-Columbia Agriculture Research and Extension Center to evaluate commercial sprayers technology to reduce spray drift utilizes low-volume applications of pesticides for insect and disease control in orchards.

This project implements the commitment of local orchard growers to reduce the risk of pesticide pollution to salmonid species in the Fifteenmile sub-basin.

Goal/Objectives/Tasks

To address the situation described in the previous section, this project will achieve the following goal and objectives and related tasks.

Goal: **Accelerate the implementation of Integrated Fruit Management practices to reduce the amount of broad-spectrum pesticides used to control pests. Promote natural, cultural, biological, bio-technical and less toxic pesticides to control pests in Fifteenmile Sub-basin orchards which will minimize the risk of water pollution or damage to fish and wildlife species such as salmon and steelhead.**

Objective 1*:* Establish and operate a network of remote orchard weather stations that enable orchard growers to use predictive degree-day models and management information systems to ensure that pesticide applications are timely and precise. Place 16 additional remote weather stations in strategic orchard locations (a total of 24 sites).

Criteria for success. Orchard growers change current pest-management practices by reducing the total amount of pesticides applied to orchard crops. Twenty percent of orchard growers will use the weather network the first year to obtain data to make pesticide application-management decisions. Within five years 80% of growers (60) will use the system to make management decisions. Time Frame to begin is January 2001 and completed by December 2006. Target Group: Orchard growers in Fifteenmile Watershed.

Task 1a: Purchase Equipment & Install. Place order for all hardware and software. Equipment provider will install and ensure all equipment functions in field. A description of equipment to be purchased is described in section g. Facilities & Equipment. Wy'East RC&D will coordinate with equipment provider to install weather stations. While equipment provider is available make sure remote weather stations, interact with web site and pest models. Deliverables: remote weather stations, repeaters, and web access equipment and software in place and working properly. Responsibility: Wy'East RC&D order equipment, Equipment provider install equipment. Growers to provide construction labor and equipment. Time frame: begin January 2001 and completed by March 2001.

Task 1b: Information delivery system. Develop an orchard grower friendly web site to deliver up-to-the minute weather and pest conditions and forecast using degree-day models unique to the grower's orchard. An internet service provider will host the internet web site. Rational. A survey of growers shows that most have internet access with varied computer skills. The presentation of data or map on-line makes the dissemination of information more effective. Responsibility: Internet service provider cooperating with Project Management Team. Deliverable: a web site that growers, applicators and crop consultants consider a useful tool. Time frame: begins February 2001 and completed by December 2006.

Task 1c: Plan & implement IFP with growers. The IFP coordinator to assist growers one-on-one to develop a plan to identify opportunities to implement IFP, with an emphasis on pest management opportunities. Some growers may have implemented IFP practices and will require little assistance while other growers IFP concepts are relatively new and growers are even reluctance to try new practices. Technical assistance provided to each grower varies depending on grower willingness to adopt changes in management. The IFP coordinator will assist the grower to use the weather network to make decisions with confidence to reduce the use of OP pesticides. Growers must have confidence that data is accurate and models are correct. Target Group: orchard growers, managers, and supervisors. Rational: Some very basic principles to guide the planning and successful implementation of IFP on private land.

- Consider the grower's facilities, machinery and economic situation;
- Incorporate the grower's willingness to try new practices;
- Consider the orchard's relationship in the orchard area and watershed;
- Ensure the IFP coordinator's presence in the orchard with the grower.

Time frame: begins February 2001 and completed by December 2006.

Responsibility: IFP Coordinator. Deliverable: technical assistance provided to growers to plan and implement an individual IFP plan that meets the needs of the grower and project objective.

Task 1d: Validate degree-day models. Scientist from Mid-Columbia Agricultural Research and Extension Center in Hood River will validate pest and disease models, estimate the financial and economic impacts weather stations have on the local economy and harvest predictions. Research programs working cooperatively on this project are entomology, pathology, economics, horticulture and post-harvest physiology. One mobile weather station will be available for research. Rational: Degree-day models have been based on research there is a need to fine-tune them for the Fifteenmile Watershed. Time frame: begins February 2001 and completed by December 2004. Responsibility: Research Scientist. Deliverable: Further the knowledge of IFP using Fifteenmile Watershed orchards as the laboratory. Refine degree-day models to make them more useful to orchard growers.

Objective 2: Information Transfer. Create the ability for orchard growers to apply Integrated Fruit Production practices to incorporate integrated pest management into orchard management operations. Criteria for success: Seek 100 % of orchard grower through cooperative efforts through education and technical assistance activities to adopt IFP practices. Information is "personalized" to meet grower need. Reach 10 community groups about the importance of IFP by orchard growers and the benefit to the community and the restoration of stream habitat. Present lessons learned to orchard grower groups in the Columbia Basin. Time Frame: begin February 2001 and completed by December 2006. Target Group: orchard growers and community groups.

Task 2a: Group training to use IFP techniques. In a workshop setting provide training to decision makers: orchard grower's, applicators, crop consultants and others on how to access the information system, use and understand degree-day models, apply IFP available pest control techniques. Target 45 of orchard growers, applicators, and crop consultants to receive training in use of the information delivery system and acceptance of the IPM demonstration. Rational: A workshop to get growers involved in the project and training on the use of degree-day models on the internet is an efficient way to begin the project with growers. Time frame: annual begin spring 2001 and end spring 2006. Target Group: includes orchard producers, applicators, and crop consultants. Responsibility: Information specialist in cooperation with Project Management Team and IFP coordinator. Deliverable: a workshop attended by orchard growers and other users of IFP and the degree-day models where they learn about the project and how to use degree-day models.

Task 2b: Grower roundtable. Initiate roundtable discussions about the use of the weather station network technology to implement IFP practices. Rational: growers share experiences, problems and solutions to make IFP work in their orchard. This provides feedback to the Project Management Team to assess the project acceptance by growers and progress. Time Frame: begin February 2001 and completed by

December 2006 Responsibility: RC&D Coordinator, IFP Coordinator, Project Management Team

Task 2c: Outreach Information & Education. The outreach target audience consists of the orchard growers in the watersheds, community groups and peer groups that have an interest in water quality issues. Topics include IFP and the remote weather stations in the orchard areas, pesticide residue on food, risk of pesticide pollution to water quality, and exposure of farm workers to pesticide residues. Time Frame: begin February 2001 and completed by December 2006. Responsibility: Information Specialist

Strategies to accomplish this task include:
Disseminate project information to orchard growers in the watershed through invitation to speak at grower-attended meetings, newsletters targeted directly to orchard growers, like Extension Service, direct mail, local and area news outlets. Produce a fact sheet that describes how orchard producers can access the remote weather stations, and project benefits to growers.

Community Presentations to meet with community groups in the area to demonstrate how orchard producers are taking steps to prevent pollution of water. Groups include civic and local government.

Publish highlights of progress in the Wy' East RC&D newsletter and other media. When appropriate, distribute press releases about the project and its accomplishments. Recognize the funders for making the project possible.

Internet Home Page. Use Internet home page to inform and educate internal and external customers about the project with periodic updates.

Participate in seminars or conferences on the project topic at regional and national meetings where other orchard growers can learn from the lessons

Objective 3: Research the effectiveness of commercial tower sprayers for reducing spray drift and the effects of low-volume applications of pesticides on insect and disease control in orchards. Research scientists will evaluate and compare the standard air-blast sprayer, used in almost all orchards in the Pacific Northwest, to a commercial orchard tower sprayer in eliminating or reducing spray drift. The second research objective will be to evaluate low volume pesticide applications for pest and disease control based on per acre application rates recommended by the orchard tower sprayer manufacturer or chemical companies. Time Frame: begin February 2001 and completed by December 2006. Responsibility: Mid-Columbia Agricultural Research & Extension Center (MCAREC) Deliverables: There are seven outcomes in this project:

- Reduce or eliminate the amount of spray materials dispersed in the atmosphere above the tree canopy by utilizing orchard tower sprayers.

- Maximize the amount of materials applied by the orchard tower sprayers that will reach the tree target.

- Maximize spray coverage with chemicals applied by the orchard tower sprayers.

- Determine the effects of intensive pruning older, larger canopied trees on pack-outs.

- Evaluate effects of each sprayer on disease and insect control.

- Evaluate the effects of low volume applications of pesticides for insect and disease control.

- Determine the profitability of adopting orchard tower sprayers to control spray drift and utilizing low volume applications of pesticides in older pear orchards.

Task 3a: Research & evaluate spray drift. Identify sites to evaluate, prune study block, monitor spray drift and coverage, harvest and analyze data. The experiments will be repeated over the next four years. Data will be accumulated over several years to determine if orchard tower sprayers are an economic, effective alternative to reducing spray drift. In addition, the effectiveness of utilizing low-volume applications of pesticides for insect and disease control in orchards.

Step 1: Startup (not funded from this proposal) Identify at least two 35-year old orchards near the MCAREC and one in The Dalles area with large, closed canopies for the spray drift portion of the study. Two sprayers will be compared: a tower sprayers and the conventional air-blast sprayer. Each treatment will consist of at least three replicates. The experiment in each orchard will be laid out in a randomized complete block design. Collect baseline data on orchard disease and pest populations. Harvest, store and run fruit from study blocks (before pruned) over MCAREC research packing line for baseline pack-out data, including cullage reports. Identify two orchards at the MCAREC to evaluate the effectiveness of low volume applications of pesticides for insect and disease control. Collect baseline data on orchard disease and pest populations from the MCAREC orchards. Timeline: begin and complete in the fall of 2000.

Step 2: Prune study block to allow orchard tower sprayers to move easily through the tree row alley and facilitate better spray coverage. Timeline: winter 2001.

Step 3: Monitor spray drift and coverage. Spray drift and coverage will be monitored at the time of pesticide applications in each treatment. Pest and disease incidence will be monitored in the three treatments throughout the season. Timeline: spring & summer 2001.

Step 4: Harvest & analyze results: Supervise harvest, store and run fruit from study blocks over MCAREC research packing line to obtain pack-outs and data on pest and disease damaged fruit. Analyze cullage from the treatments to determine if there are differences in pest or disease incidence among treatments. Analyze data statistically to determine the effectiveness of reducing spray drift and low volume pesticide applications between the orchard tower sprayers. Timeline: fall 2001.

Objective 4: Water Quality Monitoring. Improve our understanding of pesticides in Fifteenmile Sub-basin orchards and evaluate the impact of IFP practices designed to reduce pesticides in streams. Work with specialists from Oregon State University, the Oregon Department of Agriculture, the Oregon Department of Environmental Quality, the Oregon EPA, and other sources to develop a sampling protocol which accurately assesses the types and amounts of pesticides which enter area streams. These data will be used to improve farm conservation plans and identify areas which require specialized IFP techniques which reduce spray drift. Criteria for success: determine the extent of pesticides in Fifteenmile Sub-basin streams affected by orchards. Timeline: begin in January of 2001 and complete December of 2003.

Task 4a: Plan water quality monitoring. Meet with agencies to develop a pesticide monitoring plan tailored for Fifteenmile Sub-basin orchards. Timeline: Begin January 2001 and complete June 2001. Deliverable: A plan to implement water quality monitoring. Responsibility: Project Management Team, RC&D Coordinator.

Task 4b: Implement water quality monitoring. Based upon the plan in task 4a implement the plan. Criteria for success: monitoring results that accurately quantify pesticides in aquatic habitat and become a baseline for improvement. Timeline: tentatively begin January 2002 and complete December 2003. Responsibility: Sub-contractor

Objective 5: Monitoring & Evaluation, Begin a process of adaptive management that uses monitoring, evaluation, and experimentation to provide information to adjust resource management decisions as needed. Prior to major changes in the work plan, funder approval will be obtained. Wy'East RC&D will facilitate, compile and complete final report. The report will include an evaluation of the process and lessons learned. Start and Completion Date: February, 2001 - December, 2006. Responsibility: IFP Coordinator, Project Management Team, RC&D Coordinator

Task 5a: Follow up with orchard growers to evaluate progress.
The IFP Coordinator will meet with orchard growers to evaluate the effectiveness of the implementation of their individual IFP plan with emphasis on the pest management elements. Together they will evaluate the progress made and identify problems that need to be overcome to successfully implement the grower IFP objectives. The evaluation will determine how the grower has used the remote weather station network to make IPM decisions. The desired outcome is a reduction

in the use of broad-spectrum pesticides and the adoption of IFP practices identified in Objective 1. Orchard growers will change current pest-management practices by reducing the total amount of pesticides applied to orchard crops. The IFP coordinator will document the grower decisions and progress. Areas to be evaluated include:

- Evaluate the performance of the remote weather stations hardware and software to determine why and when failures occurred and how they can be avoided. Use this evaluation as the basis to purchase new remote weather stations or components.

- Evaluate survey growers acceptance to adopt IFP practices. Survey growers to determine change in type and amount of pesticides used. The evaluation is ongoing and progress reports will identify areas where the project may need modification. Questions to be answered include include:
  - How did the "personalized" information and technical assistance increase their awareness to adopt IFP practices in their orchard?
  - Has information and technical assistance affected the tradition, economic and risk impacts of the orchard grower operation?
  - Has an early research result from the tower sprayer evaluation influenced orchard grower's decisions to use this technology?
  - Have orchard growers received the "best mix" of technical, educational, and financial assistance to implement IFP?

Objective 6: Project Management The Wy'East RC&D will be responsible for all project coordination, making sure the work plan is followed, contracting, making sure equipment and service providers are paid in a timely manner. Making timely progress reports to all grantors and requesting progress payments.

Task 6a: Contract & financial management. The Wy'East RC&D will be the recipient of all grants and accountable to the grantors that the project will be completed on time and on budget. **Contract Management.** Set-up a grant management system that maintains accountability with both funders and contractors. The RC&D Coordinator will maintain liaison with funders, contractors and other participants. **Fiscal Management and Control.** Maintain an accounting system that complies with funder and non-profit accounting standards. Establish a separate account in the Wy'East RC&D accounting system in order to track all income and expenses. Process and pay vendor invoices according to Wy'East RC&D policy.
Time frame: begins January 2001 and completed by December 2006.
Responsibility: RC&D Treasurer.

Benefit to Fish and Wildlife

- The benefit to salmonid species is the new generation of pesticides are environmentally safer because they are more pest specific and less toxic. The

new generation pesticides are less toxic and will replace broad-spectrum products currently in use. There is a potential to significantly reduce the amount of broad-spectrum pesticides applied.

- The research with tower sprayer technology gives orchard growers new tools to reduce spray drift to minimize pesticides entering aquatic habitat.

g. Facilities and equipment

This section describes facilities and equipment needed for the project. The Wy'East RC&D office is located in The Dalles, Oregon. The office is fully equipped with computers, fax, copier and other essential equipment to operate efficiently.
The following equipment is needed to implement this project:

Remote Weather Station Network. The Project Management Team has not yet selected a supplier for this equipment. Prior to the purchase of equipment, we will submit a "Request for Quotes" from various suppliers. The following is a quote from Coastal Environmental a company that markets weather-sensing equipment to government and industry. We have included this information to provide reviewers information about the specifications for the equipment, quality, and relative cost. Our budget reflects different total costs because of the number of weather stations.

Zeno Weather Stations (8 Stations)

PART NO.	DESCRIPTION	UNIT PRICE	QTY.	AMOUNT
S1034	**ZENO-3200 DATALOGGER** • 32-bit microcontoller, Motorola 68332, 16MHz, Full floating point arithmetic, 16Kb data storage memory • 14 single-ended analog inputs (7 differential) 18 bit resolution, 1 sample per second +/- 5mV to +/- 5V in 10 ranges, software selectable • 2 single-ended, 12 bit resolution input channels • 8 user configurable digital input channels • 6 general purpose digital input/output channels • 1 tipping bucket rain gauge input • 5 switched excitation outputs of 1.25, 2.5, 5.0 VDC, 100mA • 5 switched power outputs, 12 VDC and 5 VDC • Power management software with hardware watchdog timer and power monitor • Real-time clock, battery-backed • EMI, ESD protection • ZENOSOFT - Operating system	$ 1,285.00	8 Each	**$ 10,280**
S1027	Enclosure, NEMA-4X, Fiberglass 15.5 x 13.4 x 8.5 inches, outside	360.00	8 Each	**2,880**
S1146Z	SENSOR: Wind monitor, cup and vane style, high durability and sensitivity.	545.00	8 Each	**4,360**
S1276Z	SENSOR - Relative Humidity and Air Temperature ± 3% accuracy – includes radiation shield and mounting bracket	598.00	8 Each	**4,784**
S1081Z	Barometric Pressure sensor, +/- 1 millibar at 22 deg, C, +/- 3 mbars over –30 to +65, includes baffle and port system.	425.00	8 Each	**3,400**
S1068Z	SENSOR: Tipping bucket, 6 inch standard for rain measurement and accumulation. Self draining and includes screen on collection funnel	415.00	8 Each	**3,320**

S1169Z	SENSOR - Leaf Wetness Sensing grid	145.00	8 Each	**1,160**
S1194Z	TOWER – Heavy duty, 3 meter, for ZENO®-3200, includes mounting hardware for Zeno and wind monitor.	518.00	8 Each	**4,144**
S1049	SOLAR PANEL - 12 VDC, 20 Watt panel with battery. 17 x 20 x 2”	585.00	8 Each	**4,680**
S1059Z	RADIO -- Two way, 2 watt RADIO (TX and RX); 1200 baud; mechanical assembly; mounting bracket, for remote unit for use with Zeno stations	1050.00	8 Each	**8,400**
S1278	BASE STATION, Two-way, 2 watt RADIO (Tx and Rx); complete with aluminum case, power supply and antennae.	2300.00	1 Each	**2,300**
			Sub-Total:	**$ 49,708**

ZENO REPEATER STATIONS (2 Stations)

PART NO	DESCRIPTION	UNIT	QTY	AMOUNT
S1358	REPEATER – Smart Repeater operates on one frequency with store and forward technology. Includes Zeno 3200, power supply, enclosure RADIO and antenna	4400.00	2 Each	**$ 8,800**
S1194Z	TOWER - 3 Meter Tripod - portable or permanent - quick-set up, stable and sturdy. Constructed of 6061-T6 aluminum. Includes ground auger	518.00	2 Each	**$ 1,036**
S1049	SOLAR PANEL - All prods, 12 VDC, **20 Watt** panel with overcharge protection, charging circuit, low voltage warning, regulator, bracket, 38 amp hour battery – installed	585.00	2 Each	**$ 1,170**
			Sub-Total:	**$11,006**

WEB ACCESS

PART NO	DESCRIPTION	UNIT	QTY	AMOUNT
	INTERCEPT POLLING STATION – Collect, display and share data with other Intercepts. (One needed for each base station.)	$ 2,200.00	1 Each	**$ 2,200**
	Web Accessed Data Base	$ 39,000.00	1 Each	**$39,000**
	Hardware for Web Accessed Data Base	$ 11,000.00	1 Each	**$ 11,000**
			Sub-Total:	**$52,200**
			Grand Total:	**$ 112,914**

h. References

Reference (include web address if available online)	Submitted w/form (y/n)
Ewing, Richard D., 1999. Diminishing Returns: Salmon Decline and Pesticides. Oregon Pesticide Education Network, on line at www.pond.net/~fish1ifr/salpest.pdf	
Extension Toxicology Network, URL http://ace.orst.edu/info/extoxnet/, June 7, 2000.	
Federal Register, Dept of Commerce, National Oceanic and Atmospheric Administration 50 CFR Part 223 Endangered and Threatened species; Salmon and Steelhead; Final Rules, July 10, 2000. http://www.nwr.noaa.gov/1salmon/salmesa/final4d.htm	
Jenkins, Jeffrey, personal communication. August 2, 2000.	
Larson, Steve, Robert Gilliom and Paul Capel. 1999. Pesticides in Streams of the United States -- Initial Results from the National Water-Quality Assessment Program: U.S. Geological Survey, Water-Resources Investigations Report 98-4222, on line at http://water.wr.usgs.gov/pnsp/rep/wrir984222/abstract.html	
Lower Deschutes Local Advisory Committee, Lower Deschutes Agricultural Water Quality Management Area Plan. June 2000.	yes
Newton, Jim, Fifteenmile Creek Subbasin Summary. June 30, 2000. http://www.cbfwf.org/files/province/subsum.htm	
Oregon State University, Mid-Columbia Cherry IFP Guidelines. January 1999. http://osu.orst.edu/dept/hort/orchardnet/chIFP.htm	
Seavert, C., 2000. Mid-Columbia Agricultural Research and Extension Center Annual Report 1999. July 2000.	yes
USDA, Natural Resources Conservation Service, National Conservation Planning Handbook, Amendment 2: April 1998. http://policy.nrcs.usda.gov/scripts/lpsiis.dll/EDS/	
USDA, Natural Resources Conservation Service, Windows Pesticide Screening Tool, April 21, 2000. http://www.wcc.nrcs.usda.gov/water/quality/common/pestmgt/winpst.htm#DESCRIPTION	
Wasco Co. Soil & Water Conservation District, Wasco County, Oregon. Fifteenmile Watershed Enhancement Action Plan, June 1997.	Disk
Wentz, D.A., Bonn, B.A., Carpenter, K.D., Hinkle, S.R., Janet, M.L., Rinella, F.a., Uhrich, M.A., Waite, I.R., Laenen, A., and Bencala, K.E., 1998, Water Quality in the Willamette Basin, Oregon, 1991-95: U.S. Geological Survey Circular 1161, on line at http://water.usgs.gov/pubs.circ1161	

Section 10 of 10. Key personnel

PERSONNEL AND ORGANIZATIONAL CAPABILITY

This section describes the qualifications of essential personnel involved in the project and the organizational capability of the Wy'East RC&D, with emphasis on qualifications which meet the needs of this project.

Qualifications of Project Staff & Sub-contractors

Merlin Berg, RC&D Coordinator, (.15 FTE), Mr. Berg's duties on this project will be to coordinate the project implementation with the Wy'East RC&D Council, Project Management Team, staff and sub-contractors.

Mr. Berg has over twenty-five years experience in natural resources conservation and rural development. Mr. Berg has the knowledge and ability to build collaborative relationships and take projects from conception to completion. He has extensive experience to implement grants management systems. He received a certificate of completion from Community Systems, Inc. in Grant Management. Mr. Berg holds a B.S. in Natural Resources Management with a concentration in Fish and Wildlife Management, 1975 and a M.S. in Agriculture with a concentration in Soil and Water Conservation 1976. Both degrees were received from Cal Poly at San Luis Obispo, California.

Mr. Berg is employed by USDA Natural Resources Conservation Service and assigned to the Wy'East RC&D as their coordinator since March 2000. Prior assignment was with the Little Colorado River Plateau RC&D located in Holbrook Arizona where Mr. Berg served since 1992. Mr. Berg serves as the primary staff for the Wy'East RC&D Council. Mr. Berg's primary responsibilities include:

- Directs office operations by overseeing and guiding activities of persons assisting the Wy'East RC&D, carry out administrative duties necessary for Wy'East RC&D operations.
- Provides leadership in developing, updating and implementing strategic, annual and projects plans to accomplish the Wy'East RC&D mission.
- Serves as liaison with local, state, federal agencies and organizations to obtain technical and financial assistance needed to reach Wy'East RC&D mission.
- Develop local leadership in the Wy'East RC&D to improve their capability to plan develop and carry out their mission.
- Keep abreast of current developments in policy, federal and state legislation, and funding sources.

Relevant projects recently coordinated at the Little Colorado River Plateau RC&D:

- Arizona Sustainable Forest Partnership (forest restoration) brought together government, business and industry and environmental organizations to

reinvigorate the forest products industry in light of restructuring of the forest products industry. Over 100 people participated. This Partnership has received "Reinvention Lab" status with the Forest Service.

- Little Colorado Watershed Collaboration (LCR-MOM) (watershed management) a collaborative initiative between units of government, tribes, and citizens with a stake in this 27,000 square mile watershed (Little Colorado River Basin). This watershed includes parts of Arizona and New Mexico, four tribal governments, numerous counties and cities. Four RC&D Councils are stakeholders. The purpose is to bring attention to watershed issues affected by watershed stakeholders. Many organizations, agencies and entities have played a role to make this project happen.

Both these projects are ongoing and Mr. Berg played a significant role in their development and success as were a number of individuals and organizations involved.

Michael Omeg, Orchard Crop Cunsultant, .6 FTE, Mr. Omeg will be contracted to perform the IFP coordinator tasks described in the section f. Proposal objectives, tasks and methods.

Mr. Omeg is a masters of science candidate in entomology (thesis will be defended in October of 2000) at Oregon State University where he is specializing in intregrated pest management of stone and pome fruit insect pests. Mr. Omeg holds a BA degree in economics from Willamette University and is currently employed as a graduate research assistant at the MCAREC in the department of enotmology. Michael is a liscensed pesticide consultant in Oregon (liscense # 154980). Mr. Omeg has worked as a IFP consultant in The Dalles for the past ten years and was responsible for the development of a predictive degree-day model and IFP control methods for management of the obliquebanded leafroller in sweet cherries. Michael has extensive experience in tree fruit IFP research and grower outreach.

Mid-Columbia Agriculture Research and Extension Center (MCARCEC), Sub-contractor. MCARCE's role is to conduct research for Objective 3, Task 1d validate degree-day models, and Task 1b information delivery system.

Offices, laboratories, greenhouses, an insectary, regular and controlled atmosphere storage facilities, specialized environmental field cages, and other equipment are located at the Mid-Columbia Center.

Research at the Mid-Columbia Agricultural Research and Extension Center provides growers with answers relating to plant protection management. Major insect pests include pear psylla, codling moth, aphids, mites, and leafminers. Diseases under study include fire blight, Pseudomonas, Cytospora, and numerous storage decays. Management

technique research includes using natural predators and parasites to reduce pesticide usage and cultural methods of reducing disease infection.

Cold Storage operators in Oregon and the rest of the world have adopted temperature and atmosphere recommendations for pears developed through research at the Center. The result is that better quality fruit arrives at the marketplace throughout the year. Researchers work to retain fruit quality during storage, with reduced use of fungicides and other coatings.

Improving production efficiency has been a goal of scientists. Methods under study include rootstocks and interstems, tree density, and training and support systems. A better understanding of mineral nutrition should allow better quality fruit to be produced and brought out of storage.

The Hood River County office of the OSU Extension Service is located at the Center, providing a close relationship between research scientists and Extension horticultural and farm management faculty. Extension staff members are actively involved in planning, conducting, and analyzing applied research programs.

Scientists at the center conduct field and laboratory research cooperatively with scientists and Extension specialists at OSU and other branch stations as well as from other states and Canada. Some specialized field research is conducted in orchards owned by cooperating growers. Most of the laboratory equipment and two major buildings at the Center were financed by funds from growers, commodity commissions and Oregon Regional Strategy dollars. Many local growers serve on one or more commodity commission research advisory committees and support the Center at both the state and Federal level.

The Mid-Columbia Agricultural Research and Extension Center is located on 56 acres, 2 miles south of Hood River, OSU owns 15 acres. Hood River County owns 36 acres and the buildings. The remaining 5.75 acres are leased from Pacific Power and Light.

Janet Turner, .15 FTE, Weather Station Network Administrator. Ms.Turner is employed by the Mid-Columbia Agriculture Research and Extension Center who will be the sub-contractor. Ms. Turner's role is to administer the weather station network and the related data and internet web site. Refer to Task 1b: Information delivery system.

Ms. Turner is currently the technician for the superintendent at the Mid-Columbia Agricultural Research and Extension Center. Her duties include maintaining seven weather stations in the Hood River Valley. The data is presented as real time data on the web page for MCAREC, and is also available for calculating degree day models on the IPPC web site through the OSU web page. She has had 50 hours of training with the Addcon weather telemetry system that she is currently using. Ms. Turner has an Applied Science degree from Clark College in Horticulture.

Ms. Turner spent 22 years working for the Forest Service at the Wind River Ranger Station and Nursery in Carson, Washington. Nursery duties involved assisting in the annual harvest of 27 million seedling conifers, plus overseeing transplanting and sowing operations in the spring. During the rest of the year Ms. Turner would work for the Fisheries and Hydrology departments, setting up and monitoring water quality baseline stations in the watersheds on the Gifford Pinchot National Forest. She also conducted stream surveys, collecting data on streambank stability, and inventorying fish habitat. She maintained various types of data loggers and water quality monitoring equipment.

Wy'East Organization Capability Statement

"Making things happen," to affect natural resource conservation and development that leads to sustainable communities in north central Oregon. The Wy'East RC&D Council, is a locally led rural development organization. Fourteen sponsors represent city, county, conservation districts, and tribal government on the Wy'East RC&D Council. We believe local citizens in leadership are best able to develop and carry out action-oriented plans for the social, economic, and environmental betterment of north central Oregon. The Wy'East RC&D is organized as a non-profit 501 (c)(3) corporation in Oregon.

Vision A strong, diversified economy supported by a healthy and productive resource base achieved through collective action of the sponsors in north central Oregon.

The purpose of the Wy'East RC&D is to accelerate the conservation, development and utilization of natural resources to improve the general level of economic activity, and to enhance the environment and quality of life in north central Oregon.

What We Do. The Wy'East RC&D Council has demonstrated the capacity to combine resources to provide an effective and efficient forum for local decision-makers to manage change. This is what Wy'East RC&D does:

- Build public/private partnerships to strengthen relationships and communication.
- Employ the skill, knowledge and ability of local people.
- Mobilize locally led groups to take strategic action.
- Leverage limited state and federal dollars with private funds to accomplish goals.
- Work toward sustainable communities with a healthy natural resource base.

*Project Planning***:** The Wy'East RC&D assists sponsors and locally led community groups to organize then find practical solutions to problems and issues. The Wy'East Coordinator assists by bringing resources and people together to accomplish a well thought out solution acceptable to the community.

Grant Proposal Writing: Wy'East RC&D forms partnerships with locally led groups to write funding proposals to government agencies, foundations, and corporations on behalf of sponsors and other organizations. Assistance includes all aspects of the grant writing

process that includes planning, conducting funder searches, proposal writing, submission, and follow-up with funders.

Project Implementation: Wy'East RC&D provides grant administration, evaluation, or and general project management in partnership with locally led groups not eligible or desire to manage grant funded projects.

Region Wide Initiatives: Wy'East RC&D with sponsors coming from six counties in north central Oregon can build partnerships that address regional natural resource conservation and development strategies. One example, is the Rural Business Online - Wy'East Area provides internet training to communities in the Wy'East service area. Wy'East is cooperating with Eastern Oregon University.

Recent Locally Led Projects

Rural Business Online - Wy'East Area. Wy'East provides training to small business owners and individuals that have an interest in learning basic computer operations, basic e-mail and internet skill to enhance their business.

Northern Wasco & Grass Valley Streambank Restoration. Provided grant writing assistance to Wasco and Sherman County Conservation District. Projects they apply conservation on the ground at nine separate bio-engineered and fish friendly, bank stabilizing treatments and uplands conservation systems. Wy'East identified a private foundation funder then prepared pre-applications to a private foundation.

Wamic Water and Sanitation. Assist Wamic to improve community sewer and water infrastructure. Through this self-help project, Wamic residents strive to build a community water and waste treatment facility in response to the communities failing individual septic systems. Wy'East provided technical assistance to prepare an environmental assessment for the project.

Ochoco West Sewer Expansion. The community has completed two phases and seeks to expand their existing sewer system. Acquiring of additional land will allow the community to expand their system and be poised for future growth. Wy'East has assisted with planning and identified funding sources.

Windmaster Wastewater Treatment. Wy'East assisted 35 homeowners with failing septic systems just outside the Urban Growth Boundaries of Hood River. Funding came from Mid Columbia Economic Development District to assist in an initial feasibility study. Wy'East provided technical assistance to plan and identify additional sources of funding. In addition, we coordinated communication between the City of Hood River and Windmaster.

Sponsors

The fourteen sponsors of the Wy'East RC&D have joined to address local issues with local citizens in leadership.

Sponsors of the Wy'East RC&D include: Confederated Tribes of the Warm Springs Reservation of Oregon, Central Oregon Intergovernmental Council, Crook County Court, Crook County Soil and Water Conservation District, Deschutes Soil and Water Conservation District, Deschutes County Commission, Hood River Soil and Water Conservation District, Jefferson County Soil and Water Conservation District, Jefferson County Court, Sherman County Court, Sherman County Soil and Water Conservation District, Wasco County Court, Wassco Soil and Water Conservation District.

Project Administration.

The Wy'East RC&D Council, the governing board, is the fiscal agent for the project and is accountable to all funders. All contracts and financial actions are the responsibility of the Council. The implementation and operation of this project will be carried out by the Project Management Team.

The *Project Management Team* make up includes the project stakeholders. They include growers, pest managers, research scientists, state and federal resource management agencies, and field persons. The Project Management Team is responsible to make decisions to implement the work plan, monitor the timetable, and make recommendations to the Council for formal modifications of contracts with funders and contractors. Also, the team will receive suggestions on network improvements and take actions to improve the network, as needed, to discuss maintenance issues, fine tune pest and disease models, and options for network expansion. The project management team leader speaks on behalf of the team.