STATE OF WASHINGTON

INDEPENDENT SCIENCE PANEL

PO Box 43135
Olympia, Washington 98504-3135
(360) 902-2216 FAX (360) 902-2215

Kenneth P. Currens, PhD
Hiram W. Li, PhD
John D. McIntyre, PhD
Walter F. Megahan, PhD
Dudley W. Reiser, PhD

July 17, 2002

TO: William Ruckelshaus, Chair
Monitoring Oversight Committee

FROM: Kenneth Currens, Chair

SUBJECT: Comments on the Comprehensive Monitoring Strategy Draft Summary (6/20/02) and Matrices

Thank you for the opportunity to review the Comprehensive Monitoring Strategy Draft Summary (June 20, 2002 version), Draft Action Plan Matrix (June 24, 2002), and Draft Current Watershed Health and Salmon Monitoring Matrix (June 24, 2002). These documents provide a great deal of useful information on potential uses, priorities, and technical approaches to monitoring watershed health and salmon recovery in Washington. The Independent Science Panel (ISP) is especially pleased with the focus that the technical workgroups have initiated on technical issues of sampling design and statistical power.

As we have in the past, we reviewed the documents with an emphasis on completeness, clarity, approach to uncertainty, and logical consistency. The summary provided us with ample opportunity to critique technical aspects of the monitoring design, choice of indicators, and associated statistical analyses. We have a general observation and recommendation about the presentation of these, but rather than an overloading this memorandum with these technical criticisms, we have chosen to focus on the important components of a monitoring strategy that remain missing or undeveloped.

Further Internal Technical Review and Revision

In science, review and revision of draft products are critical steps to progressing successfully. Although we suspect internal review has already occurred, we strongly recommend a further careful technical review and revision of each of these chapters before releasing the document for public review. Although each of the chapters showed evidence of considerable technical work, in general, we found the technical presentations inconsistent, incomplete, and sometimes contradictory. Some issues could probably be addressed by a technical editor, whereas others are matters requiring involvement by appropriate technical resource staff. For example, many of the chapters developed an aspect of monitoring (e.g., status and trend) while ignoring other aspects that should have also been included (e.g., validation monitoring). In some cases, the main monitoring question suggested to us an emphasis on a particular kind of monitoring, such as effectiveness or validation monitoring, but the chapter emphasized implementation monitoring. In other cases, the indicators listed were not consistent with the methods of analyses that were

suggested. These are not fatal flaws, but we would find them unfortunate and embarrassing if we were presenting this work as an example of the Monitoring Oversight Committee's (MOC) best scientific efforts. We expect that this is not representative of the quality of technical expertise afforded by the organizations represented by the MOC. It appeared to us, rather, that many of the chapters have not benefited from the kind of thorough internal technical review that organizations supporting the MOC can provide.

Adaptive Management

In our opinion the Draft Summary and Action Plan reflect an emphasis on data collection and distribution and leaves the steps that involve data analysis, interpretation, incorporation into decision-making, and adaptive management inadequately developed. These should be developed also. Without a clear understanding or path for incorporating these elements, monitoring will not be effective and decision makers will be less able to manage effectively.

Monitoring is an essential tool for making natural resource decisions by reducing uncertainty and providing accountability (ISP Report 2000-2[1]). Adaptive management is the framework that provides a direct feedback loop between the scientific findings from monitoring and management or policy decisions (ISP Technical Memorandum 2000-1[2]). We have consistently emphasized that for a scientifically credible monitoring program to work in an adaptive management context, eight key characteristics, including: (1) goals and objectives, (2) appropriate statistical designs, (3) appropriate indicators, (4) standardized monitoring protocols, (5) quality control and assurance, (6) access to data, (7) stable funding, and (8) integration into decision making. Each of these has critical roles in the different steps of adaptive management (Figure 1) and in ensuring sustainable fish populations and watershed health.

As Figure 1 indicates, we recognize that issues such as how monitoring information is interpreted, integrated in decision making, and used to identify important issues for continued monitoring involves both policy and technical issues. We do not believe that the strategy we reviewed has dealt effectively with these issues. The draft summary, for example, does not yet include any description of adaptive management, although in our view this is the key reason for monitoring. Unless these are addressed, the overall effectiveness and utility of monitoring will be seriously handicapped.

Interpretation of monitoring analyses is a key issue in how useful the information is for decision makers. This has two aspects. First is the balance between implementation, trend, effectiveness, and validation monitoring. Each of these focuses on a different part of what is needed to know whether management decisions are appropriate. Monitoring strategies that greatly emphasize one type of monitoring without the support of the others will ultimately handicap interpretation of the analytical results and decision-making. As indicated earlier, the balance between these types of monitoring shifts from chapter to chapter and reasons are not obvious.

A second important element of interpretation that remains undeveloped is the strategy for integrating monitoring information across "H"s. Many of the policy decisions that monitoring could affect will involve consideration of multiple "H"s. The monitoring strategy needs to consider how data and analyses can be combined across "H"s. This is also another reason for considering the balance between types of monitoring for an "H." Qualitative data from

[1] ISP Report 2000-2. Recommendations for monitoring salmon recovery in Washington State.
[2] ISP Technical Memorandum 2000-1. Preliminary review of issues regarding development of a statewide salmonid recovery monitoring program.

implementation monitoring on one "H" may be difficult to integrate with trend or effectiveness data on another.

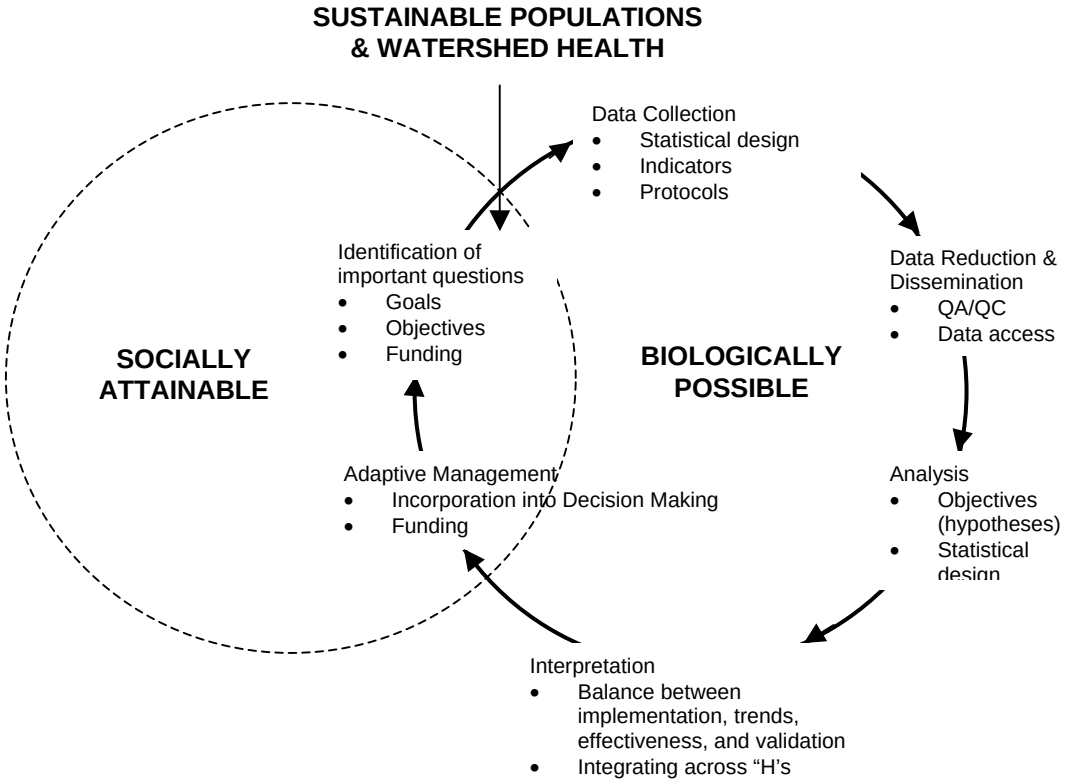

Figure 1. Relationship between eight key elements of monitoring, the cycle of adaptive management, and the intersection of what the socially attainable (policy) and biologically possible (science). Evaluating sustainability is possible only by knowing what is biologically possible and socially attainable.

Another aspect of this policy-technical interface that needs improvement is the framework for prioritization of monitoring questions. Ideally, these should be based on a clear set of policy and scientific criteria to avoid starting, changing, or stopping monitoring programs depending on the urgency of the issue of the moment. We could not identify what criteria or rationale were used to prioritize recommended items in the draft Summary and Action Plan Matrix, which might lead readers to wonder, for example, why monitoring fish passage barriers is so much more important than monitoring agricultural effects on watershed health and salmon recovery.

Monitoring Types

As we mentioned above, the balance between monitoring types is important. Status and trend monitoring appears to predominate the material we reviewed, and the rationale for this was unclear. Importantly, we found relatively little attention to validation (cause-and-effect) monitoring. This kind of monitoring is fundamental to being able to answer important questions such as "What works; what doesn't work?" As evidence of our continuing concern about this

topic we are today releasing an ISP Technical Memorandum[3] that you may find of interest. In that memorandum, we review the work of Dr. Peter Bailey of Oregon State University, whom the ISP asked to help evaluate the empirical evidence of expectations that changes in fish habitat can benefit salmon recovery. The results of Dr. Bailey's evaluation are striking. Long-term studies that could detect cause and effect relationships between habitat changes and fish populations are less and less common. Cause-and-effect studies of fish responses to habitat changes (validation monitoring) showed that density of fish can change in areas with habitat improvements but they do not show improvements in overall juvenile or adult abundance, in part because of limitations in design and analyses. Implementation or trend monitoring alone will never adequately answer this question, although it is critically important.

Conclusion

In conclusion, we acknowledge the technical work the monitoring work teams have done regarding sampling design and statistical issues of power. This represents an important improvement on many current efforts, which were begun without this level of statistical consideration. We are disappointed, however, in the presentation of the technical monitoring details, which need to benefit from a thorough internal review. We are also disappointed in the lack of attention to how monitoring will be used as part of adaptive management. Both biological and political uncertainties limit our ability to be confident about all our efforts to restore salmon populations and protect watershed health. Consequently, a disciplined, adaptive problem solving approach is essential, if we are to be efficient and effective. We note that we identified the lack of progress on this and other parts of the monitoring strategy (e.g., adaptive management, prioritization, monitoring types, goals and objectives) in our previous memoranda to the MOC. We hope that this deficiency can be corrected so that monitoring efforts are as effective as possible.

[3] ISP Technical Memorandum 2002-2. Responses of salmon and trout to habitat changes.