Lessons of adaptive management:
Perspective of the Northwest Power Planning Council

Thank you for that introduction, and for the opportunity to speak here today.

I am intrigued by the topic for this panel because at the Northwest Power Planning Council we have been working for 20 years to address the issue that is at the heart of our discussion – how to best organize to recover salmon and steelhead. I would add -- *and other fish and wildlife* – to salmon and steelhead, as the Council's legal responsibility is to protect, mitigate and enhance all fish and wildlife affected by hydropower dams in the Columbia River Basin, and meeting this mandate and integrating common sense and limited budgets is the essence of our role today.

I'm going to talk about the Council's experiences with adaptive management because adaptive management is at the heart of the Council's efforts regarding energy policy and salmon and steelhead conservation.

And so to begin, let me say that we have confronted and struggled with the issue of how best to organize an adaptive-management response to fish and wildlife problems in the context of a reliable energy supply and recovering the salmon and steelhead runs. The original Council quickly discovered that what is "best scientific knowledge" for one person is "inadequate knowledge" or even "biased knowledge" for another.

Congress assumed the Council would acquire the "best available scientific knowledge" from Indian tribes and state and federal fish and wildlife agencies. But that knowledge has proven to be

disparate, at best, and disputed, at worst. My friend John Volkman, a Portland attorney who previously worked for the National Marine Fisheries Service and before that for the Council, addressed the problems of implementing adaptive management in the Columbia Basin in a book he wrote for the Western Water Policy Review Commission in 1997. I am indebted to John's book as the inspiration for my remarks today.

Very shortly after the Council formed in 1981 and began working on the first fish and wildlife program, it became clear that the "best available scientific knowledge" was elusive. Consider the barrage of scientific information those Council members faced: Hatcheries worked and didn't work; barging juvenile salmon and steelhead downriver worked and didn't work; dams killed fish but it only could be guessed how many; degraded habitat was a problem, but it wasn't clear how serious a problem.

Today our knowledge has improved, but I would not say these issues have been resolved.

Although it is important to point out that salmon and steelhead recovery is not a "hidden secret". We all know that if we don't make the waters "salmon friendly", that is:

- Adequate in-stream flows in tributaries
- Right temperatures
- Toxin free
- Riparian protection

we cannot recover this resource long term, and in many places, we can't achieve the above four goals, hence we must be adaptive where we can.

The concept of adaptive management grew from the Council's frustration with disparate scientific knowledge. In 1984, Kai Lee, a University of Washington professor who was then a member of the Council, concluded our job requires scientific skepticism. He suggested that fish and wildlife recovery should be seen as a series of experiments. Through monitoring and evaluation of these experiments, we would begin to learn what works and what doesn't, and then focus our investments on those experiments, and elements of experiments, that show promise.

In short, we would be learning by doing, and that was the essence of adaptive management during that period.

Volkman writes that the adaptive management model proposed for the Columbia had two new, unique elements. First, computers would be used to model the ecosystem so that a wide range of experiments and experimental designs could be studied and their Columbia River systemwide consequences understood. Second, the subjects for these experiments would be identified in an inclusive process involving a range of parties.

Thus, the Council could proceed in the face of uncertainty, and traditional assumptions about recovery strategies and techniques could be tested.

In theory, it was a promising scheme. In practice, however, it has proven difficult.

Volkman points out six key obstacles confronted by the Council. I would like to discuss those briefly today because, broadly speaking, they are the type of obstacles we all face in trying to implement adaptive management.

First, it has been difficult to agree on a single computer model of the salmon life cycle in the Columbia Basin, even though such a model is necessary to understand salmon recovery efforts in their systemwide context. Over time, various models were developed and tested, and six have risen to prominence. These represent at least three distinct philosophies of modeling, and they are useful to support decision-making in fish and wildlife management.

However, none is complete enough to serve as the sole decision support tool for the region. This continuing lack of data is a problem, and we are working to improve data collection and assembly in the region as we speak. Even so, the models do a good job of ranking the expected benefits of management alternatives, and decision-makers would be well served by drawing on all the available analytical tools.

Second, it is difficult, if not impossible, to manage these problems experimentally, yet that is what adaptive management would have us do. The scientific method would have us limit or withhold variables and then monitor the results. Yet we cannot control natural forces like weather or ocean conditions. One important element of the salmon life cycle, river flows, can be controlled to some degree, but there are political, environmental and economic consequences in doing so.

The debate over the Snake River dams is a good example of this dilemma. Not long ago, one scientist suggested a dam-removal experiment in which the dams would be removed and then replaced in stages – first one dam, then another – in order to observe the response by the fish. That might be a good example, if an extreme one, of applying the scientific method to a difficult problem. But it demonstrates the difficulty of learning about

salmon through adaptive management and defies all common sense concerning the impacts of such an experiment.

Third, adaptive management often leads us to spend money on efforts that might fail. Continued failures, especially expensive ones, could erode political support for fish and wildlife recovery. Adaptive management by definition assumes that you have questions that need answers, and the adaptive management process allows you to construct experiments in the face of that uncertainty. But obviously there is an element of risk.

To help us proceed in the face of uncertainty, which I think is a polite word for ignorance; the Council utilizes two panels of independent scientists. One panel advises the Council and the National Marine Fisheries Service on scientific issues. The other panel is solely focused on reviewing projects proposed for funding through our program, and determining whether the proposals are based on sound scientific principles and have adequate provisions for monitoring and evaluation. In fact, Congress, through the '96 Gorton amendment, directed the Council to create the panel that reviews projects. It is a good way to ensure that we minimize the risk of failure and spend the public's money as carefully as possible.

Fourth, adaptive management unfortunately can be used as an excuse for delay. We at the Council have struggled with this problem. Faced with expensive activities that have promise for helping fish and wildlife, but will upset the status quo, it is easy to say that more information is needed before acting. Boosting river flows and spilling water through dams helps juvenile salmon and steelhead migrate to the ocean, for example, but comes at a cost of lost hydropower. We faced that dilemma this year, in fact, as Bonneville declared a power emergency in the face of the continuing drought and relaxed some of the spill

requirements for Snake and Columbia river dams. We knew, and Bonneville knew, that reserving water in this way for hydropower would have an impact on fish, but it was a necessary decision to ensure a reliable power supply.

Utilities concerned about lost hydropower income might argue that we don't really understand the impacts and benefits of increased flows and spill, and so the issue must be studied further, i.e. delay occurs.

In the same way, some people support the idea of using fish hatcheries to raise smolts for release into streams to rebuild naturally spawning runs, but these hatcheries are opposed by others. To one side, these so-called supplementation hatcheries are critical to rebuilding depleted fish populations, but on the other side there is concern about weakening the genetic stock if the hatchery fish and naturally spawning fish breed.

Everybody in this effort knows that hatchery produced fish not genetically representative of the stream they are introduced into don't regenerate as well as wild native stocks, but we are not, in my view, asking the most important question: WHY?

This year we know that 173,000 adult spring Chinook crossed over Lower Granite Dam, the highest Snake River Dam below Lewiston, Idaho and a large percentage of these were hatchery fish.

To just espouse, "improved ocean conditions" as the answer to this record run is an insult to all of our collective intelligence.

The bigger question to me is, "Why can't we, as a society, create hatchery fish healthy enough and genetically mirroring the wild

stock of a tributary so that they can regenerate naturally at levels equal to wild fish?"

I submit to you that hatchery practices need immediate review and improvement toward this goal. Remember, 173,000 over Lower Granite, but nowhere near that improvement in the Cowlitz, Lewis, Sandy, and other streams below Bonneville. This is where we need to be adaptive in our management.

Should we continue to fund these facilities or not? Consistent with adaptive management, should we continue to study the matter or act in the face of uncertainty? Our response has been to fund the hatcheries as experiments, with careful monitoring and evaluation. In the same fashion, we supported flow increases and water spills to assist fish passage earlier this year, but only to the extent that they did not affect the reliability of the region's power supply. In other words, last summer we advised Bonneville to spill as much water as it could replace with energy imports from outside the Northwest. That seemed to be a reasonable response to a crisis, a reasonable risk to accept, and a response that still provided limited spill benefits to fish, now we must avoid institutionalizing a "no spill" philosophy.

Fifth, adaptive management needs discipline. As the concept developed in the Columbia Basin through the 1980s and into the early 1990s, virtually any experiment or activity that proposed to answer some question about fish and wildlife recovery was funded. By the mid-1990s, it was apparent to us that we did not have enough guidance for decision-making.

An independent scientific review of our program pointed out its primary deficiency: It lacked clear goals and objectives for the Columbia Basin as a whole. In response, we revised the program to include long-term goals, objectives and strategies,

and these now provide the foundation for designing and funding projects. As well, the goals and objectives provide an effective means of measuring the successes – and failures – of the projects we select for the program.

Sixth, adaptive management of the fish and wildlife recovery effort requires a massive amount of coordination, especially in an area the size of the Columbia River Basin. I don't mean just coordination of the recovery planning effort, although that is critically important, but coordination of rivers, dams, habitat and harvest.

Charles Wilkinson and Daniel Conner wrote about this challenge in a law journal article back in 1983. They noted that a hypothetical Lochsa River salmon, spawned in the mountains of central Idaho, will pass through 17 separate management jurisdictions on its return from the ocean, and each one has some authority to allocate salmon harvest. And that is *just* harvest. There are myriad other agencies and authorities that have some impact on fish and wildlife generally and salmon specifically.

In summation, let me respond to the two questions posed to us panelists today – questions about the characteristics and principles of adaptive management successes and failures -- and answer them in the context of the Council's experiences. We learned some important lessons about adaptive management in our 20 years. We learned that the adaptive management efforts work best if they are:

well-informed,

carefully monitored,

adequately funded,

collaboratively developed

and focused on achieving clearly defined goals and objectives.

Adaptive management is continuing to prove useful in the Columbia River Basin, and we are committed to using it to its best advantage. We cannot wait for perfect knowledge before acting. We must act in the face of uncertainty. This isn't just the Council's belief, but it is what the public, whom we serve, expects of us, but it is important to remember, we can only be adaptive if we have something left to be adaptive about. Let's be certain we recover the resource in this whole process of studying our styles of management.

Thank you for the chance to speak here today.