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FOR DISCUSSION ONLY

Proposed policy or guidance on the creation and use of the "Best Available Science"

Draft 3.8.23

Purpose

Ensure that the best available science is provided to inform decision-critical questions throughout Commission decision making.

Background

The development of Department policy and natural resource decisions always involves a variety of sources of information and values. However, this document focuses on how science can and should inform policy development and decision-making in the Department. The informing of decision makers through an iterative science-policy interface is defined as social processes among scientists, policy makers, and other actors, which allows for exchanges, co-evolution, and joint construction of knowledge with the aim of improving decision-making (van den Hove, 2007).

Science is the cornerstone of natural resource management. That is, reliable, salient science provides a foundation for sound, effective decision-making. But scientific investigation of a particular topic also can take years, decades, or longer to approach certainty. In addition, scientific studies on a single topic can vary in their methods, focus, application, breadth, reliability, and conclusions.

For those reasons, Federal and State laws often require the use of the best available science (BAS; see WAC Chapter 365-195-905). Such science is deemed "best" in the sense that it provides the most reliable and useful information needed for decision-making. The term "available" indicates that decision-makers are seeking to be informed by science that exists at the time of decision-making. BAS is not an infallible standard; rather, it is the best approximation of *reliable science knowledge* that informs crafting and implementing policy and management. However, the goal of using BAS is to ensure that every possible step is taken to ensure that reliable knowledge is generated and used in making decisions.

Policy and Criteria

1. The Department shall use Best Available Science in decision making.
    a. Given the breadth of information involved in any decision, Commissioners shall identify information necessary to their decision making (decision-critical information).

       Generating and using BAS is a primary policy of the Washington Department of Fish and Wildlife (WDFW). Criteria for determining BAS and their application to various types of data or information sources are described (Table 1). Implementation processes will be developed by the staff.

       The following criteria and applications, adapted from WAC 365-195-905 *Criteria for determining which information is the "best available science" for implementation of the Growth Management Act*, are broadly applicable to the work of the WDFW.

    b. Common types of scientific information: Scientific information is generally produced through a valid scientific process, whether it involves observation, analysis, or experimentation. The characteristics generally expected in a valid scientific process include the following:
        i. <u>Peer review</u>. The information has been critically reviewed by other persons who are qualified scientific experts in that scientific discipline. The criticism of the peer reviewers has been addressed by the proponents of the information. Publication in a refereed scientific journal usually indicates that the information has been

appropriately peer-reviewed. However, peer-review is appropriate for in-house publications or reports, as deemed appropriate for the topic. Peer-review may not be appropriate for all types of information.

ii. Methods. The methods that were used to obtain the information are clearly stated, standardized in the pertinent scientific discipline, and have been appropriately peer-reviewed to assure their reliability and validity. Ideally, the methods can be replicated, but that may not always be the case when they involve or pertain to highly dynamic or random processes or environments (e.g., varying habitat conditions).

iii. Logical conclusions and reasonable inferences. The conclusions presented are based on reasonable assumptions supported by other studies and consistent with the general theory underlying the assumptions. The conclusions are supported by the data presented. Any gaps in information and inconsistencies with other pertinent scientific hypotheses and information are adequately explained.

iv. Quantitative analysis. The data have been analyzed using appropriate statistical or quantitative methods and are either fully referenced or explained. (need to consider how qualitative information is incorporated as that is a mainstay of the social science disciplines.)

v. Context. The information is placed in proper context. The assumptions, analytical techniques, data, and conclusions are appropriately framed with respect to the prevailing body of pertinent scientific knowledge. That does not mean that such information must agree with the prevailing body of pertinent scientific knowledge.

vi. References. The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature and other pertinent existing information.

c. In presentations to FW Commission, staff will identify sources of decision-critical scientific information (Table 1).

d. **Common sources of non-scientific information:** Many sources of information are not considered “scientific” because they lack the necessary characteristics for scientific validity and reliability. Information from these sources may supplement, but not substitute for scientific information. Common sources of nonscientific information include the following:

i. Anecdotal information. One or more observations which are not part of an organized scientific effort (e.g., "I saw a grizzly bear in that area while I was hiking").

ii. Nonexpert opinion. Opinion of a person who is not a qualified scientific expert in a pertinent scientific discipline (e.g., "I do not believe there are grizzly bears in that area").

iii. Hearsay. Information repeated from communication with others (e.g., "At a lecture last week, Dr. Smith said there were no grizzly bears in that area").

Table 1	CHARACTERISTICS					
SOURCES OF SCIENTIFIC INFORMATION	Peer review	Methods	Logical conclusions & reasonable inferences	Quantitative analysis	Context	References
A. Research. Research data collected and analyzed as part of a controlled experiment (or other appropriate methodology) to test a specific hypothesis.	X	X	X	X	X	X
B. Monitoring. Monitoring data collected periodically over time to determine a resource trend or evaluate a management program.		X	X	X	X	X
C. Inventory. Inventory data collected from an entire population or population segment (e.g., individuals in a plant or animal species) or an entire ecosystem or ecosystem segment (e.g., the species in a particular wetland).		X	X	X	X	X
D. Survey. Survey data collected from a statistical sample from a population or ecosystem.		X	X	X	X	X
E. Modeling. Mathematical or symbolic simulation or representation of a natural system. Models generally are used to understand and explain occurrences that cannot be directly observed.	X	X	X	X	X	X
F. Assessment. Inspection and evaluation of site-specific information by a qualified scientific expert. An assessment may or may not involve collection of new data.		X	X		X	X
G. Synthesis. A comprehensive review and explanation of pertinent literature and other relevant existing knowledge by a qualified scientific expert.	X	X	X		X	X
H. Expert Opinion. Statement of a qualified scientific expert based on his or her best professional judgment and experience in the pertinent scientific discipline. The opinion may or may not be based on site-specific information.			X		X	X

X = characteristic must be present for information derived to be considered scientifically valid and reliable

2. **Science-Policy Interface**: The Department actively supports a robust interface between science and policy. As such, the Commission recognizes the critical role of scientists as distinct and critical while also acknowledging their own role as policy makers. As such the FW Commission will support best practices to ensure a robust science – policy interface:

    a) **Invest time in identifying science questions essential to decision making.** Understanding decision makers' need for specific scientific information has been described as "Decision Critical Science". Part of policy makers responsibility in the SPI is to identify the science questions that are most salient to their decision making and then request that information from scientists

b) **Engage scientists early in the process.** Decision makers should consult with scientists well in advance of imminent policy decision points and request information from scientists with reasonable timelines

c) **Be clear in how you apply science.** Commissioners need to be explicit in how scientific information, including social sciences, is used in conjunction with tribal and treaty rights, economic, cultural, and other types of information (e.g., personal values) in their decision-making. Commissioners have broad purview in the information they use to make decisions and should avoid using scientific uncertainty or a subset of selective scientific information as a proxy for their values.

d) **Consider the relative costs of gaining more information and delaying action.** Uncertainty is inherent in decision-making and scientific uncertainty can often be reduced through additional research. In discussion with scientists, Commissioners should weigh the need for greater scientific certainty against the costs (in time, money, and management outcome [e.g., wildlife population declines, extinction etc.])) of reducing uncertainty.

e) **Collaborate with scientists in the presentation of information.** Commissioners should work through the Committee process and with Department staff (in small groups) prior to public presentation to ensure that information is answering their questions in an unbiased manner. Agency scientists may be reluctant to challenge decision makers' scientific conclusions even if they are misguided for a host of reasons, including the power differential. This reluctance can lead to agency scientists underrepresenting the breadth and depth of their knowledge, particularly in public forums.

Literature Cited

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