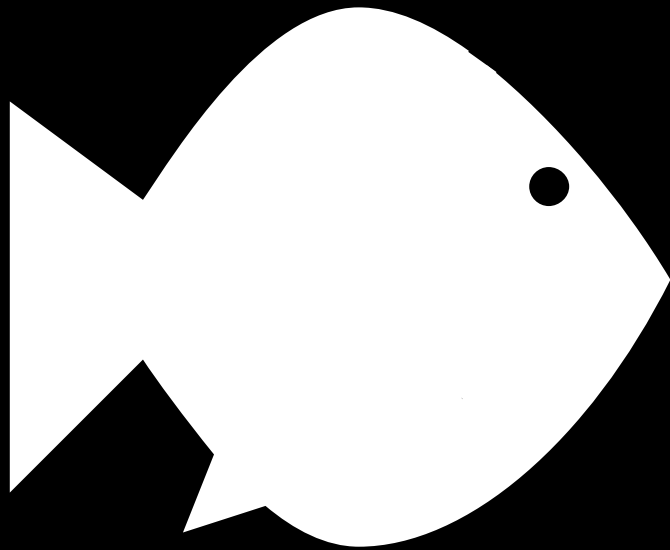


**COMPLEX COURSES FROM
CONFLICT TO ACTION**

A RIPARIAN MANAGEMENT CASE



Courtland L. Smith, Jennifer Gilden, and David Primozich

Complex Courses from Conflict to Action: *A Riparian Management Case*

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Oregon Sea Grant



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Complex environmental issues, such as the allocation of scarce natural resources and efforts to improve water quality, often become mired in conflict. When this happens, citizens, scientists, and managers who want to improve ecological and social conditions must overcome this conflict. One way to do so is through collaborative approaches, which include public involvement and learning. And to collaborate successfully, groups must surmount the fundamental problems of incomplete and inconsistent information and imperfect understanding of complex human and ecological systems.

As citizens, scientists, and managers seek ways to effectively make resource decisions, case studies related to specific problems can help illustrate many of the issues surrounding environmental conflict. The following review of a proposed riparian ordinance in Tillamook County, Oregon, illustrates the complexity of environmental decision making and why effective action is so difficult to achieve.

This Tillamook riparian management case helps explain why many citizens, mostly rural landowners, are suspicious of proposed environmental solutions. In this case, landowners did not feel their questions were adequately addressed, they did not feel heard, and they did not trust the recommendations of outside scientists and managers. They believed that statements by scientists and managers were incomplete and that often scientists' recommendations were logically inconsistent with what they knew about riparian areas. At the same time, many scientists, managers, and environmentalists saw rural landowners' views as equally incomplete. They did not feel that landowners understood scientific information or were willing to listen to logical arguments for protecting and enhancing riparian zones. Many also saw landowners as unwilling to protect the environment, preferring to emphasize economy over ecology.

Background

The Oregon Plan for Salmon and Watersheds (the Oregon Plan) was developed in 1995 with leadership from Governor John Kitzhaber. It seeks local input and participation in salmon restoration efforts. The Executive Order for the plan says "an

essential principle of the Plan is the need to move beyond prohibitions and to encourage efforts to improve conditions for salmon through non-regulatory means. Many of the most significant contributions to the OPSW [the Oregon Plan] are private and quasi-governmental efforts to protect and restore salmon on working landscapes, including efforts by watershed councils" (Kitzhaber 1999).

On June 20, 2000, the National Marine Fisheries Service (NMFS) issued the 4(d) rules, which prevent the "take" (that is, any action that may harm salmon) of 14 groups of salmon and steelhead listed as threatened under the Endangered Species Act (NMFS 2000). The 4(d) rules put many private and voluntary initiatives stimulated by the Oregon Plan, including efforts by local watershed councils, under NMFS jurisdiction. One purpose of the 4(d) rules is to protect and restore endangered salmon runs from the Central Valley of California to Puget Sound, Washington. The Oregon coast, where Tillamook County is located, is in the middle of this region. When the rules were released, Will Stelle, the director of NMFS' Northwest Region at that time, said, "These rules are both fish friendly and people friendly. They reflect our twin commitments to protect the fish and to provide powerful incentives for local conservation efforts" (NOAA 2000).

The rules are meant to help landowners understand what activities are considered a taking of salmon. Although the rules are meant to be non-threatening, many landowners do not perceive them that way.

The rules stimulated many local jurisdictions, including Tillamook County, to review their land-use planning ordinances. Although Tillamook County held public meetings and educational programs about revising the ordinance, many landowners were unaware of or otherwise uninvolved in this process. In late December 1999, the county mailed a notice about the proposed riparian ordinance to landowners. The notice contained the warning, "Tillamook County has determined that the adoption of this ordinance will affect the permissible uses of your property and may reduce the value of your property." This wording is required by Ballot Measure 56, which passed in 1998 by a four-to-one margin and was designed to alert private property owners (Oregon Secretary of State

1998). The warning succeeded in gaining the attention of many previously uninvolved landowners. In the ensuing conflict, landowners formed the Tillamook County Landowners Association and sponsored a series of meetings. Several hundred of Tillamook County's 24,000 residents attended a March 8, 2000 meeting in which attendees criticized the county's approach. Largely because of the efforts of the landowners association, the 2000 reelection bids of two incumbent county commissioners failed.

Why did the ordinance generate such a strong response? To answer this question, we review the voices of landowners responding to the proposed ordinance revisions. Their statements reflect their knowledge and values as they responded to scientists' and managers' efforts to educate them about riparian issues. The landowner responses also reflect a passionate interest in riparian issues and a large gap between local knowledge and the knowledge generally accepted by scientists and managers. Although this debate took place in Tillamook County, the comments are typical of what we have heard from landowners in other areas of the western United States (Leaver 2001; Habron 1999; Smith et al. 1997; Brunson and Steel 1994.) In fact, they are typical of the views of the "wise use," or landowners' rights, movement (Switzer 1997; Brick and Cawley 1996; Yandle 1995).

Our purpose in conducting this study is not to validate the arguments of any particular group, but rather to explore roadblocks to effective action. People usually base their actions on the knowledge they have gained through their life experiences, combined with their personal values. Landowners' experiences and values are valid for landowners. Scientists and managers have different experiences and values, which are valid for them.

When trying to "win" an environmental conflict, groups may try to politically overpower one another. They may try to educate one another in the hope of winning concurrence. Or they may try to combine their experiences as part of a collaborative learning process (Daniels and Walker 2001). Collaborative approaches seek to get groups working together to inquire and learn on the basis of a shared purpose.

In reporting landowner statements, we hope to provide decision and policy-makers, the media, the public, scientists, and interest groups on all sides of these issues a representation of views held by rural landowners. Using a case study to present landowners' views is one way to develop a better understanding of the complex interactions associated with environmental conflict.

Methodology

In conducting this study, we analyzed landowners' statements about the draft Tillamook County riparian ordinance from two main sources: letters to the editor in the *Tillamook Headlight-Herald* between January and May 2000 and videotapes of eight hours of meetings. We also used flyers and brochures in which interest groups summarized their views on the ordinance.

To organize the data, we used Ethnograph, a qualitative data analysis program. The letters and testimony were coded with 41 different themes, such as "overfishing," "Tillamook Burn," "pesticides," "calls for landowners to organize," and "calls to compensate landowners." From these themes we selected representative statements to include here. Each statement is identified by a two-letter code that enables us to find the original writer or orator but does not give the person's identity. All statements were made in a public forum, but we want to emphasize the representative rather than individual nature of each statement. On the basis of survey data (PNCERS 2001; Smith et al. 1998; TCFC 1998; Smith et al. 1997; Gildden and Smith 1996a, 1996b; TBNEP 1995), our participation in several hundred hours of public meetings, and a review of the literature, we feel the statements represent concerns commonly heard from landowners.

One of our co-authors worked from June through September 2000 with the Tillamook County Riparian Advisory Committee. The purpose of his work was to help those interested in this issue learn from their neighbors about the complexity of the problem and share their knowledge relating to the riparian issue (Primozych 2001).

Property Rights: a Root of the Conflict

Conflicts about environmental issues are rooted in underlying priorities and values. The riparian ordinance caused conflict over values about property rights and protection of endangered species. Most landowners commenting on the riparian ordinance showed concern for how the ordinance's goal of creating conditions to protect endangered species would affect property values and rights. Even though one purpose of the ordinance was to protect property owners from suits under the takings provisions of the Endangered Species Act, landowners saw the ordinance as potentially taking property value or rights. Many landowners—particularly owners of small parcels of land—felt the 4(d) rules were misguided. In general, landowners felt the county ordinance exemplified government's intrusion into their affairs, outside control of local actions, lack of scientific knowledge, environmental naïveté, and lack of respect for local experience. Further, they felt threatened by what they saw as the government's "creeping incrementalism," leading to increased government control over private lands. While not all landowners shared this view, it was not uncommon to hear landowners say the government was trying to take away their private property rights or their property itself.

Who here wants to give control of their land to a bureaucrat? [UY, landowner]

One of the greatest joys in my life is being able to own a piece of property and at least have some kind of control over it. And we're losing that. [PQ, landowner]

It is common in environmental conflicts to hear people reflect on the past, when issues were less complex. However, since change is constant in society, new rules are required to cope with changes in technology, the economy, peoples' values, the size of the population, and with the general overall growth of regulation that comes from learning about new problems.

My concern is about government incrementalism. Thirty years ago . . . we used to take our Christmas tree and tie it onto the riverbank. It allowed the water to slow down, and it built up the riverbank so the road didn't fall into the river. Today if we do that, we get fined. Little by little, your rights are taken away. They change your property use, and they wait until you get used to it. It's just a little step. You think, "oh, well, what the heck"—and pretty soon you don't have any property rights. [RD, landowner]

In addition to looking back on the past, landowners justify their views on property rights by referring to their understanding of constitutional rights.

We should do as the county commissioners in Nevada are doing. We should claim the 10th amendment [state's rights] . . . and we should also claim our 5th amendment rights to property and tell the feds to back off. If the state comes in and demands regulation, demand a proof of the need of this regulation, then tell them it is a taking of property and require the state to pay current market value to the owner for [each] square foot taken. You should require then that the state pay for all enforcement, all regulation, and all maintenance of this costly ordinance. It should be funded by the state, not by the county, if it's the state that wants this balderdash. . . . Democracy is two wolves and a lamb voting on what to have for lunch. Liberty is a well-armed lamb contesting the vote. Please arm the landowners with our constitutional rights, the 10th and 5th amendments. [VE, landowner and local leader]

Other important values regarding individual freedom are closely tied to property rights. Landowners believe they should have the right to use their property as they choose and that government rules are eroding their ability to control what happens on their land, a crucial part of private property rights.

You think you own the land that you have your house on. You don't. All you have is what's called a bundle of rights to that land. . . . One of those

rights is the right to use it. The right to sell it. The right to rent it. The right to pay taxes on it. The right to build on it. The right to give it away. The right to will it to your children. And what the government is doing under the police powers, they're taking away some of those rights . . . because there are some who would like you to have only one of those rights left—and that's the right to pay taxes. [HD, real estate]

If they pass this ordinance, they will be inspecting your property, walking across your land, telling you what you can plant, cut, and harvest, fining you heavy fines if you don't do what they tell you. To me, this is giving up many of your basic rights and privileges to your property. To me, this is an intrusion of government that I thought I would never see in this country. [VU, landowner]

Many property owners recognize that they can do things on their land that advance the public good, and they are not opposed to doing so. Most feel they are good land stewards. However, if regulations require them to comply with government-mandated protections, they feel they should be compensated.

Are we going to get compensated with tax relief if this buffer goes in? [LY, landowner]

I consider the biggest and the most devastating threat to the market is the constant nibbling away at private property rights and the taking of land through condemnation without compensation. [PI, real estate]

Questions about the Science

As in all conflicts, participants bring a variety of facts and logical models to predict ordinance outcomes. Landowners used facts and logic from their experiences, while scientists and managers used their own models to predict improvements that could come from the 4(d) rules. Proponents on each side consider their models and predictions equally valid.

Because human-ecological interactions in riparian zones are very complex and environmental knowledge is inherently incomplete, riparian managers make decisions based on an assessment of current information—“the best information available.” Typically, “the best information available” is current scientific information rather than local knowledge. Major scientific summaries include the *Oregon Plan* (Governor's Natural Resource Office 1997, chapters 3–6, and 14); *Return to the River*, by the Independent Science Group (ISG 1996); *Upstream: Salmon and Society in the Pacific Northwest*, by the National Research Council (NRC 1996); *Status and Future of Salmon of Western Oregon and Northern California*, by Botkin et al. (1995); and several edited volumes on salmon problems (Knudson et al. 2000; NSTC 2000; and Stouder et al. 1995). Each of these publications is hundreds of pages, and each is written by scientists for scientists and managers rather than for landowners. The Oregon Sea Grant newsletter *Restoration* tries to bridge this gap by providing nontechnical information on salmon restoration issues. Usually, however, the “best information available,” answers questions of interest to scientists, which are not always the questions of interest to landowners.

I grew up where I live now. I run up and down the river fishing and so I bring something to this meeting that half of the people who on a professional level that spoke don't have—and that's personal experience and knowledge. [PQ, landowner]

Often, scientists and managers give the impression of being uninterested in the knowledge of local residents. Even if they are interested, many scientists fail to give the impression that they hear what natural-resource stakeholders are saying (Gilden and Conway 2001). As a result, many landowners feel unheard and disrespected.

Because of the complexity of environmental problems, landowners, managers, and scientists select those elements of scientific information and local knowledge that support their specific interests. Time pressures increase the polarization of arguments by leaving very little time for testimony or

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learning. This limitation encourages hyperbole and prevents understanding of conflicting points of view.

Landowners express many concerns about the incompleteness of science. They often question the science that does not reflect their experience.

The landowner and I spent hundreds of hours and created a riparian buffer along a large section of the river. . . . Although miles of waterway were protected. . . we were forced to sacrifice one small area to allow the cattle to cross, and to cross with heavy equipment. . . . The next spawning season came, and I was curious to observe how the fish were going to react to all our work. The salmon came up the creek and promptly began spawning in the area we had sacrificed for the cattle crossing. In fact, in the next two years, it's the only place I've seen them spawn. Stupid chum salmon probably couldn't read the riparian plan. Meanwhile, the fertile area that we fenced off began to grow the best crop of thistles and blackberries we've ever produced . . . we were forced, reluctantly, to use amounts of chemical control we've never before resorted to. . . . The entire notion that we can turn our back on these areas and they will return to presettlement condition, although a nice thought, is totally unworkable and will yield nothing but destruction for both people and fish. [UF, watershed contractor and landowner]

While landowners feel their questions are not being adequately answered, they also feel that the science to justify proposed actions is missing or inadequate. Scientists, recognizing that their knowledge is incomplete, typically qualify their statements with words such as “may,” “could,” “likely,” and “might.” Many landowners mistrust these “wobble words.” One landowner tried to emphasize the point by asking, “If I asked you to come out and buck hay for me all day tomorrow and told you that when you were done I may pay you, would you come?”

Scientists and managers commonly use examples, stories, experiences, and findings to educate landowners. When this is presented in a top-down manner, it comes across to landowners as, “We talk, you listen.” Landowners see this type of education as a one-way flow of information from some educated

person to an audience whose personal experiences are not valued:

This presentation [at a riparian ordinance hearing] . . . has implied that if we were just properly educated and informed, we would understand the need for this taking of private property. This is an insult. The fact remains, you've given us no data to support the theory that the condition of our riparian areas caused any decline in the salmon. Where is the data, and where is the rape and pillage of this two percent riparian area in this county?" [VE, landowner and local leader]

In the case of the Tillamook ordinance, scientists and managers had a considerable body of scientific knowledge on which to base their conclusions (TBNEP 1998). The Tillamook Bay National Estuary Project (TBNEP) Management Committee had been meeting and discussing management approaches for riparian zones for over a year. The management committee was preparing the TBNEP's Comprehensive Conservation and Management Plan (TBNEP 1999), which was based on six years of research. A multimillion-dollar Environmental Protection Agency program funded 50 projects (Imperial and Summers 2000; TBNEP 1998). One of the TBNEP's outreach goals was to educate citizens about the projects' scientific findings and the nature of the Tillamook Bay watershed.

Despite all this expense and effort, one of the people associated with drafting the ordinance said,

Unfortunately there were not many other citizens involved. However, if there were I'm not sure it would have done much good. We discussed many of the issues that you are hearing now—certainly not all of them or in as great of depth; however, these issues were brought up to the planner at hand and unfortunately none of these concerns were taken to heart. The way it was presented was just that. It was presented to the citizens. It was not presented in a manner to include our comments, but rather for us to be educated of what this new ordinance would be. I brought up many of the concerns that you have heard, and it was just said then that, well, this is just the way the new

ordinance is going to be and that it needed to be based on enforcement. [US, landowner]

Because most of the scientists conducting the studies came from outside the Tillamook Bay area, many landowners with long-term experience felt the knowledge gained by the program was incomplete.

I want to know how the death, injury, or taking of an endangered species is scientifically linked, by scientific methods, to the setbacks of riparian lands. . . . Are there actual scientific methods with causal relations—if A then B? If you have a 20-foot setback vs. a foot setback, how many fish are lost? How many fish are surviving? Is there a direct relation there? Right now, unfortunately, we're basing a lot of important decisions on theories, pseudoscience, and best management polices. And that's the last thing we should be doing if these fish are truly endangered. . . . There is no scientific justification in black and white that says this will make any difference for salmon. [SI, landowner]

When scientists present their case, landowners often chide them for lacking common sense. Landowners' disagreement with the science does not mean that they are unaware of what the science says, nor does it mean that more education is needed. It means that landowners and scientists do not always agree on the questions to be asked or the information needed to make decisions. In addition, the research questions that are asked are typically of interest to outside scientists rather than local landowners. Landowners feel more emphasis should be placed on overfishing, mammal and bird predation, ocean conditions, and being realistic. Although the TBNEP had a citizens' advisory committee, the committee had little effect on the questions being asked about the operation of the watershed.

When a slide comes down the river, Mother Nature's caused that. Who's going to tell Mother Nature to stop muddying the river? We need good common sense. [CH, landowner]

Questioning Scientific Logic and Inconsistencies

Landowners readily provide examples of where they see inconsistencies in scientific logic. For example, they are concerned about how temperature standards are set, why woody debris should be placed in streams, the rationale of the Oregon Department of Fish and Wildlife's (ODFW) management of hatcheries, the perceived lack of federal control over distant-water fisheries, and the failure to control bird and mammal predators. Further, the lessons of the Tillamook Burn, when salmon flourished despite a series of catastrophic forest fires, are etched into the minds of local people.

Temperature

One of the major concerns for salmon restoration is to reduce temperatures in streams. Scientists studying the impacts of high temperature have set a standard of 64°F (USFWS 1999). The Department of Environmental Quality conducts sampling according to scientific protocols, and it uses a temperature model to evaluate streams in Tillamook County (Boyd and Sturdevant 1997). Although the 64°F temperature requirement has scientific backing, landowners, who have years of experience swimming and fishing in local waterways, distrust the methods used to measure water temperatures. Their experience tells them that young salmon can be found in cold, deep pools, and that water temperature in a stream gets colder the deeper one goes. Therefore they suspect that scientists are measuring temperatures in warmer, shallower waters to justify the government's recommendations for riparian buffers and streamside plantings. They are also not convinced that adding vegetation to riparian zones will accomplish the temperature standard.

To this day in the Hanford Reach of the Snake River, 83.5 degrees, chinook salmon are spawning up there. Their riparian area is sagebrush. We are told here in Tillamook we have to have 64-degree water for the salmon to survive . . . [but the DEQ takes the water temperature in shallow water, not in the deep holes...] [OF, landowner]

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Often, scientists and managers discount landowners' comments because of their word use. In this case, as we discovered later, the landowner knew the Hanford Reach was part of the Columbia River, but under pressure he attributed it to the Snake. One factual error such as this could lead a listener to discredit the entire statement. This exemplifies the importance of careful listening and open-mindedness on the part of those wanting to "educate" landowners. In this case, the landowner was questioning the scientific bases of temperature measurement.

Large Woody Debris

In addition to lowering temperatures, scientists promote planting trees in riparian zones in order to reestablish large wood in streams. This leads to significant confusion and criticism on the part of those landowners who remember the 1950s, when fishery scientists felt that poor logging practices had resulted in too *much* wood in streams. At that time, efforts were made to change forest and stream management practices to remove the wood from streams. In fact, scientists had determined that logging practices were clogging streams and preventing upstream salmon migration.

Past wood removal activities are only now being studied and put in the context of the times (Ford and Smith 2000). Historical study shows large quantities of wood in streams at the time of contact (Coulton et al. 1996). The emphasis on wood removal and the subsequent recommendation to return large wood to streams have frustrated coastal residents. Landowners who remember removing wood from streams now wonder why they are being told to replace it.

I know some retired foresters, and they tell me about 30 years ago, the idea was to get all of the woody debris out of the rivers . . . and, you know, let the rivers run free. And now, of course, it's just the opposite. So of course, your average citizen might wonder, well, which is right? And are we gonna ask all these citizens to basically donate their economic stake in their property, to try a certain style of land management, and then perhaps find

out later that, well, that wasn't quite right after all? [PJ, landowner]

I'd like to know, by the 1970s, '75, Fish and Wildlife used to have all the logging operations . . . absolutely clean all the creeks. The reason I know this, my husband would come home and say, "We have to hang guys with ropes over the banks to pick up the sticks and the twigs and everything." So all your streams were bare of all woody debris. Now they're putting it all back. What scientific basis is this based on? Has there been any studies done, or is it just that they figured they were doing something wrong and they needed to change it? [PI, real estate]

Fish Questions

The ODFW wild fish policy, which promotes the destruction of hatchery fish, is another major cause of confusion and frustration for landowners. Studies have shown that hatchery salmon are more prone to disease than wild salmon. In addition, they compete with wild fish for food, attract predators that prey upon wild fish, interbreed with and weaken native stocks, allow for fish harvest rates that result in overfishing of wild stocks, and lack the qualities needed for long-term survival (Lichatowich 1999; NRC 1996). As a result, ODFW has determined that hatchery fish are detrimental to the spawning of wild salmon. These scientific observations, however, receive a different interpretation from local landowners.

Why would the ODFW kill endangered fish? Because fewer fish means more government power and control. The control of the land along our rivers to protect "wild" fish is a scam. It's a hoax! [VW, landowner]

There are millions and millions of fish that all migrate from these rivers. But they don't come back. Those that do come back for a good part are slaughtered by hatcheries when they come back. The Fall Creek slaughter in 1998 and 1999 and 2000—I think they killed 30,000 or the entire run—these fish go to sea . . . and back. They escape the high seas driftnets, they escape the seals,

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the sea lions, the cormorants. Anything else that wants to eat them in the ocean . . . these fish can't be stronger or healthier, yet they slaughter them because they're going to compete [with] the wild fish on the beds, and destroy the wild runs. It just doesn't make sense to me... [VW, landowner]

ODFW's wild fish policy has sparked controversy with landowners as well as legislators, and the policy is being revised. ODFW is stuck between the logic of citizens and legislators concerned about killing hatchery-produced salmon, scientists critical of hatcheries and their operational practices (AFS 2001; IMST 1999; Lichatowich 1999), and environmental interests wanting a more "natural" environment and approach to these issues.

Management of ocean fisheries also receives criticism from landowners. Since 1976, ocean salmon fisheries have been managed by the Department of Commerce on the basis of recommendations by the Pacific Fishery Management Council (PFMC). The National Marine Fisheries Service, which oversees PFMC activities and forwards fishery management plans to the Secretary of Commerce for approval, is central to this process. There are many reasons salmon stocks managed in this process are not better off in 2000 than they were the 1970s, including fishing pressure and bycatch, urbanization, logging, road building, hatchery operations, splash-damming in coastal streams, mining gravel from streambeds, withdrawing water from streams, damming streams, historic efforts to remove wood from streams, natural cyclic variation in weather and ocean productivity, and farming, grazing, and other related agricultural activities. (www.oregon-plan.org/FCH03.html, p.1; also NRC 1996; and Botkin et al. 1995). However, NMFS' issuance of 4(d) rules under the Endangered Species Act (ESA) and its fisheries management record lead landowners to question the agency's ability to carry out the responsibilities it has under the ESA to restore threatened and endangered salmon species.

Having spent the last years in the fishing industry, and being subjected to NMFS management for a great deal of that time, the idea of NMFS management of our forest, farms and homes strikes me with terror. Under NMFS rules, we were sub-

jected to the worst management imaginable, stripped of our constitutional rights as citizens and forced to waste our resource. Every single fishery that I was involved in, after almost a century of semi-stability, now lies in ruin." [UF, watershed contractor and landowner]

Coupled with concern about NMFS' management ability is the continuing belief that foreign fishers continue to target local salmon. However, the full domestic utilization of U.S. fisheries and international enforcement measures against ocean drift netting have theoretically ended the taking of salmon by foreign fishers (Smith et al. 1998). Interviews with coastal residents in 2001 show that people still think foreign fishing is taking place. A woman who saw a large factory trawler phoned Congressman DeFazio's office and was told that it was a U.S. whiting trawler.

[On TV] they were showing these ships out there that was loading thousands . . . of tons of fish in one day. That can take care of more fish than all the fishermen in a year on these riverbanks. [CH, landowner]

Are you aware that foreign fisheries were outside the Oregon coast as much as last year, and the Coast Guard was notified? . . . It would seem to make logical sense to me that if fish were on the endangered species list, the least...we would start doing is stop fishing for them. First things first. See how that helps, before considering a land grab. [PQ, landowner]

They're willing to take our land away before they do something about things they already know are causing the problem (such as terns and seals eating fish at river mouths). [VZ, landowner]

Competition by marine birds and mammals is also seen as a threat. A National Research Council report reviews the impact of natural predators and concludes that "the rate of increase in these predators can be a concern, especially when salmon are in low abundance." (NRC 1996:261). The exact effect is difficult to determine, but most scientists do not

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list marine mammals or birds as a significant factor in the decline of salmon. Botkin et al. (1995:152) rate both as “minor factors.” More recent studies suggest that predation by birds on young salmon has significant mortality consequences (Roby 2000).

[I would like to see] equal time and equal meetings put into discussing cormorants and terns and seals. [PQ, landowner]

And talking about a shortage of salmon—you’ve got a million seals out there taking the rest of what’s coming in there. It isn’t because the riparian areas aren’t shading these rivers. [CH, landowner].

The Tillamook Burns

Certain events are etched in the memory of local residents and strongly shape local perceptions. The Tillamook Burns of 1933, 1939, 1945, and 1951 burned most of the watershed east of Tillamook. Efforts to restore the burn area began in the 1960s with a program to replant the forest. The Tillamook Burn is symbolically very important to Tillamook County residents, who see it as teaching many lessons about environmental processes. Wells (1999) evaluates the accuracy of the burn’s popular history, but longstanding views of local residents persist.

Seventy years ago we had this great Tillamook Burn . . . the condition of the forest, the streams; the practices of the logging that took place the years following, were pathetic . . . the sand and silt, no foliage from the top of the mountains all the way to the ocean. I know. I grew up here. I didn’t read it in no book or hear about it somewhere back east, or weigh it against some stream in eastern Oregon. There was a lot of fish here until the last 15 or 20 years ago, in spite of the silt, no spawning grounds, in spite of the oil and diesel and the lax logging practices. So how would you explain the riparian area being the issue when it comes to salmon runs being ran almost to extinction? Can you explain that? [PQ, landowner]

Anyone who was taught to reason knows the condition of the present riparian along the rivers in Tillamook County has nothing, absolutely nothing

to do with a decline in fish. It also has nothing to do with past or current logging practices. This conclusion is based on photos of the Tillamook Burn and information from people who fished in the 40s, 50s, 60s, and 70s after the four burns. . . . They report fantastic fishing. Ask them! Isn’t it amazing that millions of fish were capable, all by themselves, to find the water temperature that they liked during those 30 to 40 years the brush and trees were regrowing; that with the thousands of tons of silt that washed into those rivers from the bare hillsides they were able to successfully spawn, year after year. . . . Under this indisputable evidence of horrific erosion equals great fish runs, the riparian amendment issue collapses. NMFS need not tell us how to do anything. We have aerial photos of 354,936 acres of burned snags and ash. And in the terribly silted rivers running chocolate brown the fish spawned successfully year after year after year after year—without much shade from trees. Think about it. [VW, landowner]

Landowners feel that on the basis of their personal experiences, they have a more complete knowledge of their local environment than scientists do. They would like to “educate” scientists and managers as much as those who are trying to implement policy would like to educate them. After the initial power struggle derailed passage of the Tillamook riparian ordinance, each side tried to “educate” the other. These attempts at education typically took several forms: seeking a persuasive logical argument, looking for logical flaws in the opposition’s argument, or seeking new information that could be used to rebut the opposition’s argument. Each side brought forward experts to support its argument.

One problem with this type of “education” is that the knowledge presented is always incomplete, full of hyperbole, oversimplified, and restricted to the logic of one side or another. Those who are expected to be “learning” are forming opinions about information presented, based on their own knowledge base, which may be quite different than the educator’s. Without dialogue, questioning, rephrasing, examples, and experiments, information presentations cannot become learning experiences (Folb 1984).

Views of the “Other”

In addition to private property rights, science, and management issues, many landowners believe other groups have more responsibility than they do for protecting and restoring salmon. We have already seen perspectives of the “other” in the discussion of foreign fishing. Landowners say that managers are being unfair by imposing regulations on them and that other groups bear a greater responsibility. They point to government, fishers, urbanites, and businesses voicing similar complaints. Pointing to others as a scapegoat is part of the complexity of moving from environmental conflict to effective action. For example, one landowner pointed to county road maintenance:

At a recent workshop on this ordinance, the number one cause of riparian zone problems in this county was identified to be state and county roads. It is probably cost prohibitive to address those problems, but if they are not going to be addressed, why should private landowners be expected to carry such a heavy burden? [US, landowner]

No amount of Riparian Overlay Zoning will cure or add to the quality of our water as long as herbicides and pesticides are on the market. . . . You cannot lay this on the homeowner entirely, when the road departments, both county and state, are the biggest abuser with their roadside spraying that is carried by wind and drift directly into waterways. [DE, landowner]

Another “other” is forest and farmland uses:

Logging operations have been accused of muddying streams and rivers, but that falls under the Forest Practice Laws enforced by Oregon State’s Department of Forestry. Road building and repair do their share of dumping mud, rocks, and wood between road and waterways. It’s hard to tell where the responsibility lies. Farmers and the cows answer to the Department of Agriculture. [DE, landowner]

Farmers with pastures bordering our many rivers still spray manure in the pouring-down rain every week, timber companies still log all but a few trees

right up to the edge of creeks and roads, leaving next winter’s storms to finish the job. [UW, landowner]

Landowners in Tillamook County also point out the effects of urban populations on environmental degradation. The Oregon coast is separated by a mountain range and 60 miles from the more urbanized Willamette Valley. In 2000, 24,262 people lived in Tillamook County and the population of the entire Oregon coast was 300,000 (U.S. Census 2001). At the same time, 2.4 million people lived in the Willamette Valley, and 60 percent of the population was centered in Washington, Multnomah, and Clackamas Counties, just east of Tillamook over the Coast Range. Coastal residents see themselves as being controlled by these urban interests.

I feel these efforts, principally from the paved edge of the Willamette River, to modify and reduce our rights as landowners without compensation is a huge violation of a basic American landowners [sic] rights.” [UF, watershed contractor and landowner]

Landowners have a solution for those from the Willamette Valley, summarized in the following statement:

This group [urbanites] is entitled to the same rights as all other Americans and I see nothing wrong with them implementing their wills with their checkbooks the same as other Americans. Buyouts, conservation easements, and motivated landowner participation are the proper ways to implement these goals, not mandating without representation or compensation. [UF, watershed contractor and landowner]

Landowners feel that urban environmentalists don’t value their conservation efforts. They see themselves as “good stewards” and see the land as an “asset.”

There's not a person in this room who doesn't favor healthy riparian zones. And there is a lot of people in this room who have done a whole lot for healthy riparian zones already on their own, and there's people in this room who would do a whole lot more if we didn't have various state and federal agencies standing in their way. [VZ, business owner]

We believe the overwhelming majority of private landowners do act responsibly and do favor clean water and healthy fish runs. They don't need to [be] bludgeoned into it. [LI and US, landowners]

Each of us who owns a piece of land—even a half acre—we appreciate it every day. Though we do not truly own a being or thing of nature, we have respect and awe for it. The common understanding is that the land and the river are ever changing. We do the best we can to get along with nature's circumstances. I see many landowners who clean, tend, and maintain their property. We also have to clean up and protect our riverbanks and properties from others. We are all concerned with finding answers, solving problems and proceeding by trial and error. [RU, landowner]

The best solution to the problems, landowners feel, is to use local knowledge and to involve local people.

I feel that our way out of this lies in this room—in these seats [the audience's]. By the local people working together, we can deal well with this and we can take care of it. We can be a model for the entire country by working together. . . . I think this group here are definitely part of the solution and not part of the problem. [UF, watershed contractor and landowner]

Collaboration, Consistency, and Completeness

As the final statement in the previous section shows, the Tillamook riparian ordinance conflict is ready for some type of collaborative approach. Collaborative approaches to solving environmental

problems are becoming more popular with both scientists and managers, in part because efforts at resolving environmental problems are more successful when public concerns are known and understood (Daniels and Walker 2001; Kenney et al. 2000; Marriot et al. 1999; Rhoads et al. 1999; OWOW 1997; and Western and Wright 1994). The Oregon Plan for Salmon and Watersheds, which calls for a voluntary and participatory approach, is one example of a voluntary, participatory, consensus-oriented, community-based action. Federal agencies are also increasingly promoting collaborative approaches. From a citizen perspective, collaborative approaches work best when people trust the methods and sources of information, feel their voices are heard, trust the recommendations, and feel they have helped shape the agenda for action.

Although collaborative approaches may address some issues, other difficult to resolve issues still exist. To explain one of the central problems, mathematician Jacob Bronowski (1966:4) provides a useful insight on the limits of science. Bronowski writes that “every axiomatic system (set of principles about how a system works) of any mathematical richness is subject to severe limitations” First, “no set of axioms can be complete.” Second, “An axiomatic system cannot be made to generate a description of the world which matches it fully. . . .” Bronowski's summary of science is backed by mathematical proofs (Turing 1935, 1937; Church 1936a, 1936b; Gödel 1931). In the context of environmental decision making, it means that factual and logical statements about a complex system can always be faulted for being either incomplete or logically inconsistent.

In practical terms, the incompleteness-logical consistency paradox can be phrased another way. As problems become more complex, people know less about them (Daniels and Walker 2001). Thus, expert knowledge and action become increasingly important, while the respect that the public has for experts declines. Experts, by definition, know a lot about very specific elements of a problem. Effective action must take into account the holistic operation of interacting ecological, economic, and cultural systems. A large part of landowners' concern is with incompleteness and different logical perspectives.

Landowners see situations differently from those who are worried primarily about endangered species. Further, not everyone has the time to get involved when new actions are being contemplated.

Most people busy making a living and raising families don't have the time, money, or tolerance level to fight their way through the layers of bureaucracy to develop land and/or protect stream banks. . . . Lots of tax money is being paid on land the owners have lost their rights to. We'd like to do some erosion prevention on our stream banks but don't have the money to do it right or the patience to wade through all the levels of bureaucracy to get the permits. So we watch it slowly erode with each high water. [RS, landowner]

The draft ordinance and county letter to landowners did succeed in gaining the attention of people who were not previously involved in the process. However, incompleteness of participation will always be a problem for any effort to involve citizens in effective environmental actions. Some people have the time and will attend talks, meetings, workshops, and collaborative sessions. Others—often busy, powerful people—will not take the time to participate. The nonparticipants may not be paying attention, or they may feel other local or scientific experts are working on the problem and their views are being accommodated. When an action attracts their attention, they begin to use their power-brokering, educational, and networking skills to influence the process. This is what the Tillamook County Landowners Association did. In the initial stages of this conflict, each party tried to exercise political power. The county used its legal authority to try to develop the ordinance quickly in order to comply with the 4(d) rules, while landowners used their numbers to delay action and remove officials who they felt were not protecting their interests. Pressured by time, landowners and county officials focused more narrowly to achieve their goals.

Incompleteness and inconsistency characterized their discussions about the ordinance. Yet, no matter how collaborative, open, or encompassing a process, participation will always be both incom-

plete and inconsistent. People are busy working on multiple projects. Important voices might not become involved when a proposal is being drafted, but might take action after they see the result. People who might be relied on to represent different communities of interest might not attend every meeting or workshop. Further, they might not consistently or adequately represent the views of their community of interest.

Lessons Learned

Conflict over the riparian ordinance in Tillamook County, like most resource conflicts, resulted, in part, from incomplete knowledge and logical inconsistencies. Because riparian systems are so complex, individuals and groups opposed to a decision can always point to a lack of information and raise questions about the logic of an approach.

Another important part of the problem is the different perceptions of economic and ecological goals. We found that nearly everyone wants to maintain a quality environment. Because people have differing ideas of what a “quality environment” means, a first step is to reach agreement on this general objective. A typical approach is a survey to determine where consensus exists. In the case of the Tillamook ordinance, surveys were done. The Tillamook County Futures Council found that most Tillamook County residents (87 percent) agreed with the statement, “To sustain the most important qualities of Tillamook County we must protect the natural features of the area” (TCFC 1998). This was the second-highest ranked statement on a list of 36 “natural environment” statements. The highest showed a preference (90 percent) for adequate sewage treatment. In another survey, 89 percent of the respondents chose to live near Tillamook Bay because of the “views and scenery” (PNCERS 2001). This was the highest-ranked reason. Further, landowners say,

We all want to be good stewards of our natural resources. We understand that maintaining healthy riparian areas is not only the right thing to do, but it adds value to our property. [UY, landowner]

LESSONS LEARNED

Surveys, however, are general and lack specifics on ways to achieve desired goals. This limitation, coupled with the impersonal nature of traditional methods of communicating science, language differences, and the social and physical distance between scientists, managers and landowners, creates a large gulf (Sweetwater 2000). Landowners feel threatened by an impersonal, distant, government bureaucracy, often referred to as “an 800-pound gorilla,” that communicates in obscure and legalistic language. They see scientists as agents of government. Landowners, however, do not oppose environmental improvements, and many are willing to take action. Scientists and managers who are willing to learn from and build on this goodwill will help break down barriers to communication and promote learning. People will consider information that is offered in an open spirit as communication rather than as expert advice.

We want to be part of the solution to enhance and potentially do our very small part to improve our hydrologic and ecological environment. [ZG, landowner]

When the draft ordinance got the attention of Tillamook County landowners, they protested that their property rights were threatened, weak science was being used, and other groups should step forward to shoulder more of the burden. For many landowners, the issue was not loss of environmental quality, but erosion of property rights and potential loss of property value and income.

We experimented with two techniques to increase learning about the complexity of environmental issues. First, Susan Sweetwater helped form the Tillamook County Performance Partnership Outreach Task Force. The task force experimented with a number of outreach activities during 1999–2000. It found that interactive, visual, multimedia, accessible, dialog-promoting, and goal-oriented outreach activities provided a better learning environment than the more typical communication through expert lectures, distribution of brochures, and publication of newspaper articles (Sweetwater 2000). Outreach is everybody’s job, but because scientists, managers, and the media all have the

responsibility to inform, the job never gets focused, coordinated, and sustained.

The second technique was PLACE mapping sessions (Primozych 2001). The PLACE mapping learning activity helped but was limited in duration and scope. Furthermore, expectations pressed for the educational approach that involves meetings, writing text, and telling people what is known. Millions of dollars were spent gathering scientific information in Tillamook County. The expenditure on outreach was a fraction of the expenditure on scientific study. Citizens wanted action, not outreach. They wanted on-the-ground projects. Projects, however, take planning, coordination, teamwork, partnerships, funding, and public support. Initiating these activities requires expenditures to improve the literacy of local people about science and of scientists about local knowledge.

Thus, science can inform our actions, but it cannot set the direction. Local knowledge can provide detail, but it cannot unravel complex processes. Collaboration can help scientists, managers, and landowners understand one another’s logic, but ecological and human systems are complex. As long as any group feels it has the power to win a political, legal, or public relations victory, conflict is likely to prevent collaboration, learning, and effective action. Where actions can be built on people’s inclination to protect the environment, better collaboration, learning, and action are possible.

In general, citizens, scientists, and managers share the goal of wanting to maintain or improve environmental quality. Since incompleteness and logical inconsistency are always present, moving to more specific agreement on what a quality environment means in practice is a necessary first step. Once this agreement is reached, the next steps are respecting the knowledge of one another, promoting learning, and conducting experiments in learning that move complex systems toward better environmental quality.

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