

**Independent
Multidisciplinary
Science Team
(IMST)**



State of Oregon

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June 27, 2006

Dr. Ken Diebel
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Dear Dr. Diebel,

At the request of the Oregon Department of Agriculture (ODA) the Independent Multidisciplinary Science Team (IMST) has reviewed the March 1, 2006 draft titled *Agricultural Water Quality Program Monitoring Guidebook: policies, priorities, and methods*. In your April 6, 2006 letter to the IMST, you listed four questions for the IMST to consider during its technical review of the document. In the attached review, the IMST provides answers to these questions as well as general comments on the document and its current limitations.

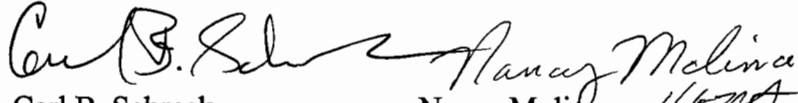
The review also includes a formal recommendation to ODA. As you are aware, Oregon Revised Statute 541.409 requires agencies to respond to recommendations made by the IMST. Responses are generally expected within six months after a recommendation is issued. We are also appending a document (see Attachment 2) that provides information on IMST's process for developing recommendations and for evaluating agency responses. This information may assist ODA staff in the preparation of a response.

The IMST discussed the draft report and its review at three public IMST meetings (April 24, May 25, and June 22, 2006). The final review was adopted with full consensus of the Team at the June 22, 2006 meeting. If you have any questions regarding IMST's procedures for reviews or would like to schedule time at an upcoming meeting to discuss the review, please contact Kathy Maas-Hebner (Kathleen.MaasHebner@oregonstate.edu or 541-737-6105) the IMST's lead administrative and technical assistant.

Please do not hesitate to contact us if we can provide clarification on the review or on the intent of our recommendation or the wording of ODA's response.

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Ken Diebel
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Sincerely,



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Attachments

cc with attachments:

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Frank Shields, Senate Nat. Res. & Alt. Eng. Committee

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IMST

**IMST Review of Oregon Department of Agriculture's
Agricultural Water Quality Program Monitoring Guidebook:
Policies, Priorities, and Methods
(ODA March 1, 2006 draft)**

Introduction

This document constitutes the Independent Multidisciplinary Science Team's (IMST) scientific review of the Oregon Department of Agriculture's (ODA) *Agricultural Water Quality Program Monitoring Guidebook*. In an April 6, 2006 letter from Dr. Ken Diebel, ODA Riparian and Outreach Specialist, the IMST was asked to review the document to help make the ODA monitoring strategy as scientifically sound and complete as necessary. ODA posed the following four questions for the IMST to consider:

1. Are we asking the right kinds of monitoring questions? Are there other questions we should be asking?
2. Are we correct to focus on riparian conditions? We think riparian vegetation can address water quality issues such as temperature, sediment, dissolved oxygen and pH, and with limited monitoring resources, riparian conditions should be our highest priority for monitoring.
3. Are we using the most appropriate tools?
4. How can we make our strategy more complete? What kinds of things are we missing?

The IMST understands that the document represents the early stages of development of an ODA monitoring program and that the document will evolve as more details become available. The present draft is not yet at the stage where it can be fine-tuned and so our comments are restricted to more generalities. This review first discusses the IMST's general comments on the organization and limitations of the guidebook; key monitoring principles for ODA to consider; answers to the four questions listed above; and finally a formal recommendation to ODA regarding revision of the document.

The document reviewed by the IMST has three major limitations. First, the intent of the publication is poorly defined. The title suggests that the document is a *water quality monitoring guidebook*, it is described as a *handbook* in the Introduction (p. 3), but becomes a detailed *technical guide* for assessing riparian condition in section 6 (p. 23–38). These transitions leave the reader uncertain about the intent of the document. Second, the use of the document by various audiences is not clear. The Introduction indicates that the document “is primarily intended for staff, but will also be useful to Soil and Water Conservation Districts (SWCDs), other Area Plan implementation partners, and agencies wishing to better understand the Agricultural Water Quality Program's monitoring efforts”, but it is not clear how these different audiences will use the document. The reader is left with the impression that some audiences (other agencies?) will use the document as a source of general information about the ODA Agricultural Water Quality Program while ODA staff and Area Plan implementation partners will use it as a technical guide for monitoring. Unfortunately, the document does not fulfill either need very well because it is a blend of the two intents. Finally, with the exception of riparian condition assessment, the monitoring activities and protocols are described in such general terms

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that they are of limited value to ODA staff, SWCDs, or cooperating state agencies in terms of detail expected from a “guidebook”.

The following paragraphs address these limitations in more detail and provide suggestions for improvement.

General Comments on Organization and Limitations

The ODA document appears to have been written to serve a number of different purposes, none of which are stated explicitly. The title *Agricultural Water Quality Program Monitoring Guidebook* suggests that the document provides guidance for monitoring the quality of water passing through agricultural lands. However, nowhere in the document are guidelines provided for monitoring water quality. The only guidelines provided are for monitoring riparian condition, an assessment intended to be used as a surrogate for water quality measurements. Based on the information presented, one can infer that the primary purpose of the document is to describe the limited monitoring programs planned under ODA’s Agricultural Water Quality Program. Other purposes may also include: 1) description of ODA’s Agricultural Water Quality Program, 2) justification of ODA’s focus on riparian condition, 3) compilation of ODA’s monitoring questions, 4) definition of Baseline, Trend, Effectiveness, and Implementation monitoring, 5) description of the process of monitoring plan development, and 6) instruction on how to assess riparian condition.

Splitting the document into two or more publications, choosing more accurate and descriptive titles, and including specific information needed by different audiences would help address the issues raised above. For example, one publication might be entitled *The ODA Agricultural Water Quality Program* and be intended for a broad audience that includes citizens, legislators, landowners, SWCDs, Watershed Councils, and state agency staff (ODA, Oregon Department of Environmental Quality (DEQ), etc.). This publication would address items #1–3 above and should include lead sections on Policy and Scope which explain the role ODA plays in the water quality arena, as mandated by Senate Bill 1010. This document would also contrast and explain the role that various state agencies (ODA, DEQ, Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Forestry, etc.) play in water quality monitoring. Given the different responsibilities of state agencies, it is important to explain ODA’s role and dependence on other state agencies and local cooperators. The introductory information available on the ODA website tends to be either too general (ODA 2006 b, c) or too specific (Oregon Administrative Rules 603-090-0000 through 603-090-0120) and does not adequately describe ODA’s role and relationship to other agencies. The recently completed Agricultural Water Quality Management Plans and Rules (ODA 2006a), however, are generally well written and provide detailed information for each of the 39 Agricultural Water Quality Management Areas in Oregon. At a minimum, the document describing ODA’s Agricultural Water Quality program should include a map of Oregon showing each of the 39 areas, along with a brief explanation of how ODA implements Area Rules in each management area.

A second publication might cover items # 4 and 5 above and could be entitled *The ODA Agricultural Water Quality Program Monitoring Strategy*. This publication would include an overview of the goals of the water quality program, definitions and examples of monitoring (baseline, trend, effectiveness, and implementation), and a step by step guide to developing a

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monitoring program, perhaps using a decision tree format for each type of monitoring. The publication should include discussions of sampling, data analysis and interpretation for each type of monitoring; topics that are not included in the ODA document under review. The audience for this publication would primarily be ODA and other agency staff charged with developing and implementing the monitoring programs. The monitoring strategies for state agencies such as OWEB (2003), DEQ (2005) and ODFW (2006) are available online and could serve as examples of the kinds of information and level of detail to be included in an ODA monitoring strategy publication.

Detailed protocols for specific types of monitoring could be included in a third publication, or perhaps more appropriately, published as an *ODA Technical Guide Book* series. These publications would include specific instructions for each type of assessment conducted, e.g. the Riparian Monitoring Protocols presented in sections 6.1–6.2 (p. 23–38). In contrast to the detailed protocol for riparian condition assessment, the Aerial Photography Protocol in section 6.3 (p. 39) lacks detail. Insufficient information is provided for the reader to understand how streams and stream segments were selected for aerial photography. Notably absent from the document under review is discussion of how the Aerial Photography monitoring component is related to or reconciled with the Riparian Monitoring component. Similarly, the document lacks information about how the data collected from these two monitoring efforts will be related to water quality measurements made by other agencies such as DEQ and ODFW. Finally, this publication must provide information on how ODA will empirically link status and trends in landscape condition to physical and chemical aquatic habitat, and to aquatic biota, especially if those data are collected by sister agencies.

There is also no reason why all of the publications suggested in the preceding two paragraphs need to be written or published at the same time. It would be easy to turn the present document into the one describing *The ODA Agricultural Water Quality Program*. Then as time allowed, the others could be produced since they will require much more detail and scientific rigor.

Monitoring Principles

To assist the ODA, the IMST identified monitoring principles that ideally should be addressed in developing a monitoring strategy (Peck et al. 2006). Under each monitoring principle in the following list, the IMST provides one or more examples that might be appropriate in *The ODA Agricultural Water Quality Program Monitoring Strategy*, or comparable document. Examples are shown in italics and are not intended to indicate policy or specific management directions.

1. Clearly stated and detailed monitoring objectives and questions

Objective: Assess all agricultural stream riparian zones in Oregon

Question: What percentage of stream length draining Oregon agricultural lands has a healthy riparian buffer?

Question: What is the extent and degree of channel incision of Oregon's agricultural streams?

Question: What percentage of Oregon agricultural stream length meets Oregon water quality criteria?

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2. Clear assessment of the funds and staff available for the monitoring

Example: \$1M per year for 10 years

3. Determine what assemblages and indicators will be assessed

Examples: Riparian plant assemblages; bank quality; water quality

Indicators: percentage alien plant cover and occurrence; percentage bank canopy density; canopy complexity rating; buffer width; frequency of human alterations in the riparian zone; channel incision; total phosphorous; total nitrogen; turbidity; temperature; key biocides

4. Establish target condition, expected trends, and/or intermediate benchmarks

Example: Target vegetation structure and composition

5. Develop a sampling design that will meet the objectives, funding, time line, and indicator limitations

Example of a rigorous design: Probabilistic design using the USGS/USEPA RF3/4 population of digital stream traces with 50 agricultural sites per reporting unit (basin, management area) including intermittent and permanent wadeable and nonwadeable streams with an unequal selection probability to insure all stream sizes are represented. Rotating panel with 5% revisits in index period and years.

6. Determine index period

Example: Summer base flow for permanent streams; winter base flow for intermittent streams

7. Determine data management system

Consider: Data entry and proofing, metadata, short- and long-term data storage and access, ability to merge data sets from multiple sources and formats, data analysis and visual display (e.g., graphs, tables, maps).entry, storage, access and analysis

8. Develop Quality Assurance/Quality Control system

Example: Conduct pilot project or obtain from literature the precision, bias, accuracy, representativeness, comparability, completeness, sensitivity and signal to noise ratio of indicators and data management to be used

9. Develop system for integrating information collected by different agencies (e.g., DEQ or ODFW)

Examples: Establish a joint-agency monitoring taskforce to determine how to best integrate data.

10. Develop reporting system (public, technical)

Examples: Two-page glossy reports; J. Soil Water Conservation articles

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IMST Responses to Questions Posed by ODA (April 6, 2006 letter from Ken Diebel)

Question 1. Are we [ODA] asking the right kinds of monitoring questions? Are there other questions we [ODA] should be asking?

The ultimate question asked in the document under review is “Are agricultural landowners and operators effectively preventing and controlling pollution from agricultural activities?” The ODA addresses this question by asking questions in five categories: 1) area plan and rules effectiveness, 2) best management practices (BMP) effectiveness, 3) outreach effectiveness, 4) agricultural land conditions, and 5) water quality trends, with three or four sub-questions within each category. Not all questions are currently being addressed because the ODA monitoring program is still under development. The IMST concludes that the questions and sub-questions posed are good ones. The IMST encourages the ODA to prioritize the questions with respect to the ultimate question being asked, as noted above. Also, questions could be stated more specifically to reflect the hypotheses being tested or the management practice being evaluated. Stating the questions as specifically as possible encourages in-depth thought about sampling strategy, appropriate tools and data management, all within the constraints of limited fiscal and personnel resources.

Question 2. Are we [ODA] correct to focus on riparian conditions? We [ODA] think riparian vegetation can address water quality issues such as temperature, sediment, dissolved oxygen and pH, and with limited monitoring resources, riparian conditions should be our highest priority for monitoring.

The IMST is unable to answer this question in the affirmative without further justification and convincing evidence that assessing riparian vegetation alone can address water quality issues such as temperature, sediment, dissolved oxygen, pH, and nutrient and biocide concentrations. Focusing on landscape condition clearly has merit because management practices employed by farmers and ranchers can affect riparian condition and water quality. However, one cannot infer water quality status from knowledge of riparian condition alone. The ODA position of assessing riparian condition is unlikely to be totally defensible unless (1) water quality parameters are also measured, either by ODA or by another state agency whose measurements are coordinated with ODA’s riparian condition assessment or (2) a thorough correlational study is done that indicates that riparian condition is a valid surrogate for direct water quality measurement.

Question 3. Are we [ODA] using the most appropriate tools?

The IMST was unable to answer this question largely because of the lack of detail provided in the document reviewed. Notably absent was information on sampling strategy and design; controls or reference sites; quality assurance/quality control; data storage, analysis and interpretation; coordination among state agencies; etc. Even when detailed riparian monitoring protocols were provided, there was no comparison with or discussion of other techniques for assessing riparian condition.

Question 4. How can we [ODA] make our strategy more complete? What kinds of things are we [ODA] missing?

The ODA monitoring strategy can be made more complete by 1) clearly describing the characteristics, goals and limitations of the ODA Water Quality Monitoring Program and its

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relationship to other state agency programs, 2) developing a detailed Monitoring Program Strategy, and 3) developing and/or adopting detailed monitoring protocols for each type of assessment employed, and 4) coordinating data collection and monitoring efforts with those of other agencies and cooperators.

IMST Recommendation (see Attachment 2)

Recommendation 1. The IMST recommends that the Oregon Department of Agriculture's Agricultural Water Quality Program Monitoring Guidebook be revised to address the shortcomings identified in this review.

The IMST would be happy to assist ODA in developing the necessary scientific underpinnings for its monitoring program.

References

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Independent Multidisciplinary Science Team (IMST) Recommendation preamble for use with reports and correspondence Adopted by the IMST on January 25, 2006

The IMST creates several types of reports¹. The largest reports are created in response to the IMST's continuing evaluation of the State's science needs necessary to pursue the mission and goals of the Oregon Plan for Salmon and Watersheds (Oregon Plan). These reports are generally topic-oriented and often called "landscape-level reports". An example of this type of report is Technical Report 2002-1, *Recovery of Wild Salmonids in Western Oregon Lowlands*. The landscape-level reports present IMST's independent evaluation of the state of the science regarding the resources being considered and support the evaluations with a comprehensive scientific literature review. These reports also receive extensive peer and technical review².

A second type of report the IMST generates is in response to specific requests by the Governor's Office, Legislature, state agency, or other entity to either provide guidance or to review draft reports or proposals involving topics related to the Oregon Plan. An example of this type of report is our 2005 evaluation of the State of Oregon's draft *Viability Criteria and Status Assessment of Oregon Coastal Coho*, the draft *Policy to Evaluate Conservation Efforts (PECE) analysis*, and the draft *Synthesis of Viability Analysis and Evaluation of Conservation Efforts*. A third type of report is called a "letter report" that may be prepared in response to specific questions, such as IMST's 2002 report addressing issues related to instream aggregate (gravel and sand) mining regulated by the Oregon Division of State Lands and how operations may affect salmonid habitat.

In the second and third types of reports, the IMST is often asked whether the scientific approach, analyses, and/or interpretations are credible and consistent with accepted scientific standards, and whether the assumptions and uncertainties are reasonable and accurately characterized. In both of these two types of reports, the IMST generally evaluates the scientific literature being used to support the agency's or State of Oregon's draft report or proposed actions, rather than produce a comprehensive review of available scientific literature.

Depending on the nature of the report being generated (more commonly contained in the landscape-level reports), the IMST may develop a series of scientific questions and answers that help to organize the report and to aid a reader's understanding of the topic. The scientific questions are created by the IMST and are judged to be relevant and useful to understanding the issues, resources or subjects being analyzed. In general, IMST develops and answers each science question, then summarizes its findings and conclusions for each question. Next, the IMST develops recommendations from specific findings and conclusions or from a synthesis of several findings and conclusions. The recommendations are often grouped into broad subject

¹ All three types of reports are an undertaking of the entire Team, although subcommittees are often assigned leading responsibilities; subcommittee composition is based on Team member expertise and interest with topic areas. Minority opinions may be appended or incorporated within any IMST report.

² Although technical reports may be subject to technical and peer review, release of draft documents is restricted by the IMST in order to insure accuracy of content prior to release to a wider audience. IMST's policy is stated in the Team's Charter and Operating Guidelines: <http://www.fsl.orst.edu/imst/charter.pdf>

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areas for convenience and the order does not imply priority. The IMST considers each recommendation important to accomplishing the mission and goals of the Oregon Plan.

Recommendations are based on IMST's assessment of the best available science pertaining to salmonid recovery, watershed function and the management of Oregon's natural resources. Recommendations are directed to one or more agencies (or entities) that have the ability to implement, or alter management actions or regulations that are needed for implementation. **The IMST emphasizes that it looks beyond the State's current ability to implement the recommendations because current legal, regulatory, or funding situations may need to be modified over time.** The IMST believes that if an agency (or entity) agrees that a recommendation is technically sound and would aid the recovery of salmonid stocks and watersheds, the agency (or entity) would then determine what impediments might exist to prevent or delay implementation and work toward eliminating those impediments. The IMST also assumes that each agency (or entity) has the knowledge and expertise to determine how best to identify and eliminate impediments to implementation and to determine appropriate time frames and goals needed to meet the intent of the recommendation. The IMST also recognizes that an agency (or entity) may already have ongoing activities that address a particular recommendation; therefore, inclusion of such an "overlapping" recommendation should be seen as reinforcement for the continuation of such actions.

Formal Responses to Recommendations

Oregon Revised Statute (ORS) 541.409, which created the IMST, specifies that agencies are to respond to the recommendations of the IMST, stating "(3) If the Independent Multidisciplinary Science Team submits suggestions to an agency responsible for implementing a portion of the Oregon Plan, the agency shall respond to the Team explaining how the agency intends to implement the suggestion or why the agency does not intend to implement the suggestion". State agencies are expected to formerly respond to IMST recommendations within six months after a report is issued.

Once formal responses are received, the IMST reviews the scientific adequacy of each response and determines if further action or consideration by the agency (or entity) is warranted. Ultimately, each recommendation response is assigned to one of four general categories:

- **Adequate** means that the IMST supports the decision of the agency
- **Intermediate** means that the IMST does not fully support the agency decision because the decision will decrease the likelihood of accomplishing the goals of the Oregon Plan in a timely manner, but not doom it to failure. IMST notes its concerns but stops short of suggesting that the recommendation be reconsidered.
- **Inadequate** means that the IMST feels the decision by the agency will seriously detract from achieving the goals of the Oregon Plan, and the IMST strongly suggests that the decision be reconsidered.
- **Indeterminate** means that IMST cannot tell what the agency decided to do with the recommendation, or lacks sufficient information to fully evaluate the response.

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IMST believes that the key characteristics of a good response are:

- It includes a short, clear statement that the agency (or entity) (a) accepts or agrees with the recommendation or (b) that it rejects or disagrees with it. In some cases, an agency (or entity) may be reluctant to agree or accept a recommendation because it sees significant difficulties in implementing it. However IMST believes if the recommendation is sound, then the agency (or entity) should work towards eliminating the impediments to implementation that it sees.
- It provides short, clear descriptions of what the agency (or entity) intends to do to implement recommendations it accepts (including how it might remove impediments) or, as required by ORS 541.409, that it provides specific reasons why it rejects the recommendations. Discussion between agency or legislative staff and Team members at IMST meetings should also help clarify agency (or entity) and IMST perspectives, and most importantly, advance the mission and goals of the Oregon Plan.

Responses that include these characteristics will be more easily characterized by IMST as *Adequate*, *Intermediate* or *Inadequate*, avoiding the use of *Indeterminate*.

The IMST evaluations of the responses are then delivered to each responding state agency (or entity) and the agency (or entity) has an opportunity to discuss the IMST evaluations of their responses. Agencies (or entities) are also encouraged to update the IMST their progress on implementing recommendations.

Finally, IMST includes any formal responses to recommendations and IMST's evaluation of the responses in its reports to the Governor and the State Legislature (e.g., Joint Committee on Salmon and Stream Enhancement or other natural resource committees as appropriate).