CHAPTER 1. INTRODUCTION

Watershed assessments are unique in that they are based on science, but also depend to a large degree on old-fashioned town hall democracy. The watershed assessment process was developed by coalitions of farmers, ranchers, environmentalists, scientists, foresters, agency personnel, tribes, business people, and many others. Assessments were intended to give local communities and resource managers the information and tools they needed to take the lead in managing their own landscapes. This process, which was pioneered here in the state of Oregon, grew out of a recognition that science all by itself cannot solve, or even fully understand, the problems we face when it comes to the natural resources we depend upon. To accomplish our goals, it is necessary to integrate scientific knowledge with the social, cultural and economic dynamics of local communities.

In the Klamath Basin, various local organizations have worked since the late 1990s to initiate watershed assessments. But this work took on a new importance after the water crisis of 2001. Many who lived through that unfortunate event came to the conclusion that an overall plan was needed that would keep similar events from happening again. Stakeholders from all sides of the issues called on the scientists and regulators to be much clearer about what the problems were, and what it would take to fix them. Participants wanted to get the problems fixed and go on with their lives, but they couldn't if they didn't even agree on what was broken. The watershed assessments were identified as the approach that would help people sort this out.

Starting in 2003, three different organizations – the Hatfield Working Group, the Klamath Watershed Council, and the Klamath Basin Ecosystem Foundation – began to cooperate to put the project together. The Hatfield Group was made up of representatives of the various interest groups – timber, agriculture, environmentalists, agencies, local government, etc. It was their job to make sure the assessments happened in a way that all the different constituencies could support. The Klamath Watershed Council was made up of representatives of the various sub-watersheds in the Upper Basin. It was their job to make sure that the assessments were done with the input and participation of the people who lived and worked in the areas being assessed. The Klamath Basin Ecosystem Foundation (KBEF) was made up of a diversity of representatives, but it also had its own non-profit status. It was KBEF's job to raise the money, keep the books, negotiate the contracts and do all the paperwork.

This partnership of organizations secured grants from the Oregon Watershed Enhancement Board and the Klamath Basin Ecosystem Restoration Office, and then got to work. The first step was to develop a strategy for doing the assessments. The Upper Klamath Basin is a very big place, and to do the assessments at the scale and pace that they have been done in other parts of

the state would take around sixty years and cost somewhere around six or seven million dollars. No one was interested in taking that long or spending that much, so the partnership devised a strategy that balanced the need for detailed analysis with the need to be expedient, and to be responsible with taxpayer dollars.

The upper basin was divided into seven "Assessment Units." The Upper Williamson, The Upper Sprague/Sycan, The Lower Sprague/Williamson, Upper Klamath Lake, Upper Lost, Lower Lost/Klamath Project, and The Klamath River Canyon. The plan was to do one of these a year, in the order they were just listed, for about $100,000 to $150,000 each. This would be less than a tenth of the cost of an average watershed assessment.

From the beginning, it was important to all involved that assessments be based on actual conditions out in the territory, and not just on published studies and reports. It was obvious that there was a wealth of information in the heads of people who have lived on the land for generations, and who may have never gotten around to publishing a scientific report.

It was also obvious that published reports sometimes didn't tell the whole story about conditions on the ground, because they sometimes had to generalize about large areas. Everyone knew that what was true in one place wasn't necessarily true in another. There was interest in finding ways to supplement the published data with information collected from local landowners, and through direct encounters with the landscapes of each watershed. An additional benefit of working at a smaller scale is that it allows greater local involvement in the development of the document, and we hope, eventual support of the resulting action plans.

The project began with guidance provided by the Oregon Watershed Enhancement Board in their Watershed Assessment Manual. This manual is geared toward incorporating community involvement in the assessment process, which was a novel idea back when it was first tried. This process was used in our first assessment in the Upper Williamson, and it was improved by incorporating a series of public field days covering various parts of the watershed. This worked fairly well, but there was still the feeling that the field-based information from the field days (which sometimes contradicted the published reports) wasn't being successfully incorporated into the assessment document itself.

It was also learned during those field days (most of which took place on private lands) that many landowners and managers were eager to make improvements on their property. In many cases they had given considerable thought to what could be done, and in some cases they had already gone ahead and done it. So there was interest in finding ways to make sure that the field days could provide landowners with help right there on the spot, in addition to making sure landowners' perspectives got incorporated into the assessment.

The answer to these needs came in the form of the Working Landscapes Alliance (WLA). The WLA is a unique group of natural resource specialists with decades of experience in the management of natural resources and social dynamics in the western United States. Their approach to stream assessment and enhancement, called "Proper Functioning Condition" or "PFC," has a history here in the Upper Basin.

PFC assessment refers to a methodology for assessing the physical functioning of riparian-wetland areas, including hydrology, vegetation, and erosion/deposition (soils) attributes and processes (Prichard et. al 1998). WLA also has a collaborative adaptive management philosophy and works to create a common vocabulary about upland and riparian-wetland (watershed) function among diverse people and interests. The WLA recognizes that "science doesn't solve problems, people do," and that there is a need to develop shared understanding of basic watershed functions and the impediments to functionality caused by management choices among diverse types of people (landowners, agency representatives, tribes, conservation organizations, etc.) that live in a watershed. This shared understanding is a pre-requisite to carrying out actions to restore functionality for values such as increased forage or threatened species recovery."

As early as 1995, local producer groups, in cooperation with the Oregon Cattlemen's Association, Oregon State University and the Klamath Watershed Council, had been sponsoring workshops teaching the principles of PFC. The PFC approach was successful back then because it focused on actual conditions on specific stream reaches, describing in detail how soil, vegetation and water interact to dissipate the stream energies that cause erosion, resulting in more stable stream channels, improved fish habitat, cleaner water, and even improved forage production. The information gathered through this approach is documented in a way that could contribute to the overall watershed assessment by serving as a "cross-reference" for the published studies. At the same time, it gives a landowner some information that he or she can put to use almost immediately.

Another need that was identified was to look more at the role upland areas play in overall watershed health. The Working Landscapes Alliance includes a specialist in range management and upland function, who focuses on the ability of upland landscapes to "capture, store, and safely release" the precipitation the watershed receives. An "Uplands Discussion Guide" was developed which was adapted from Pellant, et al (2005), and included the professional experience of WLA members. The Discussion Guide parallels the riparian PFC format.

So now there was a process, based on the OWEB Manual, for looking at the existing data and published studies, oriented toward understanding how the watershed as a whole worked, and toward involving the community at large. There was also a process, based on PFC, that took a much closer look at specific upland and riparian sites, oriented toward involving particular resource managers right there on the land they managed.

It is important to understand that the OWEB process and the PFC process are distinct processes. And while the PFC-based field days provided important information that appears in this document, it was the OWEB process, and not PFC, that was used to produce this assessment document.

THE OWEB PROCESS AND ISSUE IDENTIFICATION

The shortest way to describe the OWEB process is as follows:

1) Decide what needs to be assessed.
2) Assess those things.
3) Decide what is going to be done about those things.
4) Do it.

For many, the item of most interest is number 4, and if the assessment process doesn't result in tangible actions in the watershed, then it has all been for naught. This assessment document, although it is thick and heavy, is not the point of this process. It only covers Steps 1 and 2 in the list above – figuring out what we want to know about, and then digging up everything that anyone knows about those things. Sometimes the assessment part of the process can be frustrating, because it seems like a lot of work and expense with not a lot to show for it. Sometimes it only starts to seem practical at step three, the "Action Plan" step.

Action Planning uses what was learned from the assessment steps to make a prioritized list of the practical actions necessary to meet the needs that have been identified. Projects could include setting up off-stream watering or planting trees, or gathering more information on topics or in areas where the existing information was not helpful. Action Planning is usually faster and easier than assessment, in part because by then people are anxious to move on to step 4: doing the actual projects.

But before that could be done, the first two steps had to be accomplished. For the Upper Sprague and Sycan Watershed Assessment, which covers all the territory upstream of the confluence of the Sprague and Sycan, the process started by having an "Issue Identification" workshop. This was held on August 16, 2005, at the Senior Country Café in Bly. Sixteen people attended the workshop, including landowners, agency personnel, and private industry. There were more agency people than anyone else, so the input from the workshop was supplemented by soliciting input by phone, email or personal communication from other parties, including other landowners and the Klamath Tribes.

At the workshop, participants assembled into small groups to generate lists of as many potential issues for the watershed as possible. Participants spent

part of the time developing issues from viewpoints different from their own, and part of the time identifying issues that affected them directly.

Individual issues were then classified into a number of categories by the whole group, and then ranked. The ranking process allowed each participant to assign a weight to an issue by distributing colored dots among the issues. In addition, each participant was given a colored star to indicate the one issue that was the most important to him or her individually. Issues were ranked according to the total number of votes (dots and stars) received. In the case of ties, issues with stars ranked higher. This method allowed issues to achieve a high rank by virtue of being very important to a few participants or of lesser importance to many participants.

There were 119 issues raised which were classified into 12 categories. The categories were ranked using a weighting method that combined the number of stars with the average votes per issue. In cases where the total number of votes was the same for different issues, the rank was based on the number of stars received. Of the 119 issues identified during the workshop 56 (nearly half) received no votes. The top issues reflected concern about the effect of property sales to developers, the effect of government regulations on agriculture, and the effect of endangered species on agriculture operations.

The following tables summarize the input received. Table 1-1 lists all the issues raised, organized into categories. Table 1-2 lists the categories ranked by the total number of votes. Table 1-3 presents the categories ranked by the weighted scores.

Table 1-1. Issues raised during the Issues Identification Workshop listed by category.

Category	Issue
Water Quantity	How do we manage annual fluctuations in water amount?
	What impact are wells having on artesian flow and groundwater?
	Water rights adjudication creates uncertainty about water for irrigation and fish and wildlife.
	Mid-elevation uplands* are in fair to poor hydrologic condition. *(sagebrush/grass, sagebrush/grass/juniper, juniper/grass/shrub)
	In-stream flow needs for channel maintenance, biotic support, refugia and migration for healthy riparian function.
	Juniper encroachment may affect water availability for Sprague system.
	Are the water rights such that there is enough water left in channel for physical ecological processes and biology to flourish?
	Weeds and invasive species consume more water and are out-competing native species.
	Irrigation water supply.
	A true balance in water delivery.
	Who owns the water can affect my lifestyle and maybe even livelihood.
	Having enough water to grow hay and water cattle.
	Tribal rights are reduced by over-allocated water resources.
	Availability and quality of water from above Klamath Lake affects flexibility for Klamath Lake irrigation project.

Table 1-1. Continued.

Category	Issue
	Late season flows.
	Irrigation water and tribal rights.
Ranch	Presence of endangered species on my land may retard use and profit.
	Rising land values affect opportunities for agricultural landowners to own and retain land.
	Conservation of open space.
	Increase public land grazing.
	My neighbor doesn't care, why should I?
	River and riparian restoration may affect economic viability of ranching and farming operation.
	Forage production.
	Remove all public land grazing.
	Access to public lands for grazing.
	Grazing allotment reform.
	How will this information increase my bottom line?
Water Quality	Water quality, including temperature and chemistry is a problem for fish recovery.
	Poor water quality issues including temperature, sediment, dissolved O_2, pH, nutrients.
	What limitations do the agriculture water quality management plan impose?
	Need improved water quality by reducing impacts of livestock, roads, forest practices.
	Need to preserve wild and scenic qualities of the waters.
	Streambank erosion affecting H_2O quality.
Riparian	Functional soil, water, and vegetation to sustain creation of what we value.
	How much water does riparian vegetation remove from the system?
	Geomorphology issues including lack of flood plain connectivity, lateral and vertical stability, sediment loads, channel geometry.
	Current condition of riparian areas is very poor.
	Bank stability.
	Flood plain connectivity.
	What regulations control managing riparian areas on private lands?
	Restoration of previous wetland and riparian areas.
	Stream and riparian degradation can be caused or influenced by on-site management, and upland or upstream management. It takes critical thinking to determine cause and effect.
	There is a lack of riparian restoration targets.
	Erosion control into riparian areas.
Culture	Faulty data leads to faulty results.
	Dignity, economy, and biology go hand in hand.
	Local participation.
	Truthful representation on biological issues.
	Tribe: Termination took our land and our spirit.
	Tribal culture and heritage is not respected by non-tribal groups.
	How will the information influence the way we make management decisions?
	Family health.
	Tribes: Don't trust whites and their government and organizations.
	The kids stay in town (hometown).
	There is not enough wilderness.
	Our love of the land is as old as Creation. The white's love of the land is new, artificial,

Table 1-1. Continued.

Category	Issue
	copied, and greedy.
	Community integrity.
	Want to sustain our tribal culture by getting lands back.
	Lack of understanding: What's the big deal?
Recreation	Preserve open lands for public use.
	Provide more recreational opportunity such as trails.
	Recreational opportunities for guests at our B&B.
	Recreational fishing.
	The land and its resources - water, timber, fish, and wildlife belonged to the Klamath Tribes and were taken by the Euro-American settlers.
	Eco-tourism.
Fish Habitat	Fish population are too low: a) redband, b) bull trout, c) sucker.
	Numbers and health of native fish such that there is enough for all to eat.
	Flood control has created fish habitat problems (channelization).
	Concerns on improving sucker population.
	Relationships with landowners and agencies who are managing the fish habitat so that we all get what we need and want from the catchment.
	We need to protect bull trout for the future.
	There is a need for target fish populations by watershed.
	Management and limitation for ESA species including: Lost River and shortnose sucker, bull trout, coho salmon, bald eagle.
	Suckers live in the mud, who cares?
	Maintaining traditional hunting and fishing areas under ESA requirements.
	Fish passage is not complete.
	Fish habitat.
Biological Diversity	Noxious weeds.
	Maintain plant and animal diversity and viability.
Wetland	Does Sycan Marsh reduce water flows to downstream areas?
	What federal or other programs assist people who want to improve streams?
	Why does the Nature Conservancy dry up the Sycan River?
Regulatory	Government regulations on water and land usage and how they are affecting the next generation of agriculturalist.
	Is there a way to recover the watershed while providing protection of private landowners?
	Policy and regulations (state and federal) conflict with watershed recovery (e.g. diking)
	Standards too hard to reach or comply with.
	Governmental agency intrusion.
	Conformity to government standards. Regulation.
Economics	Loss of private lands and rapid sale to developers.
	Sustaining rural economies.
	How much money do the various types of stream restoration cost?
	Economic viability/diversity.
	Not enough money to make changes.
	No time to work on these things and make a living.

Table 1-1. Continued.

Category	Issue
Forest and Uplands	Timber: Juniper encroachment into historically non-juniper areas.
	Need to cover uplands--the other 98% of the watershed.
	Does cutting juniper and pine forest increase stream flow?
	Need to increase timber harvest to reduce fuel loads and release suppressed stands.
	Keep forests healthy and productive.
	How much volume in conifer and juniper thinning is available on an annual bases? Private land? National forest land?
	Need to preserve late and old successional forest.
	Forest stand density/composition.
	Preserve all unroaded areas.
	Make the forest healthy, sustainable, and resistant to fire.
	Timber harvest.
	Roads can act like stream channels if not designed, constructed, maintained.
	Needs flexibility on environmental assessment of Forest Service leases.
	Stop all timber harvest.
	What are primary barriers to forest health thinning?
	The mismanagement of timber resources yielding less production and unhealthy forest stands.
	Timber thinning to release suppressed stands and provide biomass for electricity generation.
	Insect infestation leads to stand degradation.
	High danger of catastrophic fire. (especially near Forest Service and BLM?)
	Forest management.
	Regulatory issues. Oregon Forest Practices Act.
	Current demands of harvest practices increase cost.
	Road maintenance costs (is expensive).
	Low fish populations restrict amount of necessary forest thinning (hazard reduction and wood production).
	Lack of prescribed fire.

Table 1-2. Watershed issues ranked by total votes cast by workshop participants.

Rank	Issue	Category
1	Loss of private lands and rapid sale to developers.	Economics
2	Government regulation on water and land usage and how they are affecting the next generation of agriculturalist.	Regulatory
3	Presence of endangered species on my land may retard use and profit.	Ranch
4	Timber: Juniper encroachment into historically non-juniper areas.	Forest and Uplands
5	Functional soil, water, and vegetation to sustain creation of what we value.	Riparian
6	Faulty data leads to faulty results.	Culture
7	Need to cover uplands—the other 98% of the watershed.	Forest and Uplands
8	How do we manage annual fluctuations in water amount?	Water Quantity
9	What impact are wells having on artesian flow and groundwater?	Water Quantity
10	Noxious weeds.	Biological Diversity
11	Water quality, including temperature and chemistry is a problem for fish recovery.	Water Quality
12	How much water does riparian vegetation remove from the system?	Riparian
13	Is there a way to recover the watershed while providing protection of private landowners?	Regulatory
14	Water rights adjudication creates uncertainty about water for irrigation and fish and wildlife.	Water Quantity
15	Fish populations are too low: a) redband, b) bull trout, c) sucker.	Fish Habitat
16	Dignity, economy, and biology go hand in hand.	Culture
17	Mid-elevation uplands* are in fair to poor hydrologic condition. *(sagebrush/grass, sagebrush/grass/juniper, juniper/grass.shrub)	Water Quantity
18	Rising land values affect opportunities for agricultural landowners to own and retain land.	Ranch
19	Local participation.	Culture
20	Does cutting juniper and pine forest increase stream flow?	Forest and Uplands
21	Geomorphology issues including lack of floodplain connectivity, lateral and vertical stability, sediment loads, channel geometry.	Riparian
22	Does Sycan Marsh reduce water flows to downstream areas?	Wetland
23	Policy and regulations (state and fed)conflict with watershed recovery (e.g. diking).	Regulatory
24	Sustaining rural economies.	Economics
25	In-stream flow needs for channel maintenance, biotic support, refugia and migration for healthy riparian function.	Water Quantity
26	Juniper encroachment may affect water availability for Sprague system.	Water Quantity
27	Current condition of riparian areas is very poor.	Riparian
28	Bank stability.	Riparian
29	Floodplain connectivity.	Riparian
30	Preserve open lands for public use.	Recreation
31	Need to increase timber harvest to reduce fuel loads and release suppressed stands.	Forest and Uplands
32	Keep forests healthy and productive.	Forest and Uplands
33	Conservation of open space.	Ranch
34	Increase public land grazing.	Ranch
35	Poor water quality issues including temperature, sediment, dissolved O_2, pH, nutrients.	Water Quality
36	What limitations do the agriculture water quality management plan impose?	Water Quality
37	Truthful representation on biological issues.	Culture
38	Tribe: Termination took our land and our spirit.	Culture
39	Tribal culture and heritage is not respected by non-tribal groups.	Culture
40	How will the information influence the way we make management decisions?	Culture

Table 1-2. Continued.

Rank	Issue	Category
41	Maintain plant and animal diversity and viability.	Biological Diversity
42	How much volume in conifer and juniper thinnings is available on an annual bases? Private land? National forest land?	Forest and Uplands
43	Need to preserve late and old successional forest.	Forest and Uplands
44	Forest stand density and composition.	Forest and Uplands
45	Are the water rights such that there is enough water left in channel for physical ecological processes and biology to flourish?	Water Quantity
46	Weeds and invasive species consume more water and are out-competing native species.	Water Quantity
47	Irrigation water supply.	Water Quantity
48	A true balance in water delivery.	Water Quantity
49	My neighbor doesn't care, why should I?	Ranch
50	Need improved water quality by reducing effects of livestock, roads, forest practices.	Water Quality
51	Need to preserve wild and scenic qualities of the waters.	Water Quality
52	What regulations control managing riparian areas on private lands?	Riparian
53	Restoration of previous wetland and riparian areas.	Riparian
54	Family health.	Culture
55	Tribes: Don't trust whites and their government and organizations.	Culture
56	Provide more recreational opportunity such as trails.	Recreation
57	Numbers and health of native fish such that there is enough for all to eat.	Fish Habitat
58	Flood control has created fish habitat problems (channelization).	Fish Habitat
59	Preserve all unroaded areas.	Forest and Uplands
60	Make the forest healthy, sustainable, and resistant to fire.	Forest and Uplands
61	Timber harvest.	Forest and Uplands
62	Roads can act like stream channels if not designed, constructed, maintained.	Forest and Uplands
63	Needs flexibility on environmental assessment of Forest Service leases.	Forest and Uplands

Table 1-3. Categories ranked by weighted scores.

Category	Score	No. of Issues
Regulatory	2.83	6
Riparian	2.77	11
Culture	2.37	15
Biological Diversity	2.25	2
Forest and Uplands	2.24	25
Economics	1.92	6
Water Quantity	1.56	16
Ranch	1.32	11
Wetland	1.00	3
Water Quality	1.00	6
Fish Habitat	0.79	12
Recreation	0.33	6

To the extent possible, these prioritized lists of issues were used to guide the assessment work. In some cases, such as the "Culture" or "Economics" categories, it was difficult to get a watershed assessment to address certain issues. It also should be acknowledged that the Issue Identification process may not have resulted in the best possible representation of community concerns in the assessment area, because it did not gather input from everyone, and because it was limited to a brief period of time during the fall of 2005.

THE WORKING LANDSCAPES ALLIANCE PROCESS

As mentioned earlier, the Working Landscapes Alliance (WLA) represented methods for gauging the health of both riparian and upland areas. For the riparian areas, the method is known as Proper Functioning Condition, or PFC. The focus in uplands is also functionality.The Upland Discussion Guide evaluates the ability of a site to "capture, store and release (C-S-R)" available precipitation. These two methods were used during a series of workshops and field days that took place during the spring, summer and fall of 2005.

One reason for these field events was the need to connect the conversations about the watershed to actual conditions and management on the landscape in addition to maps and spreadsheets. In this sense, the field days functioned as a limited "ground-truthing" of published information.

It was also clear that it was very difficult for busy community members, especially farmers and ranchers, to spend daylight hours sitting indoors at a meeting. So another purpose of the field events was to meet landowners on their own territory where it would be more convenient, and where the assessment work would be more likely to be directly useful to them.

Each month during the growing season, a week was scheduled when the people of the Working Landscapes Alliance – Wayne Elmore, Hugh Barrett, Janice Staats, and Mike Lunn – would spend the week in the assessment area. One day of that week would be a public field day at a site that would illustrate a particular type of landscape in the Upper Sprague and Sycan. Participants visited private ranches, Forest Service grazing allotments, the Sycan Marsh Preserve, U.S. Timberlands' timber ground, and other sites. The groups on these field days were always fairly diverse, with landowners, agency people, scientists, and other community members. The best part of these public field days was hearing everyone talk about the same landscape from all their different perspectives. These conversations got a lot of good information out in the open, including facts and figures that otherwise wouldn't have made it into this assessment. The field days also tended to surprise people who thought they knew all about what was happening on a

particular piece of property. This happened to landowners, activists and scientists alike.

On the rest of the days during the field weeks, private ranch visits were scheduled that would not be open to the public. Sometimes the ranch owners would invite neighbors or employees, but the point of the visits was not to "educate the public." The point was learn from the landowner what he or she knew to be true on the land where they lived, and to see if there was something the WLA could do to help the landowner. Most times, the WLA would conduct a detailed Proper Functioning Condition site assessment, which included a narrative, reach photos, conclusions and recommendations.

The riparian PFC site assessment is a way to determine if a stream has what it needs to keep itself stable during high-flow events (5-, 10- and 20-year events). The analysis is based on a set of seventeen questions regarding the vegetation, the hydrology and the sediments on the site. It starts with an inter-disciplinary (ID) team that usually includes specialists in hydrology, vegetation, soils, biology, as well as, ideally, the landowner or resource manager. The ID team walks the stream reach together, each looking at the area through their own perspectives based on their experiences and expertise. A similar approach was taken in reviewing upland function.

This approach can take quite a while sometimes, because people are always having to stop and talk about this or that. The botanist finds a plant that is particularly good for holding stream banks in place, or the hydrologist notices where the main flows got cut off from a big meander, or the soils person finds a patch of soil that indicates that the site used to be a lot wetter than it is now. And all the way through, the landowners are talking about how they run animals, how they move water, and what they remember their parents or grandparents saying about what the place was like long ago.

When the group gets to the end of the stream reach, they all sit down and start comparing notes. They talk about each question in turn: "Can frequent flood flows get out of the channel and on a floodplain reasonably often?" "Are there enough of the right kinds of plants on site, and are they healthy?" "Is the stream able to move the sediment that comes onto the floodplain or through the system, or are there big sandbars out in the middle?" "How is water moving across the soil surface?" They go back and forth until they all agree on the answers to each question, and then they make a call. Is the site functioning properly? Is the site at risk, and if so is it on an upward or a downward trend? The answers to these questions really help to clarify what a landowner can do – or can't do for that matter – about the conditions of the stream.

In some cases these site assessments led straight to a stewardship project or to monitoring. In other cases all the WLA experts could say is that things looked good, and that the landowners just need to keep doing what they are doing. But in all the cases, everyone who participated learned a lot about how the Upper Sprague and Sycan watersheds work.

Although there were many finding that came out of these field days (see Riparian and other chapters), two things were particularly striking about what was learned, at almost every site that was visited.

One was how truly resilient and responsive these landscapes and streams are. So often environmental issues are approached like they are enormously complicated and difficult. But over and over again field day participants learned how, with a little better understanding of how these systems function, and some relatively minor adjustments in management, these riparian sites will bounce back both quickly and dramatically.

The other striking thing that was learned was how often a recommended action benefited both the natural system and the landowner. Some stakeholders often tend to think that in order to improve the natural systems there has to be a negative affect on an agricultural operation (or vice-versa). But what was learned on the ranch visits was that sites where the stream wasn't working well were often also the sites where forage production had gone down. And since stream and upland stability is invariably linked to the amount and vigor of the vegetation on the site, the solution to the stream problem often results in improved forage production and quality as well.

THE ECONOMICS OF RESTORATION

No analysis of a watershed is complete without consideration of those social and economic factors that necessarily drive the behavior of those who influence that watershed. Because much of the most important habitat areas within the watershed are owned privately, the influence of these factors, especially economic ones, on landowners is one of the most important determinants of watershed condition.

These landowners, for the most part family ranchers and farmers, run labor intensive, low profit margin operations, which are under increasing economic pressure from rising costs and regulatory requirements. While take the stewardship of their land quite seriously, they must also sustain a viable business that supports their families. Some well meaning attempts at environmental restoration in the past have not been successful long-term precisely because they have failed to take just such factors into account. Some projects have appeared successful at the time of implementation, but the landowners have not had the time and money to maintain the projects long term.

Therefore, while the best scientific approaches and conditions are vital, they need to be applied within the constraints of their social and economic settings. A functional watershed in optimal condition would balance the needs of species, people and economics.

The economics are restrictive at many different levels. There is not an unlimited source of money from granting entities, government agencies and landowners. Projects and management changes must therefore be prioritized.

At another level, it is important to consider economic feasibility from the landowner viewpoint. Quite simply, the landowner is limited in time and money. Often management changes that may be beneficial in the long term are prohibitively expensive in the short term. To a landowner who is extremely busy managing their current operation, it is often difficult to find the time or money to implement idealized management changes. While landowners, no less than others, recognize the importance and benefits of such long-term management changes, their challenge is to balance the cost-benefits of implementing best management practices and beneficial projects with the needs of their business.

Habitat restoration efforts that fail to take into account these issues can also fail to address a more profound threat to the long term environmental health of the basin: The combination of increasing economic threats to the viability of family ranches and farms with the rising value of their land for "recreational use" by increasing numbers of retirees and others threatens these lands with conversion to commercial real estate development. In many areas of the West, including the Klamath Basin, such development has often resulted in substantial degradation of the environment. Therefore, efforts to restore the watershed that fail to account for the social and economic needs of landowners might well have precisely the opposite effect over the long term.

A NOTE ON "REFERENCE CONDITIONS"

Whereas it is often useful to refer to "reference conditions" or a "natural state," it is important to note that such baseline conditions may not be considered desirable for the present. For example, while juniper overgrowth is a problem that can often be addressed by burning, most would agree that the reference condition of completely uncontrolled wildfires that could threaten life and property is inappropriate for today. Similarly, few would advocate closing all roads within the watershed, but this would indeed represent the "reference condition." Another limitation is our limited ability to accurately characterize conditions that existed before detailed records or data were collected.

Therefore, within the text of this Watershed Assessment, the term "reference condition(s)" should be understood to be limited to just that: a frame of reference against which to measure the impact of our civilization, for better or for worse. No inherent value is implied nor should be inferred.

DOCUMENT ORGANIZATION

The format of this document reflects certain principles that have emerged from the watershed assessment process. The topics that are covered, and the order in which they occur, are meant to emphasize that scientific understanding must be joined with social and economic understanding in order to result in lasting solutions that have solid community support. They are also meant to emphasize the conviction that overall watershed condition and function -- in both riparian areas and in the uplands -- are the result of dynamic interactions between soil, water, and vegetation.

The insight that soil, water and vegetation interact dynamically to produce watershed conditions has led to two principles that have informed the content of this document. First is the importance of basing our restoration and/or our management planning on site-specific conditions, rather than on generalized judgments about conditions at the watershed scale. While watershed-scale statements and analyses are very important for context and for the "big picture," any actual on-the-ground actions must be rooted in analysis of the actual conditions on the site in question.

Second is the importance of focusing on "trend over time," rather than on static "snapshots" of watershed conditions. The snapshot approach to assessment of conditions compels the analyst or resource manager to make "black or white" determinations about whether or not a given site is acceptable. Focusing on trend over time, on the other hand, allows the resource managers to determine whether fundamental processes are in place that will produce a stable -- but dynamic -- landscape over the long term.

The preceding principles are reflected in the format of this document in the following ways:

- Initial chapters present information about community involvement in the process, and about social, economic and historical aspects of the watershed
- Chapters Four through Eight present information about soils, water, and vegetation, in that order, for both riparian areas and the uplands; Chapter Nine addresses how the interactions of these components result in different stream channel forms within the watershed
- Chapters Ten through Twelve relate this information to regulatory and species habitat issues, with specific attention to water quality and listed species
- Chapter Thirteen, the Watershed Function Summary, is both brief and general, reflecting the principle that watershed-scale appraisals are important for context and prioritization, but secondary to site-specific analysis when it comes to restoration or regulatory action.
- The document ends with action-oriented chapters, emphasizing both the substantial restoration accomplishments of local stakeholders, as well as the work that is yet to be done.

CONCLUSION

Although this document is printed and bound, the Upper Sprague and Sycan River Watershed Assessment will continue to be a work in progress. The landscapes that support us are always changing, and so are the communities we live in. We will continue to learn more about how the watershed works, even as we get to work on the projects we want to do. In fact, that's probably where the real learning begins: when we get out on the land itself, trying to make things better.

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