

AN ABSTRACT OF THE THESIS OF

Leigh Kingsbury for the degree of Master of Science in Agricultural and Resource Economics presented on August 24, 1999. Title: Oregon's Conservation Reserve Enhancement Program: Likely Participation and Recommendations for Implementation.

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This study used contingent valuation techniques to model the probability of participation in Oregon's CREP as a function of the incentive payment and a vector of socio-economic variables. Possible reasons for non-participation were evaluated and landowner preferences for various program components were assessed.

Recommendations for program improvement and implementation were made.

A population of riparian landowners along 5 streams in Union County and 6 streams in Washington County was surveyed with a mail questionnaire. The overall response rate was 63.7% and data was analyzed from a total of 290 respondents who identified eligible land for Oregon's CREP. Separate willingness to participate models were estimated for irrigators and dry land operators. Statistical results indicate that although annual payment positively influences the participation decision in most instances, it is not a driving factor. Perception of an environmental issue appears to be the most significant factor contributing to participation for irrigators; the relationship is the same for non-irrigators but not significant. The

Oregon's Conservation Reserve Enhancement Program:
Likely Participation and Recommendations for Implementation

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Contribution of Authors

Dr. William G. Boggess, Dr. JunJie Wu and Dr. Penny Diebel were involved in the design, analysis and writing of each manuscript.

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Oregon's Conservation Reserve Enhancement Program: Likely Participation and Recommendations for Implementation

Introduction

In October, 1998 the Secretary of Agriculture and the Governor of Oregon announced that the U.S. Department of Agriculture (USDA) and the State of Oregon would join together in an initiative to enhance riparian habitat on agricultural lands along streams that provide important habitat for salmon and trout species that have been listed under the Federal Endangered Species Act. The partnership was formed through USDA's Conservation Reserve Enhancement Program (CREP), a joint federal and state conservation program that targets significant environmental issues related to agriculture. Oregon's CREP is designed to address water quality degradation which is a direct or indirect result of agricultural activities on private lands along freshwater streams. It is a voluntary program that uses financial incentives to encourage farmers and ranchers to enroll in the Conservation Reserve Program (CRP) under contracts of 10 to 15 years' duration to remove lands from agricultural production. Oregon's CREP allows up to 95,000 acres of riparian land and 5,000 acres of wetland in Oregon to be converted from agricultural or range land production to specified conservation practices, including forested riparian buffer strips, filter strips and wetland restoration.

Various forms of riparian buffer strip programs have been implemented nationwide as a land management strategy to restore and protect aquatic habitat and water quality. They have been shown to be successful at meeting the goals of habitat and water quality restoration under a variety of different land use practices (Lowrance et al., 1984; Cooper et al., 1987; Schulz and Leininger, 1990; Osborne and Kovacic, 1993; Belt and O’Laughlin, 1994; Schulz et al., 1995; Kauffman et al., 1997). While the use of buffer strips as a means to protect and restore habitat and water quality appears to be successful, it is important to realize that varying degrees of success will be met depending upon the size of the buffer, the plants growing within the buffer and the manner in which the buffer is managed (National Research Council, 1995). The effectiveness of riparian buffer strips will also be a function of riparian landowners’ willingness to participate in this type of management strategy.

The purpose of this study is to assess the willingness of private riparian landowners to participate in Oregon’s Conservation Reserve Enhancement Program under various contract provisions and to make recommendations for program improvement. This thesis reports the results from a contingent valuation survey of riparian landowners in two Oregon counties and provides recommendations for program implementation based upon these and other findings.

The thesis is organized into four parts. Part one provides an introduction to the research topic including information on Oregon’s CREP, riparian buffer strips and the purpose of the research. Part two is a manuscript entitled *An Economic*

Analysis of Riparian Landowners' Willingness to Participate in Oregon's Conservation Reserve Enhancement Program. The probability of landowner participation in Oregon's CREP is modeled as a function of an incentive payment and a vector of socio-economic variables, possible reasons for non-participation are evaluated and landowner preferences for various program incentives are assessed. The statistical model, variables of interest and survey design are described. Part three is a manuscript entitled *Oregon's Conservation Reserve Enhancement Program: Recommendations for Implementation*. This manuscript combines the findings from the economic analysis described above with current literature and actual program implementation to make recommendations for improving the program. Part four summarizes the findings and concludes with recommendations for further research.

**An Economic Analysis of Riparian Landowners'
Willingness to Participate in Oregon's
Conservation Reserve Enhancement Program**

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Introduction

In October, 1998 the Secretary of Agriculture and the Governor of Oregon announced that the U.S. Department of Agriculture (USDA) and the State of Oregon would join together in an initiative to help restore fresh water ecosystems that provide habitat for salmon and trout listed under the Federal Endangered Species Act. The partnership was formed through USDA's Conservation Reserve Enhancement Program (CREP), a joint federal and state conservation program that targets significant environmental issues related to agriculture. The CREP is a voluntary program that uses financial incentives to encourage farmers and ranchers to enroll in the Conservation Reserve Program. In response to declining native fish populations, Oregon's CREP requires that all participants suspend production on their riparian land for up to 15 years and convert it to one of three riparian conservation practices; forested buffer, filter strip or wetland restoration. Approximately \$250 million is available to enroll up to 95,000 acres of riparian land and 5,000 acres of wetland along streams where native salmon and trout exist or are known to have historically existed.

The primary goal of this study is to model the probability of participation in Oregon's CREP as a function of the incentive payment and a vector of socio-economic variables. Secondary goals include determining possible reasons for nonparticipation and evaluating landowner preferences for program incentives. Obtaining non-participant and preference information increases the range of possible policy instruments to encourage enrollment (Lohr and Park, 1994).

An Economic Approach to Assessing the Probability of Participation

Eliciting a landowner's willingness to participate in Oregon's CREP is analogous to the types of questions typically addressed in contingent valuation (CV) studies. For the purpose of obtaining valuation responses, a dichotomous choice (DC) approach is preferred to direct elicitation (Department of Commerce, 1995). With the dichotomous choice format, the respondent is asked to provide a "yes" or "no" response to a particular bid contained in the participation question, where the bid amount is varied across the respondents. Rather than attempting to identify an individual's profit function to determine a minimum incentive to induce participation, dichotomous choice allows for determining whether or not an individual's minimum willingness to accept (WTA) is less than or equal to the offered incentive payment.

Economic theory provides some insight as to how respondents make the decisions necessary to complete a dichotomous choice question. The participation decision process can be modeled as a random utility model, assuming that the axioms of rational choice and utility theory are met (Hanemann, 1984).¹ When individuals are presented with the dichotomous choice of participation in Oregon's CREP they are faced with comparing their utility with and without participation. From utility theory, an individual will accept \$A to enroll in Oregon's CREP if the individual perceives him or herself as better off with the incentive payment and the program than without; i.e., if $U(0,y;\mathbf{x}) \leq U(1,y+A;\mathbf{x})$, where 0 is the initial state and

¹ For discussion of utility theory and the axioms of rational choice see Nicholson, 1995 pages 75-80.

1 is the state where the individual participates in Oregon's CREP, y is an individual's income, A is the "net" incentive payment and \mathbf{x} is a vector of additional attributes that may influence the participation decision. Allowing variable A to be the net incentive payment assumes that the pecuniary costs of participation and non-participation are considered. Because an individual's utility, $U(i,y;\mathbf{x})$, is unknown it can be considered a random variable for the researcher. The observable portion of an individual's utility function can be denoted by the indirect utility function $V(i,y;\mathbf{x})$, the mean of the random variable, U . Through addition of an independent and identically distributed (iid) error term, ε^i , the individual's decision to accept $\$A$ and participate in Oregon's CREP can be re-expressed as:

$$V(0,y;\mathbf{x}) + \varepsilon^0 \leq V(1,y+A;\mathbf{x}) + \varepsilon^1. \quad (1)$$

If $V(i,y;\mathbf{x}) = \mathbf{x}'\beta^i + \alpha y$, where $\alpha > 0$, for $i = 0,1$, then an individual will accept $\$A$ and participate in the program when;

$$\mathbf{x}'\beta^0 + \alpha y + \varepsilon^0 \leq \mathbf{x}'\beta^1 + \alpha(y+A) + \varepsilon^1 \quad (2)^2$$

where α is the coefficient on the bid variable and β is a vector of coefficients on the remaining attributes. Following Cooper and Keim (1996), the decision to accept $\$A$ and participate in the program can be expressed in probability framework as:

$$\text{pr}\{\text{WTA} \leq \$A\} = \text{pr}\{V^0 + \varepsilon^0 \leq V^1 + \varepsilon^1\} = \text{pr}\{\varepsilon^0 - \varepsilon^1 \leq V^1 - V^0\};$$

$$\text{where, } V^1 - V^0 = \Delta V = \mathbf{x}'\beta + \alpha A \text{ and } \beta = \beta^1 - \beta^0. \quad (3)$$

Maximum likelihood procedures are used to fit a logit model to the cumulative probability of participation. The logistic distribution used to model the

² Adapted from Cooper and Keim, 1996

probability of participation is: $\text{pr}(\text{yes}) = [1 + e^{-(\Delta V)}]^{-1} = [1 + e^{-(x'\beta + \alpha A)}]^{-1}$. When the probability of accepting the bid equals 0.5, the individual will be indifferent between a 'yes' and 'no' response. Thus, the median WTA can be derived by setting the probability of accepting the bid equal to 0.5 and solving for A.

In the logit model, unlike the linear statistical model, the parameter value of β_j is not directly interpretable as the effect of change in an explanatory variable on the mean of the dependent variable. The magnitude of the change in probability, given a change in x_{ij} , is determined by the magnitude of β_j and the magnitude of $\exp(x_i'\beta)$ (Cameron, 1988; Griffiths et al., 1993). For each observation $(\beta_j)(\exp(x_i'\beta) / 1 + \exp(x_i'\beta))$ is computed. The means of these quantities are reported as the marginal influence of each variable (Cameron, 1988).

Factors Influencing the Participation Decision

Development of the conceptual framework for analyzing the participation decision was based upon a review of literature pertaining to adoption of various conservation practices. The traditional diffusion of innovation model (Rogers, 1962; Napier et al., 1988; and Camboni et al., 1990) and the farm structure-institutional constraints perspective (Napier et al., 1988 and 1994; Camboni et al., 1990; Lohr and Park, 1994; and Cooper and Keim, 1996) were particularly useful in deciding which variables should be included in the WTA model. Previous studies have focused on identifying socioeconomic characteristics of landowners and their property that are correlated with decisions to adopt conservation practices.

Typical factors hypothesized to influence the participation decision include financial incentives, income, land value, farm size, tenure, age, and environmental attitudes and perceptions (Lant, 1991; McLean-Meynsse et al., 1994; Lohr and Park, 1994; Cooper and Keim, 1996; Lant et al., 1995a,b; and Konyar and Osborne, 1990).

Riparian landowners, in general, recognize the limited direct benefits of adopting conservation practices meant to reduce off-site damages to freshwater habitat and water quality. Under Oregon's CREP, contracts lasting up to 15 years prohibit landowners from changing management in their riparian areas regardless of commodity prices or additional farm program incentives. In addition, there are costs associated with establishing and maintaining permanent forest cover for the buffer strip; cost-share available through Oregon's CREP only covers 75% of the cost of establishing the practice and a \$5 per acre per year maintenance payment. For each individual there is a threshold where the benefits from receiving a guaranteed yearly payment compensates for the loss in production revenue, the cost of establishing and maintaining the buffer strip and the risk involved with participation.

The relationship between the payment offered and the participation decision is hypothesized to be conditioned on sociological and past experience variables as well as three economic constraints: opportunity costs, future expectations, and preferences (Table 1). The opportunity cost of an action is the value of the foregone

alternative action (Pearce, 1992). For an individual to consider participation in Oregon's CREP the yearly payment should compensate for the expected revenue foregone (either direct or indirect) over the contract period.

Table 1. Variables Expected to Influence the Participation Decision

Categories & Variables	Variable Description	Expected Relationship
PAYMENT	Annual payment for participation	+
<u>Opportunity Costs</u>		
ACRES	Total acreage of the property	+
HIGHVALUE	Total acreage dedicated to high value crops	-
LOWVALUE	Total acreage dedicated to low value production	+
%FARMINC	Percent of income from farm sources	-
<u>Future Expectations</u>		
PLAN RETIRE	Planned retirement within 10 years	+
SENATE BILL	Compliance with Senate Bill 1010	+
REGULATION	Compliance with future regulations	+
FLEXIBILITY	Flexibility of future land use	-
<u>Preferences</u>		
ENV IMPORT	Low importance placed on fish & water quality	-
ENV SAT	Low satisfaction with fish & water quality	+
ENV PERCEPT	No perception of an environmental problem	-
AGENCY	Required interaction with a State/Federal Agency	-
NEIGHBOR	Acceptance by neighboring landowners	+
COST-SHARE	Availability of cost-share	+
ECONOMICS	Reduced economic returns	-
<u>Sociological</u>		
AGE	Age of respondent	-
EDUCATION	Completion of some education beyond high school	+
RETIRED	Retired	+
<u>Past Experience</u>		
CRP	Lack of familiarity with CRP	-
CREP	Prior knowledge about Oregon's CREP	+
PAST PART	Past participation in a USDA program	+

An individual's expectation about the future determines their planning horizon and may be a critical component influencing the participation decision. Future expectations regarding environmental regulation and planned retirement are

components hypothesized to influence the participation decision. Preferences, past experiences and sociological demographics provide the content within which individuals make utility maximizing decisions.

Survey Design and Population Description

The entire population of riparian landowners along five streams in Union County and six streams in Washington County was surveyed for their willingness to participate in Oregon's CREP following the Total Design Method (Dillman, 1978). These counties were chosen to reflect the diverse climate and management regimes in Oregon. Situated west of the Cascade Mountain Range, in the Willamette Valley, annual precipitation in Washington County is approximately 38 inches. Union County, located in the Northeast, receives significantly less precipitation, approximately 14 inches annually. Temperatures also vary between the two counties: Union has colder winters and longer periods of dry, hot summer weather with mean maximum and minimum temperatures of 84 and 24 degrees Fahrenheit, respectively. Extreme high's and lows range from 108 to -24 degrees F. Washington County, under maritime influences, has a more temperate climate with mean maximum and minimum temperatures of 80.5 and 33.3 degrees F, respectively. Extreme high and low temperatures range from 106 to -2 degrees F. Climatic variability accounts for the different management regimes among the counties. Individual producers in Union County are predominantly involved in the ranching industry, with a limited amount of land dedicated to irrigated crops.

Washington county producers have a more diverse cropping system with land dedicated to nursery crops, vegetables, berries, nuts, grass etc. and limited involvement in ranching.

In a mail survey, 216 Union County and 1116 Washington County riparian landowners were presented with a hypothetical opportunity to accept or reject an annual payment to participate in Oregon's CREP. The questionnaire provided a description of the benefits that might accrue to society, the operational components of the program, the enhanced incentives offered, and the program requirements. The enhanced incentives offered include: establishment of fixed rental rates for irrigated land; additional cost-share reimbursement to establish program practices; a special signing bonus; a mechanism to voluntarily meet state water quality practices for riparian land; and technical assistance from state and federal natural resource agencies.

Consistent with dichotomous choice, each respondent was asked to either accept or reject a specified annual payment to enter into Oregon's CREP. Respondents who were willing to participate in the program were asked to complete further questions to define their preferences for particular program incentives; unwilling respondents were asked to complete scaled response questions as to possible reasons for their non-participation decision. All respondents were asked to identify reasons that potentially make a difference in their decision to establish riparian buffer strips as well as descriptive data about themselves and their property.

Of the 1332 surveys distributed to the population, the overall response rate was 63.7% (65.3% in Union County and 63.3% in Washington County). Data was analyzed from a total of 290 respondents who identified eligible land for Oregon's CREP; 123 of these could not be used in the logit analysis due to incomplete responses to critical analysis variables. 500 questionnaires were returned by respondents ineligible to participate in CREP. 181 indicated that they did not own riparian land and 319 did not meet the requirements of the CREP program (cropped two of the past 5 years or grazed within the last 5 years). 28 potential respondents declined to answer the questionnaire and 47 questionnaires were sent to wrong addresses. Descriptive statistics for the 167 observations analyzed in the logit model are listed in Table 2. A majority of the observations are from Washington County, 77% and 79% for non-irrigated and irrigated land, respectively.

Whenever the number of respondents is less than the original sample there is potential for non-response bias: unit and item non-response. Non-responses result in the loss of valid information. This calls into question the reliability of estimates and how accurately the results reflect the values of the population in question (Mitchell and Carson, 1989). Unit non-response bias is a persistent problem in contingent valuation surveys because different categories of respondents tend to have different non-response rates and these categories of people also tend to have different values for the amenity in question (Mitchell and Carson, 1989). According to Mitchell and Carson, the primary correction for this type of bias is to weight the cases in the realized sample so that the weighted sample statistics for key

demographic variables correspond to known population parameters. However, this correction technique could not be utilized in the present research as there is no “known” information available for the population in question; riparian landowners. Dillman recommends contacting non-respondents to gather demographic information for comparison with the responding observations to determine whether non-response bias is a concern. This method allows for statistical comparisons to be made between respondents and non-respondents and allows the researcher to determine if there is systematic non-response bias. This type of follow up questioning was not conducted for this study, as telephone numbers were not readily available.

A review of available survey data was conducted to determine if each of the waterways (creeks, streams, rivers) listed in the survey was represented in the study. This procedure was undertaken to provide a better idea of the distribution of usable responses. As expected larger stream systems had a greater percentage of representation than small creeks. The Grande Ronde and Tualatin Rivers have 55% and 43%, respectively. Aside from Warm Creek in Union County, smaller waterways were represented between 8% and 28% of the time. No respondents noted that they owned property along Warm Creek in Union County, therefore they were not represented in this study.

Table 2. Mean Statistics of the Populations

Variable	Dry Land Respondents	Irrigated Land Respondents
ACRES	1069	157
HIGHVALUE	31	56
LOWVALUE	49	59
%FARMINC	25.89	47.86
PLAN RETIRE*	0.26	0.33
SENATE BILL*	0.46	0.62
REGULATION*	0.53	0.59
FLEXIBILITY*	0.76	0.86
ENV IMPORT**	1.53	1.45
ENV SAT**	3.10	2.64
ENV PERCEPT**	1.41	1.54
AGENCY*	0.44	0.57
NEIGHBOR*	0.29	0.33
COST-SHARE*	0.62	0.72
ECONOMICS*	0.48	0.75
AGE	58	55
EDUCATION*	0.86	0.78
RETIRED*	0.14	0.13
CRP***	2.33	2.22
CREP*	0.42	0.64
PAST PART*	0.41	0.46

*Interpreted as percentage. ** Interpreted on a scale of 1 to 5 (1 = very important, very satisfied, strongly perceived; 5 = unimportant, not satisfied and not perceived, respectively). *** Interpreted on scale of 1 to 3 (1 = very familiar, 2 = somewhat familiar and 3 = not at all familiar).

Factors of Participation and Mean WTA from Logit Analysis

Separate econometric models were analyzed for dry land riparian landowners and irrigators. Both models have a high percentage of correct prediction, 90.1% and 92.1% respectively, indicating that the models do a good job of predicting the response to the ‘willingness to participate’ question. Estimated coefficients, their respective T-ratio’s, and estimates of the marginal impacts for both models are provided in Table 3.

Table 3. Logit Model Parameter Estimates for the Participation Decision

Variable	Dry Land			Irrigated Land		
	Coefficient	(T-Ratio)	Marginal	Coefficient	(T-Ratio)	Marginal
PAYMENT	0.048	(2.63) ²	0.44E-2	-0.041	(-2.22) ²	-0.26E-4
UNION				-27.22	(-2.41) ²	-0.53
PAY*UNION	0.015	(0.85)	0.24E-1	0.171	(2.36) ²	0.83E-4
ACRES	-0.002	(-0.97)	-0.19E-3	0.035	(2.24) ²	0.22E-4
HIGHVALUE	-0.007	(-0.57)	-0.60E-3	-0.041	(-2.05) ²	-0.26E-4
LOWVALUE	0.012	(1.80) ³	0.10E-2	-0.042	(-2.32) ²	-0.27E-4
%FARMINC	-0.052	(-2.47) ²	-0.48E-2	0.034	(1.30)	0.22E-4
PLANRETIRE	-2.207	(-1.56)	-0.17	6.714	(2.41) ²	0.34
SENATE BILL	2.383	(2.04) ²	0.21	-1.100	(-0.90)	-0.96E-1
REGULATION	-2.210	(-1.88) ³	-0.18	2.587	(1.75) ³	0.24
FLEXIBILITY	-2.324	(-1.79) ³	-0.20	-9.575	(-2.45) ²	-0.42
ENV IMPORT				-2.510	(-1.78) ³	-0.16E-2
ENV SAT	-0.524	(-1.33)	-0.48E-1			
ENV PERCEPT	-1.114	(-1.15)	-0.10	-2.807	(-2.90) ¹	-0.18E-2
AGENCY				-2.346	(-1.80) ³	-0.19
NEIGHBOR	3.969	(2.74) ¹	0.35	0.665	(0.55)	0.63E-1
COST-SHARE	5.207	(3.23) ¹	0.43	3.812	(2.28) ²	0.32
ECONOMICS	-2.303	(-1.91) ³	-0.19	3.806	(2.27) ²	0.29
AGE	-0.068	(-1.66)	-0.62E-2	-0.076	(-1.02)	-0.49E-4
EDUCATION	-3.974	(-2.30) ²	-0.32	5.039	(2.55) ²	0.35
RETIRED				6.162	(1.98) ³	0.37
CRP	0.667	(0.87)	0.061	2.657	(1.87) ³	0.17E-2
CREP				1.472	(0.83)	0.14
PAST PART	1.597	(1.49)	0.15	-1.708	(-1.22)	-0.15
INTERCEPT	1.427	(0.33)	0.13	8.092	(1.06)	0.52E-2
N		91			76	
Observations at 1		34			38	
Observations at 0		57			38	
% of Correct Predictions		90.1			92.1	
McFadden R ²		0.57			0.58	
Estimated Mean WTA						
Union County		\$148.94			\$144.38	
Washington County		\$196.43			\$204.55	

¹ Significant at the 1% level. ² Significant at the 5% level. ³ Significant at the 10% level.

The yearly payment (BID), as expected, significantly contributes to the participation decision in all circumstances. In order to separate the influence of the annual payment for Union and Washington County respondents (for both dry and

irrigated land), a dummy variable is added to the analysis. The dummy variable (PAY*UNION) is the product of the bid rate offered and a county dummy, UNION (1 if Union). Inclusion of this variable allows for an independent calculation of the mean willingness to accept (WTA) for each of the counties. The coefficient on the PAYMENT variable is positive for both Union and Washington County dry land respondents as well as for Union County irrigators. However, the coefficient is negative and significant for Washington County irrigators. This latter result is unexpected but may be related to the diversity of irrigated crops grown in the county and the limited range of bids offered to the respondents³.

The estimated marginal influence of the annual payment on the probability of participation varies by county for dry and irrigated land. It appears that if the annual payment were to increase by \$1 per acre for dry land the probability of participation would increase by 0.44% and 2.4% in Washington and Union Counties, respectively. The seemingly large difference in these marginal influences may be related to two factors. First, individuals in Union County generally own relatively more acreage than residents in Washington County. Second, the marginal value of land is higher in Washington County due to productivity levels and urban encroachment. The marginal influence of the annual rental rate for irrigated land is more difficult to explain. Due to the negative relationship between participation

³ A recent Maryland CREP focus group indicated that the incentives offered were not a major factor in improving the impression of the program or increasing likely participation. Some farmers participating in the focus group indicated that their interest in the program had little to do with financial incentives because the incentives only marginally affected their "bottom-line" (Penn et al., 1999)

and the BID in Washington County, it appears that an increase of \$1 in the annual payment will decrease the probability of participation by 0.0026%. Union County irrigators, however, appear to react more favorably to an increase in the annual payment; probability of participation increases by .0083%, on average, for a \$1 per acre increase in the rental rate.

The variables chosen to represent “opportunity cost” also help explain the participation decision. Landowners who dedicate their acreage to producing high value crops, as expected, have a decreased probability of participation for both irrigated and dry land (significant only for irrigated land). For every additional acre of irrigated land dedicated to producing high value crops, on average, the probability of participation decreases by 0.0026%. Also as expected, landowners dedicating their dry land to less valuable production such as haying or grazing have an increased probability of participation. For every additional acre of dry land dedicated to grazing or haying the probability of participation increases by 0.10%, on average. However, irrigators who dedicate their land to haying or grazing have a decreased probability of establishing forested riparian buffer strips through Oregon’s CREP. On average an additional acre of irrigated land dedicated to haying or grazing decreases the probability of participation by 0.0027%. This latter result is not surprising as irrigated riparian land dedicated to grazing and producing hay is often times a critical source of forage for ranch operations. It is not unreasonable to expect the probability of participation to decrease for these types of producers.

Expectations regarding the flexibility of future land use appear to significantly influence participation for both irrigators and non-irrigators. Results indicate that individuals who place importance on the reduced flexibility of future land use are less likely to participate in CREP by 20% and 42% for dry and irrigated land, respectively, than individuals who are not concerned with a decrease in flexibility. Perhaps this indicates that contract periods are too long in duration or do not provide enough management flexibility during the duration of the contract. This result is consistent with previous researchers who have found that providing flexibility in conservation programs will increase participation rates (Purvis et al., 1989; Lant, 1991).

The importance of a conservation program to provide compliance with current or future land use regulations is significant but of opposite sign for irrigators and non-irrigators. A dry land riparian landowner who considers compliance with current or future regulations an important part of a conservation program is 18% less likely to participate in Oregon's CREP than an individual who considers this component unimportant or is neutral to its inclusion. An opposite relationship exists among irrigators. An individual irrigator who considers compliance with current or future land use regulations an important program component is 24% more likely to enroll in Oregon's CREP than someone who does not see the importance of this program component. Related to the concept of compliance with land use regulations is the expectation that the ability to meet Agricultural Water Quality Management Area Plans for riparian lands under state

Senate Bill 1010 will likely influence the participation decision. As expected, non-irrigators who indicate that compliance with SB1010 is important are 21% more likely to participate in Oregon's CREP than individuals who do not see the importance of compliance. The relationship was opposite, but not significant for irrigators. The mixed findings for the importance of compliance with current or future land use regulations and SB 1010 may imply that some respondents do not perceive these regulations as pertaining to their property. Agencies may want to communicate with landowners regarding whether their land management practices meet current and anticipated water quality and habitat regulations and the key role that this conservation program can play.

Preferences, sociological variables and past experiences also help explain participation. In general, landowners appear to recognize the benefits of the cost-share component of Oregon's CREP. Individuals who place importance on the availability of cost-share to establish conservation practices are 43% and 32% more likely to participate in the program than those who do not, for non-irrigators and irrigators respectively. The perception of an environmental issue needing to be addressed on streamside property also increases the likelihood of participation. Respondents were asked to assess how strongly they agreed or disagreed with the need to address a number of environmental issues on the streams running through their property. As the level of agreement decreases from 'strongly agree' to 'strongly disagree' the probability of participation decreases by 0.18% per level, for irrigators. Although the relationship is similar for non-irrigators, it is not

statistically significant. An individual's preference for becoming involved with a state or federal agency also significantly decreases the probability of participation in Oregon's CREP. Irrigators who consider the requirement of interaction with an agency of import are 19% less likely to participate in the program than individuals who are neutral to this required interaction.

Variables such as percent of income from farm sources and whether or not an individual is retired or plans to retire within 10 years influence the participation decision as expected. As the percentage of income from farm sources increases by 1% for non-irrigators the likelihood that they participate in Oregon's CREP decreases by 0.48%. This variable is not statistically significant for irrigators. However, the variables related to retirement and planned retirement are significant and positive for irrigators and not significant for non-irrigators. As expected, persons who are retired or plan to retire within the duration of the program, 10 years, have an increased probability of participation of 37% and 34%, respectively. Familiarity with the CRP decreases an irrigator's likelihood of participation by 0.17% but is insignificant for non-irrigators.

The mean WTA for irrigators and non-irrigators for each county is provided in Table 3. It is of interest to note that each of the estimates is at the high end of (or exceeds) the values currently being offered by the Farm Service Agency for participation in Oregon's CREP. Also of interest is the small difference between the mean WTA for irrigated and dry land in each of the counties. This difference

was expected to be larger as estimates indicate that on average irrigated land rents for twice the rate of dry land in Oregon.⁴

An Analysis of Unwilling Respondents

While the results from the logit analysis may assist policy makers in their efforts to understand the factors that influence participation in Oregon's CREP, perhaps of equal interest are the reasons why respondents chose not to participate in the program. Respondents who indicated that they would not participate in Oregon's CREP were asked to address possible reasons for not participating. The mean results of these responses are reported in Table 4.

Of the original 290 survey's used in the analysis, 171 individuals indicated that they would not participate in the program, 103 indicated a positive willingness to participate and 16 declined to answer the question. The number of respondents' to each statement, N in table 4, varies due to the fact that some respondents did not address all of the reasons provided in the questionnaire.

It appears that the primary reasons for non-participation include reduced flexibility to change land use as economic conditions warrant, concern over restrictions at the end of the contract, and a strong belief that riparian areas can be restored through proper management. Of slightly lesser importance is the

⁴ An alternative model, eliminating respondents who said "no" to the participation decision but went on to indicate that their "no" response was not directly related to the annual payment, was also estimated. The mean WTA of the alternative model appears to more closely reflect the annual payments that are currently being offered to dry land riparian landowners under Oregon's CREP (\$121.60 and \$61.08 for Washington and Union Counties, respectively). The mean WTA for irrigated land in Washington and Union counties increased to \$256.82 and \$145.97, respectively.

perception that participation will interfere with managing the remaining property and distaste for involvement with the Federal and State government.

Table 4. Mean Responses of Unwilling Respondents*

Reason	N	Mean	Standard Deviation
A. Annual payment insufficient	153	2.3	1.11
B. Too expensive to establish conservation practice	153	2.5	1.12
C. Too expensive to maintain conservation practice	153	2.3	1.07
D. Reduced flexibility to change land uses as economic conditions warrant	158	1.8	1.00
E. Interference with management of remaining property	155	2.1	1.18
F. Riparian land is too productive to convert to "no-use"	151	2.4	1.20
G. Concern about restrictions at the end of the contract period	157	1.6	0.96
H. I do not want to enter into a contractual arrangement with the federal government	162	2.0	1.11
I. I do not want to enter into a contractual arrangement with the state government	160	2.0	1.10
J. Opinions from neighboring land owners prevents me from considering enrollment	150	3.7	1.13
K. I believe that riparian areas can be restored with proper management	154	1.8	0.89

*1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; 5 = strongly disagree. N = number of respondents

Respondents who declined to participate appear to agree that the annual payment they were offered was insufficient to induce participation. However, it is of interest to note that only 2 other potential reasons for non-participation were ranked less important: the cost of establishing the conservation practice and the

opinions of neighboring landowners. This result implies that there may be a number of policy actions that could increase participation other than increasing the annual payment. This result also bolsters the results from the logit analysis presented above which indicate that the payment is significant but perhaps not a strong driving factor in the participation decision.

Preferences for Program Components

Thus far the results have focused on analysis of the participation decision with little discussion of what riparian landowners think of the various components of Oregon's CREP. Survey respondents were presented with a description of potential program benefits, operational procedures, enhancement incentives, and program requirements. This section will discuss landowner preferences for various program components including temporary leasing of in-stream water rights for irrigators; the special signing bonus; and operational components such as cost-share availability, technical assistance etc.

Temporary Leasing of Appurtenant Water Right to In-stream Flow

In recognition that irrigated land has a higher economic value than non-irrigated land, Oregon's CREP offers an increase in the annual payment to landowners that irrigate with a certified Oregon Water Resources Department (OWRD) water right. In return for the higher annual payment, landowners are

required to lease the portion of the existing water right appurtenant to the enrolled acreage for in-stream flow for the duration of the contract. The leasing agreement is temporary and does not alter the original water right. Respondents that irrigate with a certified water right and indicated a willingness to participate in Oregon's CREP were asked if they would consider leasing their water right to the OWRD for in-stream flow. A follow up question regarding possible reasons for not considering this option was posed to appropriate respondents.

Approximately 40% of survey respondents irrigate their land with an OWRD permit, of these, 54 indicated a willingness to participate in Oregon's CREP. Twenty-three irrigators said they would consider leasing the appurtenant portion of their water right to the State, 22 indicated they would not, and 9 declined to answer the question. This implies that approximately half of the irrigators who participate in Oregon's CREP will not consider leasing their water right to the State for in-stream flow. Potential reasons for this decision are found in Table 5.

Concern regarding future alteration of existing water rights appears to be the main obstacle to obtaining leases for in-stream flow. This result is not surprising as one recalls that future expectations are hypothesized to influence a participation decision and in light of the fact that respondents perceive water as a valuable commodity. These results may also be in reaction to the complex relationships that exist between water quality, fish habitat (particularly water flow), the water rights system, and Federal legislation such as the Clean Water and Endangered Species Acts. It seems reasonable that a water right holder might have

concern regarding the future of such a highly demanded commodity. Clarification of the water leasing process and a guarantee that existing water rights will not be altered, in conjunction with education and outreach regarding the value of in-stream flow, may assist in increasing the number of irrigators willing to consider leasing their water right for in-stream flow.

Table 5. Mean Responses for Not Considering a Water Lease*

Reason	N	Mean	Standard Deviation
A. I would prefer to enter into an in-stream agreement with an alternative water leasing organization	21	3.3	1.23
B. Water is a valuable commodity and I will not consider leasing it for in-stream purposes	19	2.5	1.21
C. Pressures from neighboring landowners will keep me from entering into any in-stream flow agreement	19	3.6	0.90
D. Concerns regarding future alteration of my existing water right will keep me from participating in a lease agreement	19	2.0	0.82

*1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; 5 = strongly disagree. N = number of respondents

Special Signing Bonus

In order to concentrate riparian restoration practices along contiguous stream stretches, Oregon's Conservation Reserve Enhancement Program offers landowners a bonus for acting in cooperation with one another. Under Oregon's

CREP, the U.S. Department of Agriculture will make a one-time payment of four times the annual rental rate to all cooperating enrollees when at least 50% of a five-mile stream segment is enrolled in the program. All respondents indicating a willingness to participate in Oregon's CREP were provided with a description of the special signing bonus incentive and a representative bonus tied to the initial program annual payment. Respondents were then asked to either accept or reject the special signing bonus component of the program. Respondents who declined to work with their neighbors under the auspices of the special signing bonus were asked to explain why they declined the opportunity.

Recalling that 103 respondents indicated a willingness to participate in Oregon's CREP, approximately 76% suggested that they would take advantage of the signing bonus to assist in the enrollment of contiguous stream segments; 12% refused the offer and 12% did not respond to the question. The high percentage of individuals agreeing to take advantage of the signing bonus suggests that this component of the program may be an adequate method to target enrollment of contiguous stream stretches. A majority of the respondents who declined to be involved with the signing bonus incentive did not explain their reasons. However, prevalent among the reasons provided included the general feeling that this portion of the program is a government pressure tactic and respondents did not want to be involved with their neighbors' business. The time required and number of neighbors needed to qualify for the signing bonus was also an issue among some respondents.

General Program Components

All survey respondents were directed to complete a question eliciting their opinions regarding the relative importance of various program components from cost-sharing opportunities explicitly defined in the program to less well defined possible consequences of participation, such as loss of moisture to adjacent lands. The results of this question are presented in Table 6 and will provide policy makers with a better idea of what riparian landowners believe to be important aspects of a conservation program requiring implementation of riparian buffer strips, filter strips or wetland restoration.

The most important program components are the possibilities of erosion control and a fear of reduced flexibility in future land use. It is not clear whether or not landowners believe that Oregon's CREP offers an opportunity to control erosion, however, this is one of the benefits that may be provided through participation in the program. The issue of flexibility has already been discussed but it is of interest to note that this issue appears to be of utmost importance to the entire population surveyed, not simply the respondents refusing to participate in the program. Recognizing that flexibility is an important issue to potential participants, whatever flexibility exists within Oregon's CREP should be stated clearly to alleviate any preconceived perceptions. In addition, policy makers attempting to improve upon the program should consider this issue of great importance. Related to flexibility is a concern regarding reduced economic return from the land. Oregon's CREP offers an annual rental rate to compensate landowners for potential

economic losses due to enrollment. The established annual payments are based on soil type and therefore should reflect the productivity of the land. However, compensation for loss of productivity may not be enough to convince landowners to participate in the program. There are additional economic costs associated with participation, some of which are reflected in the responses provided in Table 6.

Table 6. Mean Responses for the Importance of Program Components

Program Component	N	Mean	Standard Deviation
A. The cost share available.....	246	2.15	1.13
B. The technical assistance available through various resource agencies.....	246	2.27	1.15
C. Ability to meet Agricultural Water Quality Management Area Plans for riparian lands as described under SB 1010...	238	2.50	1.10
D. Compliance with current or future land use regulations...	242	2.35	1.13
E. Erosion control possibilities..	245	1.95	1.06
F. Time required for the application process.....	243	2.49	1.19
G. Possible loss of moisture to adjacent agricultural fields..	243	3.03	1.23
H. Acceptance by neighboring landowners.....	241	3.12	1.26
I. Required interaction with a state or federal agency.....	246	2.39	1.12
J. Reduced flexibility of future land use.....	245	1.73	1.01
K. Reduced economic return from the land.....	244	2.21	1.27

1 = very important; 2 = somewhat important; 3 = neutral; 4 = not too important; 5 = not important.
N = number of respondents

The time that is required to complete the application process and the required interaction with state or federal agencies are two program components that

may be considered “uncompensated” costs of participation in the form of “transaction costs.” Landowners, in general, agree that these program components are important when it comes to making a decision about participation in a conservation program. In light of the finding that the time required to complete the application process is important to landowners, Oregon’s CREP personnel may want to review their application process to ensure that it is as easy and fast as possible. In recognition that landowners, in general, do not want to be required to interact with state or federal agencies, a relatively easy and rapid application process might reduce the amount of time that individuals spend with agency representatives.

On a more positive note, landowners in general believe that cost-share, technical assistance and ability to comply with current or future land-use regulations, such as SB 1010, are important components of a conservation program. Oregon’s CREP offers a cost-share of 75%, provides technical assistance from the Natural Resource Conservation Service, local Soil and Water Conservation Districts and Oregon’s Department of Forestry, and provides for compliance with Oregon’s SB 1010 for riparian lands.

Policy Implications

The results of the logit analysis indicate that approximately 50% of irrigators and 37% of dry land riparian landowners will participate in Oregon’s CREP, as described in the questionnaire, at yearly payments close to those

currently offered. Some changes, or clarification, of Oregon's CREP may assist in increasing participation. While the annual payment offered influences participation, it is clearly not the sole driver of the participation decision. Increasing the annual payment may induce participation, but other changes to the program may be necessary as well. Clarifying the regulations that pertain to enrolled land at the end of the contract period appears to be essential. In addition, providing flexibility for land management during the contract seems desirable. Communication between land owners and resource agencies may also help to increase participation as those who perceive a need to address environmental issues are more responsive to the program.

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**Oregon's Conservation Reserve Enhancement Program:
Recommendations for Implementation**

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Introduction

The management and use of rivers and riparian areas has traditionally been centered on activities that lead to economic growth and societal wealth. These management practices have led to endeavors such as hydroelectric power development, transportation, flood control, and use of river water for agricultural, industrial, and municipal purposes (Nehlsen et al., 1991; National Research Council, 1992; Lawson, 1993; and Brown et al., 1994). As a result of these practices, and others such as fishing, logging and mining, many of the rivers and riparian areas in the western United States have been extensively altered since Euro-American settlement (Odum, 1978; National Research Council, 1995). The result of these alterations has been a decrease in diversity, function, and productivity of riparian environments and aquatic ecosystems (Odum, 1978; Correll, 1991; National Research Council, 1992).

Riparian and aquatic ecosystems are currently being altered and impacted at a rate greater than any other time in history (National Research Council, 1992). Alteration of riparian systems may decrease their ability to perform critical ecosystem functions such as purification of water, maintenance of stream flows and temperatures, recharging of groundwater and establishment and maintenance of habitat for many fish and wildlife species (National Research Council, 1992; Frissell, 1993; Lawson, 1993, Kauffman et al., 1997). Oregon's riparian ecosystems follow the same trend of decline as the rest of the western United States as exemplified by the declining status of native fish populations. According to

Nehlsen et al. (1991), the primary factor contributing to the decline of aquatic species in the western United States, including Oregon, is loss and degradation of habitat.

Riparian buffer strips have been recommended as a means to utilize the natural functions of riparian areas to maintain/restore cool river temperatures, provide wood for streams to maintain channel complexity, buffer high flows with stabilized root systems and overhanging banks, filter pollutants from adjacent lands, provide stormwater filtration and restore degraded wildlife habitat (Almand et al., 1978; Barry, 1978; Hirsch et al., 1978; Cooper et al., 1987; Osborne and Kovacic., 1993). In an effort to reverse the declining trend of native fish populations, the State of Oregon and the U.S. Department of Agriculture have recently agreed to an enhancement of the federally operated Conservation Reserve Program (CRP) in Oregon. The fundamental purpose of Oregon's Conservation Reserve Enhancement Program (CREP) is to "enhance riparian habitat on agricultural lands along streams which provide important habitat for salmon and trout species which have been listed under the Endangered Species Act throughout Oregon" (State of Oregon, 1998). Oregon's CREP requires that all participants suspend production on their riparian property for up to 15 years and convert it to one of three riparian conservation practices; forested riparian buffers, filter strips and wetland restoration. Approximately \$250 million is available to enroll up to 95,000 acres of riparian land and 5,000 acres of wetland along streams where native salmon and trout exist or are known to have historically existed.

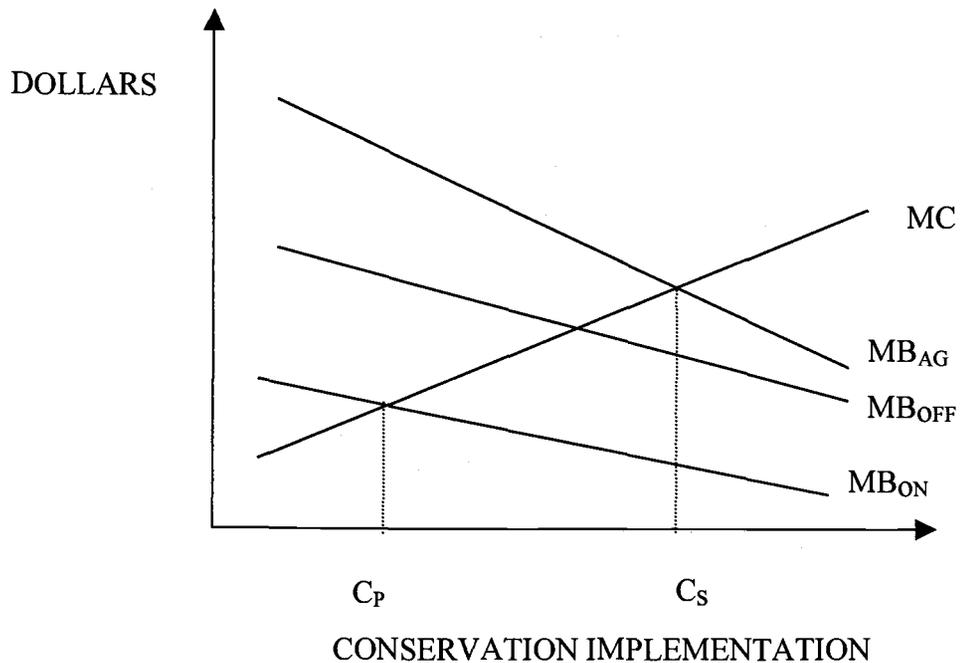
Kingsbury (1999) conducted a dichotomous choice contingent valuation survey of riparian landowners in two Oregon Counties with regard to Oregon's CREP. She modeled the probability of participation as a function of the annual payment and a vector of socio-economic variables. In addition, she assessed possible reasons for non-participation and landowner preferences for various program components. The primary purpose of this paper is to incorporate the results from Kingsbury with existing literature and CREP implementation procedures to provide recommendations for improving Oregon's conservation efforts.

Conservation in a Public Policy Context: Is Oregon's CREP Enough?

Many of the benefits provided by establishment of riparian conservation practices have the characteristics of a public good: indivisible and non-excludable. While the practitioner of riparian conservation may receive on-site benefits such as erosion control and bank stability, off-site benefits such as improved water quality and aquatic habitat may also exist. Economic theory suggests that public goods, in a pure market economy, will tend to be provided in quantities less than deemed "efficient" from a societal standpoint (Perman et al., 1996). Adoption of a conservation practice depends upon its marginal benefits and marginal costs. Farmers, primarily concerned with the benefits and costs of conservation on their land, perceive different benefits of conservation than society as a whole, who

considers both on and off-site benefits and costs. This divergence can be shown graphically with the use of marginal cost and marginal benefit curves (Figure 1).

Figure 1. Marginal Costs and Marginal Benefits of Conservation



MC = marginal cost
 MB_{AG} = aggregate marginal benefit
 MB_{OFF} = off-site marginal benefit
 MB_{ON} = on-site marginal benefit

Figure 1 depicts an upward sloping marginal cost curve that represents the additional costs incurred by the landowner as conservation efforts and benefits are expanded and intensified. The downward sloping marginal benefit curves represents the demand for conservation practices. Demand for conservation

depends upon perceived benefits, thus, it is of no surprise that the marginal benefit curves are different for individuals considering only on-site benefits and society who considers the on and off-site advantages of conservation.

A private landowner is expected to implement conservation practices up to the point where the marginal benefit of on-site conservation equals the marginal cost of implementing the practice ($MB_{ON} = MC$), or point C_P in figure 1. From a landowners perspective the benefits of conservation may be monetary and/or non-monetary. Monetary benefits may include erosion control, preventing losses in crop productivity, and maintenance of the property market value. Improved wildlife habitat and personal satisfaction associated with good land stewardship are non-monetary benefits that may be derived from implementation of riparian conservation practices.

From society's perspective, the optimum conservation implementation is represented by point C_S , where the combined on- and off- site benefits (MB_{AG}) equals the marginal cost of implementing the practice. Society, along with private landowners, recognizes the on-site benefits of conservation. However, on-site decisions regarding conservation tend to ignore off-site benefits, which were previously described as the "public good" component of conservation. These benefits may include increases in water quality through filtration and temperature stabilization, wildlife habitat restoration, flood prevention, etc.

The difference between the optimum implementation of conservation from the landowner and society perspective is of significance. The size of the divergence

(C_P to C_S) varies depending upon the slopes of the marginal cost and marginal benefit curves. However, economic theory suggests that without policy intervention, a landowner will provide conservation only when the on-site marginal benefits of implementation exceed the marginal costs and that the public may be willing to support additional conservation expenditure to narrow the gap. Offering landowners financial incentives to help off-set the cost of conservation implementation will likely increase a landowners willingness to establish conservation practices in excess of C_P . Embedded within Oregon's CREP is the theory of public policy for the public good. The program is designed to increase the use of conservation practices on private land so as to move toward the socially optimum level of utilization.

Kingsbury (1999) estimates the median compensation required for riparian landowners in two Oregon Counties, Washington and Union, to enter into Oregon's CREP. Her findings estimate compensation values for which the average landowner in each of the counties will be indifferent between participation and non-participation. These estimates assist in program implementation but tell us little about the socially efficient level of expenditure for conservation and restoration of riparian ecosystems, C_S . Loomis et al. (1999) reports the total economic value of restoring ecosystem services in an impaired river basin in Colorado through use of riparian buffer strips. Five ecosystem services that could be restored along a 45 mile section of the Platte River were described to respondents using in-person interviews and a building block survey implementation technique developed by an

interdisciplinary team. The five ecosystem services included dilution of wastewater, natural purification of water, erosion control, habitat for fish and wildlife and recreation. Results from his contingent valuation study indicate that the average household is willing to pay, on average, an additional \$21 per month through an increase in their water bill for the ecosystem services provided by establishment of riparian buffer strips. Extending the results of his research to the study population, he concludes that the total willingness to pay for additional ecosystem services is between \$30 million and \$70 million depending on whether non-respondents were assessed at a zero value or not. He notes that both of these values “greatly exceed” the cost of implementing farmland easements through the Conservation Reserve Program (\$12.3 million) and water leasing (\$1.13 million) which would be necessary to produce the increase in services.

Recognizing that the results from the Loomis study cannot be directly applied to Oregon’s population, it is never the less of interest to note that the citizens of Oregon may be willing to pay far more for riparian conservation and ecosystem restoration than what is currently being spent to implement Oregon’s CREP. Further research in this area may assist in defining and promoting conservation at the socially optimum level.

Oregon’s CREP provides a mechanism to promote conservation on specified cropped and grazed riparian land but further conservation programs may be needed to promote conservation on other types of riparian land to meet not only social efficiency but also the goals of the program. This recommendation is

confirmed by the results of the survey conducted by Kingsbury. Approximately 40% of the respondents surveyed in Union and Washington counties were not eligible to participate in Oregon's CREP because they had not cropped their land in two of the last five years or grazed within the last five years. Additional flexibility in program eligibility requirements or formulation of an alternative program for different land uses may be necessary to address the influence of land management in riparian areas supporting native fish species.

Program Incentives, Messages, and the Participation Decision

Oregon's CREP offers potential participants a number of incentives to induce participation. Among these are an annual rental rate based upon soil productivity and irrigation activity; a 35% premium for riparian acreage; 75% cost-share for establishment of conservation practices; voluntary compliance with Oregon's Senate Bill 1010⁵ for riparian areas; a special signing bonus and technical assistance from state and federal natural resource agencies. Kingsbury, in modeling the participation decision, reports some interesting results regarding landowner perception and preferences for these and other program components.

Economic theory suggests that the annual rental rate provided for enrollment will positively influence the participation decision. This outcome is realized in three of four situations in the Kingsbury results, with the exception of

⁵ A mechanism to comply with the Federal Clean Water Act.

Washington County irrigators⁶. However, the marginal influence of the annual payment (including the 35% premium) is minimal for dry land operators and irrigators in both counties. These results indicate that the incentive payment is not a driving force in the participation decision for the average landowner. Confirmation of these results can be extracted from a similar study of Maryland's CREP.

Maryland's CREP seeks to enroll 100,000 acres of agricultural land around the Chesapeake Bay for conversion to riparian buffers (grasses or trees), wetland restoration and highly erodible land stabilization. Similar to Oregon, Maryland offers annual rental payments, incentive payments, cost-share payments, and technical assistance. Preliminary results from a survey of Chesapeake Bay Area landowners with regard to Maryland's CREP support the findings reported in Kingsbury with regard to the rental payment. "Overall, incentives [are] not a major factor in increasing the impression of [the] program, likely participation, and interest in learning more about it" (Penn et al., 1999). Preliminary results indicate that 38% and 62% of respondents asked about the likelihood of participation, without knowledge of the financial incentives, were *very likely* and *somewhat likely* to participate in Maryland's CREP, respectively. Of the respondents with knowledge of available financial incentives, 41% and 60% were *very likely* and *somewhat likely* to participate in the program, respectively. Some Maryland respondents indicate that their interest in the CREP program has little to do with

⁶ The unexpected relationship between the annual payment and participation is troubling but may be related to the diversity of irrigated crops grown in Washington County and the truncated range of bids offered to the respondents.

financial incentives “because receiving 50% to 70% above soil rental rates will at best only marginally affect their bottom line” (Penn et al., 1999). Oregon landowners appear to feel similarly.

Approximately 45% of Oregon landowners declining to participate in the program noted that an insufficient annual payment was **not** the reason. The annual payment does not appear to be a driving factor in the participation decision for the average landowner. However, this does not mean that financial incentives are unimportant or should be removed from the program. Perhaps it is an indication that program personnel should consider marketing the program differently, with less emphasis on annual payments and more emphasis on other program components.

Results from the Maryland study indicate the most convincing and favorable message regarding CREP has to do with the opportunity to practice conservation stewardship so that the quality of the land would be maintained for future generations of farmers. The least favored and convincing messages were those incorporating protection of streams, the possibility of profits through participation and the ability to label products as “environmentally friendly” or “Bay-friendly” (Penn et al., 1999). Results from Kingsbury indicate that a successful message for Oregon’s CREP may include the benefits of the conservation practices, particularly erosion and flood control, and the cost-share available for implementation. These program aspects appear to be of second and third most importance when an Oregon landowner considers participating in a

conservation program that requires establishment of CREP practices (Kingsbury, 1999). The most important factor however, is concern regarding reduced flexibility of future land use. This concern may be related to future expectations regarding state forestry practices and how they affect a CREP participant at the end of the contract period. To a large extent, this concern has been addressed in Oregon through grandfathering the current Forest Practices Act (FPA) requirements. CREP participants may choose to file legal papers with their deed to ensure that at the end of the CREP contract they will be responsible for maintaining the forested buffer at widths prescribed by the FPA at the time of contract entry (Larkin, 1999). It is critically important that potential program participants know what regulations they will be subjected to as a direct result of participation.

Kingsbury asked landowners two questions regarding the incentive of compliance with regulation; one was specific to Oregon's SB 1010 and the other was a more generic question regarding current or future land use regulations. Results indicate that some landowners may not understand how SB 1010 relates to their activities or property. Irrigators who consider compliance with current or future land use regulations important are more likely to participate in Oregon's CREP. However, compliance with SB 1010 does not significantly contribute to the participation decision for this group of landowners. In addition, compliance with current or future land use regulations was slightly more important to landowners than the ability to meet the requirements of Agricultural Water Quality Management Area Plans for riparian land as described in SB 1010. These findings,

along with the fact that many survey respondents commented that they did not know what SB 1010 was, indicates that there is some uncertainty with regard to the legislation. Compliance with SB 1010 is much more likely to be an effective incentive if landowners understand the requirements of the bill and the consequences of non-compliance.

Landowners indicating a willingness to participate in Oregon's CREP, in general, responded favorably to the special signing bonus which offers a payment for landowners acting in cooperation with one another to enroll contiguous stream stretches. Approximately 76% indicated that they would be willing to work with their neighbors toward enrollment of the targeted stream miles (Kingsbury, 1999). Among the reasons provided for not wishing to take advantage of the bonus was the thought that it would require a large investment of time, as the number of landowners needing to be contacted would be large. Perhaps modification of the special signing bonus could be made for landowners owning small parcels of land or small amounts of river frontage. This type of modification would only be advised if it is determined that there is a pattern of small lot landowners in a particularly critical area. Otherwise, the complexity of this type of modification may cause more confusion than the derived benefits. The last incentive, technical assistance in planning and establishing the conservation practices required under CREP, does not appear to significantly influence the participation decision. However, landowners generally believe that it is an important aspect of the program.

Addressing the Concerns of Landowners Unwilling to Participate

Kingsbury observes that the primary reasons for non-participation in Oregon's CREP have to do with concerns about restrictions at the end of the contract period, reduced flexibility to change land management practices as economic conditions warrant, and a belief that riparian acres can be restored with proper management (1999). The first of these concerns was addressed in a previous section of this paper, the second and third might easily be addressed through allowing some flexibility in management practices on contracted lands. One such compromise would be to allow minimal haying, grazing and cropping in specified areas of the riparian acreage. Another alternative might be to have a period of no-utilization in the riparian area followed by a management plan allowing for partial utilization of the acreage. Previous research on participation in the Conservation Reserve Program (CRP) has shown that increasing the flexibility of the contract to allow haying and grazing will increase the probability of participation and may decrease the annual payment necessary to compensate landowners for enrollment (Purvis et al,1989; Lant et al., 1991). If the goals of Oregon's CREP can be met and still allow for flexibility in management practices it appears that there might be an increased interest in the program. Increased flexibility may also appease landowners that feel riparian restoration can be achieved with proper land management practices. A Field Survey and Literature Review on Effective Cattle Management in Riparian Zones provides an interesting

review of successful riparian grazing practices that might be applicable to Oregon streams⁷ (US Department of the Interior, 1997).

Irrigated Rental Rates and Leasing Water In-stream

In recognition that irrigated land has a higher economic value than non-irrigated land, Oregon's CREP offers an increase in the annual payment to landowners that irrigate with a certified Oregon Water Resources Department (OWRD) water right. In return for the higher annual payment, landowners are required to lease the portion of the existing water right appurtenant to the enrolled acreage for in-stream flow for the duration of the contract. Kingsbury found that approximately half of the irrigators willing to participate in Oregon's CREP would not consider leasing the appurtenant portion of their water right for in-stream flow, even with the higher rental rate. This figure could be as high as 60% if all non-respondents were considered unwilling. Potential reasons for not wanting to lease the water in-stream were concerns regarding future alteration of the water right and a belief that water is a valuable commodity. A recent conversation with a Natural Resource Conservation Service representative confirmed that irrigators are concerned about the alteration of water rights (Larkin, 1999). She indicated that some irrigators in Union County are choosing to keep their water right and participate in Oregon's CREP at the dry land rental rate, stating a concern regarding

⁷ It is beyond the realm of this paper to discuss the ecology of riparian restoration. It should however be noted that there is extensive literature on this topic.

the future of their water right as the reason. Respondents tended to disagree that an alternative water leasing organization would be preferred to the Oregon Water Resources Department and that pressures from neighboring landowners would keep them from participating in a lease agreement.

It comes as no surprise that irrigators are concerned about the future of their water right particularly since it is seen as a valuable commodity. Barkley, in a contingent valuation study measuring the willingness of Deschutes County irrigators to donate water for in-stream flow, found that very few water right holders were willing to donate (1997). Most irrigators responded that they “couldn’t afford to give up the amount of water asked for” and that “Government should leave irrigators alone” (Barkley, 1997). Recognizing that Oregon’s CREP is providing some compensation for the lease, these results may not be indicative of the responses that Oregon’s CREP will receive from irrigators. However, the second comment regarding government intervention may be important to consider when Oregon’s CREP seeks to lease water.

An additional potential concern regarding leasing of a water right for in-stream flow through Oregon’s CREP is the procedure an irrigator must go through with Oregon’s Water Resources Department (OWRD). Although Kingsbury did not elaborate on the leasing process for the purpose of her survey and research, it appears that the water leasing process is cumbersome. It requires lessors to extend the lease every other year for the duration of the contract. If the lease is not extended the participant may face government penalties. While Kingsbury has no

direct feedback from potential CREP participants regarding this aspect of the program, it is presumed that this would reduce an irrigators willingness to lease the water to the OWRD. Some simplification of this process or an alternative process should be formulated. Perhaps Oregon Water Trust, a not-for-profit organization specializing in acquiring leases and rights for in-stream flow, would be interested in working with Oregon's CREP and landowners to take on the responsibility of extending the leasing contracts. Changes in this portion of the program may be insignificant unless Oregon's CREP is able to deal with the concerns regarding alteration of the water right. It is critical that potential in-stream water leasors know, with certainty, that their water rights are not in jeopardy of alteration through the leasing program.

Conclusions

Oregon's CREP provides an opportunity for riparian landowners to establish riparian buffer strips on their land with some compensation from society. The program is in its early stages and the recommendations provided in this paper may guide policy makers in their attempt to expand the program, improve the incentives and address the concerns of riparian landowners. Specific recommendations include:

- 1) Clarify for riparian landowners the requirements of Senate Bill 1010 including how it applies to them; what penalties exist for non-compliance and the roll that Oregon's CREP can play to bring landowners into compliance.

- 2) Provide assurance of retained water rights for irrigators who are able, through CREP, to lease their water for in-stream flow.
- 3) Simplify the water leasing arrangement with the Oregon Water Resources Department so that landowners do not have to renew their lease every two years for the duration of the CREP contract.
- 4) Clarify/simplify the restrictions that landowners will be required to abide by at the end of the contract period.
- 5) Provide for additional flexibility in land management practices. In particular it might be beneficial to allow for some haying or grazing in the riparian area where use will not greatly detract from the goals of the program and where haying or grazing has occurred previous to the contract.
- 6) Market the program on the basis of potential private on-site benefits.
- 7) Provide more flexibility in program eligibility requirements or form an alternative program for different land uses to address the number of riparian landowners that are currently ineligible to participate in Oregon's CREP.

Increasing the annual rental rate will positively influence participation. However, large increases are not strongly recommended at this time, as rental rates do not appear to be a dominant factor in the participation decision. With such a young program there are many other avenues available for improvement of the program.

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Summary and Conclusions

Oregon's history is replete with stories of salmon so abundant that they "were loaded into wagons with pitchforks" (State of Oregon, 1998). Runs of millions of fish occurred on an annual basis. In recent years, many salmon runs have been depleted to a small percentage of their previous abundance. There are a number of reasons for this decline; hydropower generation, transportation, flood control, and use of river water for agricultural, industrial, and municipal purposes begin to name a few. Oregon's Conservation Reserve Enhancement Program has been designed to address water quality degradation and riparian vegetation alteration which are a direct or indirect result of agricultural activities on private lands along freshwater streams where native fish live or are known to have existed. On a statewide basis approximately 20% of the freshwater salmon streams on private land pass through agricultural use areas; these are the lands that are targeted under Oregon's CREP.

Success in enhancing riparian corridors on agricultural land through Oregon's CREP will be successful only if landowners are willing to participate in the program. This research set out to model the likelihood of participation in two Oregon Counties as a function of the annual rental payment and a vector of socio-economic variables, examine reasons for non-participation and assess landowner preferences for various program components. A contingent valuation study design was developed through a review of literature and a mail survey was conducted.

Recommendations for program implementation were drawn from the results of the survey and from other current literature.

Approximately 1,300 riparian landowners along 5 streams in Union County and 6 streams in Washington County were requested to respond to the survey instrument. The overall response rate was 64% and data was analyzed from 290 questionnaires. Maximum likelihood procedures were used to fit a logit model to the cumulative probability of participation. A transformation of the logistic regression coefficients was made to calculate point estimates of the median willingness to accept for dry land operators and irrigators in the two counties. Individually fitted marginal influences of the factors hypothesized to influence participation were calculated from the estimated regression coefficients and the probability function. The means of these fitted values are reported. The median willingness to accept for dry and irrigated land in Union County is approximately \$149 and \$144, respectively. If “protest-no’s” are excluded from the analysis these values become \$61 and \$146, respectively. Washington County values are a bit higher reflecting the increased productivity of the land. For dry and irrigated land, respectively, in Washington County the median willingness to accept is \$196 and \$205. The alternative model estimates these values at \$122 and \$257. The results also indicate that approximately 50% of irrigators and 37% of dry land riparian landowners will participate in Oregon’s CREP, as described in the questionnaire, at yearly payments close to those currently offered.

The study found that willingness to participate is influenced by a number of factors including the annual rental rate. Perception of an environmental issue, such as flooding, erosion, water quality, and fish habitat, positively influences the participation decision for irrigators. The relationship is similar for dry land operators but not significant. Overall it appears that the ability of a program to bring landowners into compliance with current or future land use regulations will positively influence participation. Irrigators who have large acreage, are retired (or plan to retire within 10 years) and view fish habitat and water quality as important are likely participants. Irrigators concerned about flexibility in land management and involvement with state or federal agencies are less likely to participate. Dry land operators appear to make their decisions differently. These landowners have an increased probability of participation if they hay or graze their land, are less reliant on farm income, and believe that cost-share and neighbor acceptance are important. Concern regarding flexibility of land management and reduced economic return will yield a less likely participant.

The top three reasons for non-participation were concern about restrictions at the end of the contract; a belief that riparian areas can be restored with proper management; and a reduced flexibility to change land uses as economic conditions warrant. In general, survey respondents react favorably to Oregon's CREP incentives: cost-share, technical assistance and ability to comply with Senate Bill 1010. Those willing to participate in the program responded favorably to the signing bonus incentive. Leasing of in-stream water in return for the higher

irrigated rental payment received a less favorable response. As many as 60% of irrigators were not willing to enter into this type of arrangement. The primary reason being fear of future alteration to their water right.

Recommendations for improvement of the program includes increasing flexibility; clearly defining “end of contract” obligations; changing the way the program is “promoted” to more closely match the interest of landowners; and clarifying the role the program can play with regard to regulation compliance. The program has potential to be mutually beneficial for private landowners and the people of the State of Oregon. Any changes in program policy or implementation that can be made to more closely match the needs of both parties will increase the likelihood that the program is successful.

This research provides one small contribution to what could potentially be done to improve Oregon’s CREP. Continued research might explore the other dimension of the research presented in this thesis; the willingness to pay for establishment of buffer strips on private riparian land. A comparison of the results from this thesis with actual enrollment might also provide an excellent opportunity for further research; testing the legitimacy of the contingent valuation method. More immediate work could be done through gathering of information on the implementation process from a landowner and agency personnel perspective; answering questions of what works best, where there are successes and where there are failures.

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Appendix

WATER QUALITY, FISH HABITAT AND YOUR STREAMSIDE PROPERTY

1. Do you own property along a year round stream in Union County?
- 1 YES (*Please continue with this survey.*)
 - 2 NO (*Please circle and return questionnaire in the stamped envelope provided.*)
2. Has the land along the stream on your property been cropped two out of the past five years **OR** is it pasture land that has been grazed within the last 5 years?
- 1 YES (*Please continue with this survey.*)
 - 2 NO (*Please circle and return questionnaire in the stamped envelope provided.*)
3. Please indicate whether or not you own property along each of the following waterways? (*Please circle one number for each.*)
- | | <u>YES</u> | <u>NO</u> |
|--|------------|-----------|
| a. Catherine Creek | 1 | 2 |
| b. Indian Creek | 1 | 2 |
| c. Grande Ronde River | 1 | 2 |
| d. Warm Creek | 1 | 2 |
| e. Gordon Creek | 1 | 2 |
| f. OTHER (<i>please specify</i>) _____ | 1 | 2 |

For the remainder of this survey, all questions regarding land use will refer only to the property that includes the waterway(s) indicated above.

4. Are you normally responsible for making major land use decisions on your property? (*Circle one number.*)
- 1 YES
 - 2 NO (*please pass this survey to the person who makes major land use decisions*)
5. Approximately how many acres of land do you own and operate along these waterways?

_____ ACRES

6. Approximately how many miles of stream run through your property? (*Please attempt to approximate to the nearest 1/4 mile.*)

_____ MILES

7. How is the land within 150 feet of the stream(s) on your property used? (*Please estimate the percentage in each category that applies; the percentages should add up to 100.*)

	<u>PERCENT</u>
a. Vegetables/Grass seed	_____ %
b. Small grain crop (including currently fallow land)	_____ %
c. Hay	_____ %
d. Pasture/Range	_____ %
e. Forest buffer	_____ %
f. Grass buffer or filter strip	_____ %
g. Other use (<i>please specify</i>) _____	_____ %
	100 %

8. Please indicate the **level of importance** you place on the following items by circling one of the following responses for each.

VI = VERY IMPORTANT, SI = SOMEWHAT IMPORTANT, N = NEUTRAL,
NT = NOT TOO IMPORTANT, NI = NOT IMPORTANT

	<u>VI</u>	<u>SI</u>	<u>N</u>	<u>NT</u>	<u>NI</u>
a. Water Quality?	1	2	3	4	5
b. Fish Habitat Conditions?	1	2	3	4	5

9. Please indicate how **satisfied or unsatisfied** you are with the following conditions in or on the stream(s) that are on your property by circling one of the following responses for each.

VS = VERY SATISFIED, SS = SOMEWHAT SATISFIED, N = NEUTRAL,
NT = NOT TOO SATISFIED, NS = NOT SATISFIED

	<u>VS</u>	<u>SS</u>	<u>N</u>	<u>NT</u>	<u>NS</u>
a. Water Quality?	1	2	3	4	5
b. Fish Habitat Conditions?	1	2	3	4	5

10. Please indicate how strongly you agree or disagree that each of the following areas needs to be addressed on the stream(s) that run through your property?
SA = STRONGLY AGREE, A = AGREE, N = NEUTRAL, D = DISAGREE, SD = STRONGLY DISAGREE

	<u>SA</u>	<u>A</u>	<u>N</u>	<u>D</u>	<u>SD</u>
a. Fish populations	1	2	3	4	5
b. Stream water quality	1	2	3	4	5
c. Summer stream flows	1	2	3	4	5
d. Stream bank erosion	1	2	3	4	5
e. Streamside vegetation loss	1	2	3	4	5
f. Flooding	1	2	3	4	5
g. Other _____	1	2	3	4	5

11. Are you familiar with the federal Conservation Reserve Program (CRP)?

- 1 VERY FAMILIAR
- 2 SOMEWHAT FAMILIAR
- 3 NOT AT ALL FAMILIAR

THE CONSERVATION RESERVE ENHANCEMENT PROGRAM AND YOUR LAND

The State of Oregon and the US Department of Agriculture have agreed to offer an **enhancement** of the federal Conservation Reserve Program (CRP) to farm and ranch landowners in Oregon. The Conservation Reserve **Enhancement** Program (CREP) provides an opportunity for farmers and ranchers to voluntarily establish certain conservation management practices along their streams by providing financial and technical assistance. Components of the **CREP** are outlined below.

Operational components of the **enhanced** CRP:

- The **enhanced** CRP will operate under the continuous CRP sign-up process, making enrollment possible at any time.
- Riparian acreage will automatically be accepted with annual **fixed** rental payments based on soil productivity.
- Eligible conservation practices include forested riparian buffers, filter strips and wetland restoration.
- The width of the conservation buffers may range from 35 to 150 feet.
- Participants will receive a \$5 per acre maintenance payment regardless of the conservation practice installed.
- The duration of the contract will be 10 to 15 years.
- Lands with an existing CRP contract or an approved offer with a contract pending are not eligible for the enhanced program until that contract expires.

Enhancement components to the CRP include:

- Special incentive payments of 25%, 35% and 50% above the annual fixed rental rate for filter strips, forested riparian buffer strips and wetland restoration, respectively.
- Establishment of fixed rental rates for **irrigated** land entered into the **enhanced** CRP.
- An additional 25% of cost-share reimbursement for implementing approved restoration practices, bringing the total public cost-share payment to 75%.
- A special signing bonus when at least 50% of the eligible stream bank within a 5 mile reach of stream is enrolled in the **enhanced** CRP.
- A mechanism to voluntarily meet Agricultural Water Quality Management Area Plan practices for riparian lands, as described under Oregon Senate Bill 1010.
- Technical assistance from the Natural Resource Conservation Service (NRCS), local Soil and Water Conservation District's (SWCD's) and the Oregon Department of Forestry (DOF).

Conservation Practice Requirements:

- The contracted land cannot be harvested or grazed by domestic livestock for the duration of the contract.
- Noxious weeds and other undesirable plants, insects and pests must be controlled on the contracted land.
- Contracted lands **DO NOT** become open for public access.

12. Prior to receiving this survey, had you heard of Oregon's Conservation Reserve **Enhancement** Program?

- 1 YES
- 2 NO

13. Do you currently irrigate all or most of your riparian land with surface water permitted through the Oregon Water Resources Department?

- 1 YES (*GO TO QUESTION 14.*)
- 2 NO (*SKIP TO QUESTION 15.*)

14. Would you enroll your streamside land in Oregon's Conservation Reserve Enhancement Program if the total annual rental rate (including the fixed rental rate, the 35% riparian buffer practice incentive and the maintenance payment) were \$190 per acre for irrigated land? *(Please circle your answer.)*

- 1 YES**
2 NO*

14A. On a scale from 1 to 10, 1 being **very uncertain** and 10 being **very certain**, how certain are you of your response to question 14? *(Please circle your response below.)*

VERY
UNCERTAIN

VERY
CERTAIN

1 2 3 4 5 6 7 8 9 10

*If you answered NO to question 14, skip to question 16;
**if you answered YES, please skip to question 17, page 7.

15. Would you enroll your streamside land in Oregon's Conservation Reserve Enhancement Program if the total annual rental rate (including the fixed rental rate, the 35% riparian buffer practice incentive and the maintenance payment) were \$125 per acre for dry land? *(Please circle your answer.)*

- 1 YES**
2 NO*

15A. On a scale from 1 to 10, 1 being **very uncertain** and 10 being **very certain**, how certain are you of your response to question 15? *(Please circle your response below.)*

VERY
UNCERTAIN

VERY
CERTAIN

1 2 3 4 5 6 7 8 9 10

*If you answered NO to question 15, please answer question 16,
**if you answered YES, please skip to question 18, page 8.

16. If you would not consider enrolling in Oregon's CREP, please indicate how strongly you agree or disagree with each of the following reasons why NOT. (Please circle a response for each reason provided.)

SA = STRONGLY AGREE, A = AGREE, N = NEUTRAL, D = DISAGREE,
SD = STRONGLY DISAGREE

	SA	A	N	D	SD
a. The rental rate provided above is insufficient	1	2	3	4	5
b. It would be too expensive and time consuming to establish plants and trees for the practice	1	2	3	4	5
c. It would be too expensive and time consuming to maintain the practices required	1	2	3	4	5
d. Enrollment will reduce my flexibility to change land uses as economic conditions warrant	1	2	3	4	5
e. Enrollment of the riparian land will interfere with activities on the remaining portions of my property .	1	2	3	4	5
f. Riparian land is too productive as cropland or grazing land to convert to a "no use" conservation practice .	1	2	3	4	5
g. I am concerned about the restrictions that may be placed on my land at the end of the contract period	1	2	3	4	5
h. I do not want to enter into a contractual arrangement with the federal government	1	2	3	4	5
i. I do not want to enter into a contractual arrangement with the state government	1	2	3	4	5
j. Opinions of neighboring land-owners prevents me from considering enrollment	1	2	3	4	5
k. I believe that riparian areas can be restored with proper management	1	2	3	4	5
l. Other _____	1	2	3	4	5

SKIP NOW TO QUESTION 19, PAGE 8.

17. In recognition that irrigated land has a higher economic value than non-irrigated land, an increase in the rental payment will be offered under Oregon's CREP. In return, the State is requiring that the portion of the existing water right appurtenant to the enrolled acreage be leased for in-stream flow, pursuant to the laws of the State of Oregon for the duration of the contract. This is a **temporary** transfer and will not alter the priority date of the original water right. By accepting the fixed dry land CRP rental rate, a landowner may choose to forego the State water right dedication.

Assume that you participate in Oregon's CREP, would you consider leasing the appurtenant portion of your water right to the Oregon Water Resources Department for in-stream flow?
(Please circle response.)

- 1 YES (SKIP TO QUESTION 18)
2 NO



17A. Please indicate to what extent you agree or disagree with the following statements. SA = STRONGLY AGREE, A = AGREE, N = NEUTRAL, D = DISAGREE, SD = STRONGLY DISAGREE (Please circle one answer for each of the following statements.)

	<u>SA</u>	<u>A</u>	<u>N</u>	<u>D</u>	<u>SD</u>
a. I would prefer to enter into an in-stream flow agreement with an alternative water leasing organization	1	2	3	4	5
b. Water is a valuable commodity and I will not consider leasing it for in-stream purposes.....	1	2	3	4	5
c. Pressures from neighboring landowners will keep me from entering into any in-stream flow agreement	1	2	3	4	5
d. Concerns regarding future alteration of my existing water right will keep me from participating in a lease agreement	1	2	3	4	5
e. Other (please specify) _____	1	2	3	4	5

18. In order to concentrate riparian restoration practices along contiguous stream stretches, Oregon's Conservation Reserve Enhancement Program is offering landowners a bonus for acting in cooperation with one another. Under Oregon's CREP, the U.S. Department of Agriculture will make a one-time payment to all enrollees at the outset of a contract when at least 50% of the stream bank within a 5 mile stream segment is enrolled in the program.

Would you work with your neighbors to encourage participation in Oregon's CREP in order to achieve this 5 mile target level if the one-time payment were \$345 per enrolled acre?

- 1 YES
- 2 NO (Please explain why not.)

18A. On a scale from 1 to 10, 1 being **very uncertain** and 10 being **very certain**, how certain are you of your response to question 18? *(Please circle your response below.)*

VERY
UNCERTAIN

VERY
CERTAIN

1 2 3 4 5 6 7 8 9 10

A LITTLE BIT ABOUT YOU

19. What is your age?

_____ YEARS

20. Please indicate the highest level of education you achieved. *(Please circle response.)*

- 1 HIGH SCHOOL OR LESS
- 2 SOME COLLEGE, BUSINESS SCHOOL OR VOCATIONAL TRAINING
- 3 COMPLETED BACHELORS DEGREE
- 4 SOME GRADUATE OR PROFESSIONAL SCHOOL TRAINING
- 5 COMPLETED GRADUATE OR PROFESSIONAL DEGREE
- 6 OTHER _____.

21. How many years have you actively farmed or ranched?

_____ YEARS

22. Are you retired from farming or ranching?

1 YES

2 NO



22A. Do you plan to retire from farming or ranching within: *(Please circle response.)*

1 0 TO 5 YEARS

2 6 TO 10 YEARS

3 11 TO 15 YEARS

4 16 OR MORE YEARS

23. Have you ever participated in any U.S. Department of Agriculture program (i.e., CRP, Environmental Quality Incentives Program, Commodity Support Program, etc.)?

1 YES

2 NO

24. In 1997, what was your approximate total sales of agricultural products? *(Please circle response.)*

1 LESS THAN \$10,000

2 \$10,000 - \$49,999

3 \$50,000 - \$99,999

4 \$100,000 - \$499,999

5 \$500,000 OR MORE

25. What percentage of your total family income in 1997 came from farm and non-farm sources? *(Please estimate the percentage in each category; the percentages should add up to 100.)*

a. From farm sources	_____	%
b. From non-farm sources	_____	%
	100	%

26. Please indicate how important each of the following aspects are to your potential participation in a conservation program that provides for implementation of buffer strips, filter strips or wetland restoration practices. VI = VERY IMPORTANT, SI = SOMEWHAT IMPORTANT, N = NEUTRAL, NT = NOT TOO IMPORTANT, NI = NOT IMPORTANT

	<u>VI</u>	<u>SI</u>	<u>N</u>	<u>NT</u>	<u>NI</u>
a. The cost-share available	1	2	3	4	5
b. The technical assistance available through various resource agencies ...	1	2	3	4	5
c. Ability to meet Agricultural Water Quality Management Area Plans for riparian lands as described under SB 1010	1	2	3	4	5
d. Compliance with current or future land use regulations	1	2	3	4	5
e. Erosion control possibilities	1	2	3	4	5
f. Time required for the application process	1	2	3	4	5
g. Possible loss of moisture to adjacent agricultural fields	1	2	3	4	5
h. Acceptance by neighboring land owners	1	2	3	4	5
i. Required interaction with a state or federal agency	1	2	3	4	5
j. Reduced flexibility of future land use	1	2	3	4	5
k. Reduced economic return from the land	1	2	3	4	5
l. Other _____	1	2	3	4	5

THANK YOU FOR YOUR COOPERATION. PLEASE COMPLETE AND RETURN THIS SURVEY IN THE RETURN ENVELOPE PROVIDED WITHIN ONE WEEK.

USE THE OTHER SIDE OF THIS PAGE TO INCLUDE ADDITIONAL COMMENTS OR SUGGESTIONS REGARDING OREGON'S CONSERVATION RESERVE ENHANCEMENT PROGRAM. YOUR CANDID THOUGHTS AND SUGGESTIONS ARE APPRECIATED.

FOR QUESTIONS CONTACT: LEIGH KINGSBURY
213 BALLARD EXTENSION HALL
CORVALLIS, OREGON 97331
(541) 737-1446

If you would like a summary of the results obtained from this survey please write your name and address on the back of the return envelope.

Additional information regarding Oregon's Conservation Reserve Enhancement Program can be obtained from your local USDA Service Center, Soil and Water Conservation District, or the Oregon Governor's Watershed Enhancement Board. Information can also be obtained from the FSA web site at <http://www.fsa.usda.gov/dafp/cepd/crpinfo.htm>