

# PRINCIPLES FOR THE PRACTICE OF ADAPTIVE MANAGEMENT

IN THE PREVIOUS SECTION, WE DISCUSSED the specific steps involved in the practice of adaptive management. In this section, we outline eight principles that you should keep in mind as you go through these steps. Each principle describes a characteristic of an individual, project, or organization that we believe contributes to effective adaptive management.

These principles are:

Principle 1: Do Adaptive Management Yourself

Principle 2: Promote Institutional Curiosity and Innovation

Principle 3: Value Failures

Principle 4: Expect Surprise and Capitalize on Crisis

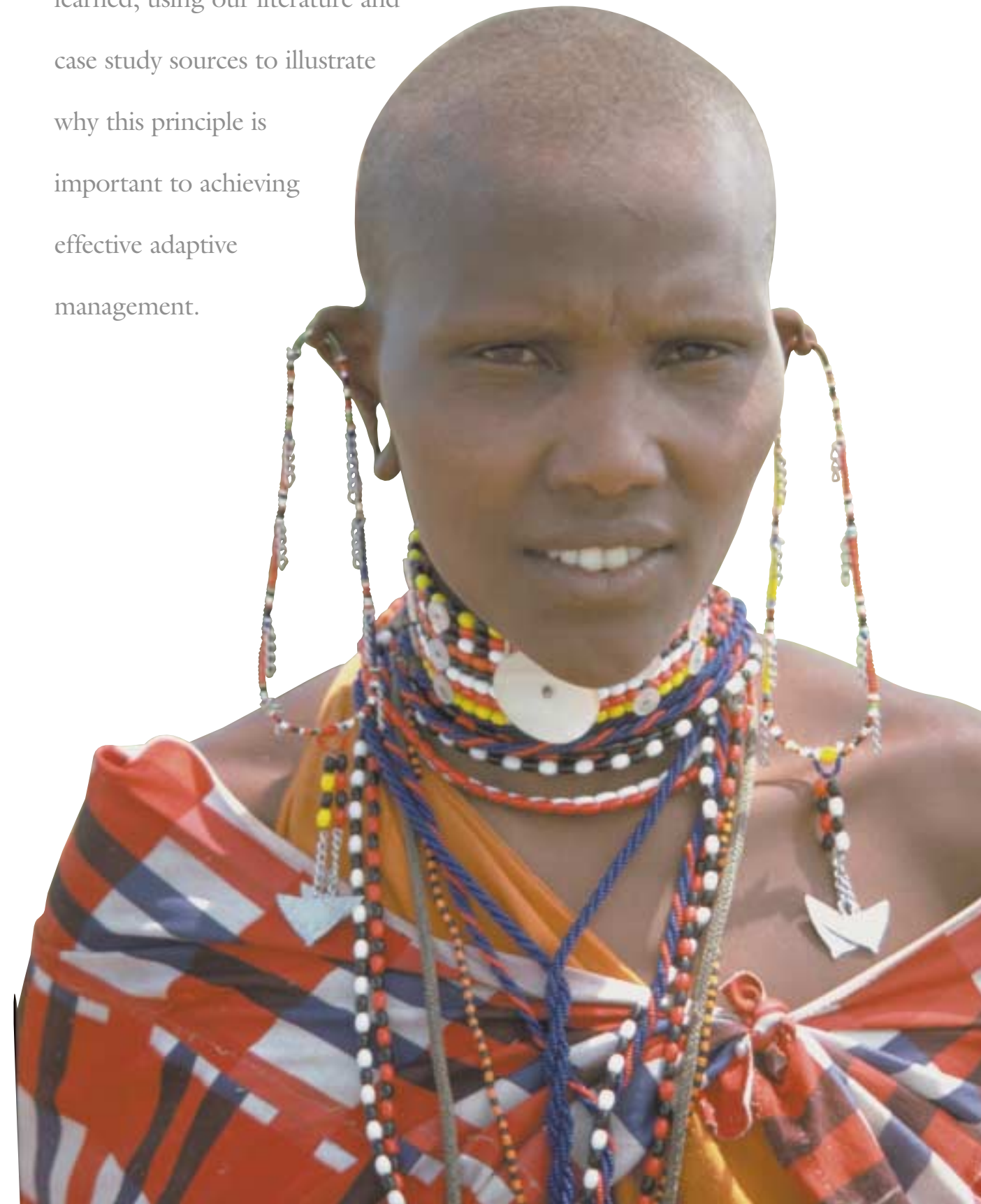
Principle 5: Encourage Personal Growth

Principle 6: Create Learning Organizations and Partnerships

Principle 7: Contribute to Global Learning

Principle 8: Practice the Art of Adaptive Management

For each of these principles, we first discuss what the principle means in the context of conservation. We then lay out some of the key things that we learned, using our literature and case study sources to illustrate why this principle is important to achieving effective adaptive management.



## Principle 1: Do Adaptive Management Yourself

Perhaps the most important principle is that project team must be responsible for performing effective adaptive management. All too often, it seems that either an external consultant or a member of the lead organization who is based in a headquarters office designs conservation projects. These outside people go through some of the planning steps discussed in the previous section such as doing a site assessment and developing management and monitoring plans. They then turn the plans over to the project team on site to implement them. One obvious problem with this external based design process is that the outside designers may not be fully aware of the complexities of the situation at the project site. As a result, the project may not fit with local conditions.

From an adaptive management perspective, however, a more troubling problem with the standard approach is that because the project team was not involved in the design of the project, it may be hard for them to feel ownership over the project. In particular, the project team will have little knowledge of the assumptions and ideas that lie behind the project. As a result, they may not be able to implement the project in the way that the designers intended. More importantly, it becomes difficult for the team to change the plan in any systematic way. And it becomes hard for them to do any learning under these conditions.

To solve these problems, it is imperative that the project team members go through the steps in the adaptive management cycle themselves. Adaptive management cannot be left solely to outside experts that are not involved in project management. It also cannot be delegated to a special research team that is solely charged with looking impassively at the potential project outcomes while the rest of the team sits around waiting for their results. The team may need to get some advice or assistance from outside sources, but ultimately they need to do the work themselves. You and your colleagues are the researchers. You are responsible for testing your own assumptions and for using and learning from the results.

### Involve Regular Project Staff Members

A number of the literature sources that we reviewed emphasized the importance of having regular program staff conduct adaptive management. As Kai Lee says:

*For a policy to be an experiment, regular program staff must carry out major portions of the experimental protocol...if a change is to be made as a result of lessons learned from the experiment, the acceptability of that change to those who must implement it is likely to be heavily influenced by their memory of the experiment and how it was carried out.<sup>86</sup>*

In a similar fashion, Norm Bilodeau of the BC FORESTRY INITIATIVE believes that since he is the resource manager, he is also ultimately responsible for designing the adaptive management process. He often consults with various experts, but that “somewhere in the research process, you need to have somebody like me that’s sort of a generalist — someone who is not a master of all the specialties, but has an overall perspective.” He went on to say

that having the resource manager design the process is key so that the specialists don’t get off track by focusing on their particular specialty. As the resource manager, he can tell the specialists that what they advocate “has to make sense to me.” John Ericho of the PNG PROJECT agreed, saying that “the key aspect of this process is that we as project staff are doing it — because we understand it, we are able to go back and say this is not right, I think we should do this other thing instead.”

### Help People Learn About Adaptive Management

Although the concept of having a project team doing adaptive management sounds good in theory, getting a team to fully participate in the process may be easier said than done. It may be hard to get people unfamiliar with the concept to pay attention to a process that they might not understand until they can see the relevance of the situation for themselves. Kai Lee describes how one potential problem in getting regular staff to carry out adaptive management experiments is that, “They may not know what they are doing and bungle the task, or they may know and subvert it instead.” Lee goes on to say, “The key point is to realize that human beings living and working in an operational environment, who do not see themselves as researchers or guinea pigs, are being asked to be one or both.” As a result, gaining their confidence is “a precondition for training staff in their research tasks.”<sup>87</sup>

John Ericho and Robert Bino of the PNG PROJECT echoed these comments when they told the story of how they gave the conceptual model they developed to newer project members. John started by saying, “I think that the conceptual model is possibly mostly completely understood by just the two of us. I really don’t think that the new staff members completely understand it at some levels.” Bino added, “I think that after they have been in the field, they understand. Not when they first come to the project. When then they go out in the field, then they say ‘Oh — So this is what we do.’ They don’t really appreciate the model until they are immersed in the scenario.”

## Principle 2: Promote Curiosity and Innovation

Effective adaptive management fundamentally requires that you have a sense of wonder about how things work and a willingness to try new things to see whether they are more effective. Both curiosity and innovation are basic human traits — as children, all of us investigated our world and tried out different activities. Although things did not always work as expected, we usually learned from the experience.

Unfortunately, curiosity and innovation are not things inherently found in many organizations. As they grow, organizations tend to become more bureaucratic and less flexible. They develop set systems and ways of doing things. As a result, curiosity and innovation are not valued, and may even be discouraged. Spending time wondering about how things work can be perceived as wasteful daydreaming. It becomes safer for employees to use an existing procedure rather than try something new.

To overcome this tendency, for an organization to truly promote learning, it must actively maintain an environment in which staff members are free to explore new ideas and ways of doing things. A common feature of organizations that exhibit “institutional curiosity” is that they continuously question the efficiency, effectiveness, and appropriateness of the projects they implement — they do not simply assume that what they are doing is always right. It also requires that they value the learning that comes from trying new interventions instead of only trying to achieve short-term results.

## Innovate to Survive in a Changing World

The business and organizational management sources that we reviewed emphasize that organizations must maintain institutional curiosity to survive in a competitive marketplace. If an organization does not value curiosity and innovation, chances are it will become stagnant, set in its ways, ineffective, and eventually, overtaken by its competitors that do innovate. For example, Senge quotes the head of planning for a major corporation who states, “The ability to learn faster than your competitors may be the only sustainable competitive advantage.” Senge goes on to say, “as the world becomes more interconnected and business becomes more complex and dynamic, work must become more ‘learningful.’”<sup>88</sup>

All of the conservation practitioners that we spoke with agreed that promoting institutional curiosity and innovation are important for dealing with complex and changing situations. For example, Stephan Forster of the ZAMBIA KANTIPO PROJECT described how “in a dynamic situation, everything changes so you must maintain institutional curiosity. There are new challenges all the time, and you must always be asking ‘Why?’” In a similar fashion, Brian Nyberg of the BC FORESTRY INITIATIVE said:

*I think a lot of even senior field-level managers who have come up through the command-and-control stream in the old days now are under so much pressure and have so many problems facing them that they don’t have easy solutions. Even they realize that curiosity and learning is something that is important.*

## Start with Managers at the Top

If an organization is going to be curious and innovative, then this attitude has to come from the top. As Senge writes, the manager is no longer the “captain of the firm” issuing absolute commands. Instead:

*The essence of the new role...will be what we might call manager as researcher and designer. What does she or he research? Understanding the organization as a system and understanding the internal and external forces driving change. What does she or he design? The learning processes whereby managers throughout the organization come to understand these forces.*<sup>89</sup>

The practitioners that we talked to also felt strongly that it is important for managers to encourage their staff members to explore new ideas and ways of doing things. As Brian Nyberg of the BC FORESTRY INITIATIVE stated:

*Whenever an institution makes a commitment to adaptive management, there has to be a serious commitment from top people. It is important to make people involved in adaptive management projects feel that they are free to innovate. In this situation this is best served by having a manager who tells people that they must be free to think outside the box.*

Obviously, as Nyberg said, you “can’t legislate curiosity, but you can encourage it.” Instead, he believes that you have to give people the proper incentives — that “thinking outside the box should be built into performance evaluations.” He went on to say, “I don’t believe that having a top-down directive that ‘You will be innovative and do adaptive management’ is of much help either unless there is a lot of support provided from the ground up and leadership from top down.”

The ability of a manager to promote curiosity and innovation is not only affected by the culture of institution they are working in, but also the culture of the overall society. For instance, many conservation and development projects take place in cultures in which there is traditionally a great deal of respect for authority. This tendency can make it difficult for younger and lower level staff members to try to offer their own ideas instead of trying to tell the boss what they think the boss wants to hear. For example, John Ericho of the PNG PROJECT said:

*Sometimes it is hard for me to get people to talk because I’m the boss. People just want to listen to me and they say to themselves “ok, so he knows better than I do, so I will keep my big mouth shut.” And so that’s something that we are having to work around to promote staff participation and contribution. Where people are afraid to speak, we need to make it an environment where they can talk.*

Ericho also feels that part of this difficulty in encouraging innovation may come from the cultural emphasis on maintaining personal relationships. As he said, “Here in PNG we are worried less about results and thinking more that ‘I must not hurt the relationship.’ So I might be thinking about new ideas but choose not to discuss them with my boss because I think to myself ‘man, if I discuss them with him, is he going to get cross with me?’” Finally, Ericho feels that some of the team building work that RCF is doing may also ironically discourage creativity. As he said:

*We tried to build a team spirit here where everyone is working together. I think this has been counter-productive in terms of speaking your mind because we built the team spirit so much that people don’t want to get out of line by asking too many questions or by saying something different to what everyone has been saying.*

## Principle 3: Value Failures

Effective adaptive management also requires that you value failure instead of being scared of it. Fear of failure stops us from trying risky things. If you are scared of falling, you may never try to ride a bicycle because you know you will fall off the first few times you try. If you are ashamed of falling, you may not stop to think about why you fell and learn from your mistakes. You may also avoid discussing your experiences with more experienced cyclists. Valuing failure does not mean that failure is desired — falling off a bicycle hurts and causes delays in reaching your short-term destination. In the long-run, however, people who are willing to fall a few times while learning how to ride a bicycle will reach future destinations faster than those who are not willing to fall and must walk everywhere they go. A willingness to fail is thus an indicator that you are pushing yourself to get better.

Many projects and organizations seem to be like the person scared to ride a bicycle for the first time. Under pressure to achieve short-term “results,” failure is seen as something to be avoided at all costs. Accordingly, risky activities are not undertaken. Furthermore, when (as is inevitable) things do fail, great effort is expended to cover up the failures and pretend they never happened. As a result, no learning occurs and people keep making the same mistakes over and over again.

It is also important to create environments in which the risk of failure is lessened. Going back to our example of the new bicyclist, it would not be a good idea to have a novice rider learn to ride on hard bumpy terrain. Instead, we should try to pick a soft place where the rider can fall with minimal pain and maybe even give the rider a helmet. In a similar way, projects and organizations can provide a setting in which their staff members feel secure about sharing their failures. Without this safe-fail environment, free from the fear of punishment, people may feel cautious and unwilling to take risks or share what they have learned the hard way.

To overcome this tendency, it is important for a project or organization to embrace failure rather than try to hide it. Failure should not be valued as much as success, but neither should it be hidden if it can be put to good use — that is, if it is used as a learning experience. It also requires organizations to create an environment in which project team members have the security to take risks and learn from failures.

## Learn from Your Mistakes

The literature sources that we reviewed emphasize the need to value failure in order to promote learning. In effect, they state that it is important not to hide failures, but instead to learn from them. As Pirsig puts it:

*An experiment is never a failure solely because it fails to achieve predicted results. An experiment is a failure only when it also fails adequately to test the hypothesis in question, when the data it produces don't prove anything one way or another.*<sup>90</sup>

In a similar fashion, Lee says that if an implemented policy fails, “an adaptive design still permits learning, so that future decisions can proceed from a better base of understanding.”<sup>91</sup> Senge echoes this when he says, “failure is an opportunity for learning (about inaccurate pictures of current reality, about strategies that didn't work as expected, about the clarity of the vision.”<sup>92</sup> He goes on to quote one business manager as saying “the hallmark of a great organization is how quickly bad news travels upward.”<sup>93</sup>

All of the practitioners supported agreed with the importance of recognizing failures. Perhaps Brenda Taylor of the BC FORESTRY INITIATIVE said it most succinctly when she described true failure as “Not taking advantage of opportunities and not learning from something — that true failure occurs when you fail to learn.” In a similar vein, her colleague Brian Nyberg stated:

*We have to accept the fact that we are probably not going to achieve exactly what we wanted, and some people may call that failure. If you deliberately try two or three different things, somebody is going to be able to say that one of them, at least, was a failure. But if you learn from it and especially if you can share evidence with other people and show them why one thing worked and another didn't, then that's not a failure by any means.*

## Create a Safe-Fail Environment

The literature sources that we reviewed emphasized the importance of creating an environment in which employees know they will not be “blamed” or “punished” if something goes wrong. According to Senge, leaders intent on creating a learning organization must:

*Work relentlessly to foster a climate in which the principles of personal mastery are practiced in daily life. That means building an organization where it is safe for people to create visions, where inquiry and commitment to the truth are the norm, and where challenging the status quo is expected — especially when the status quo includes obscuring aspects of current reality that people seek to avoid.*<sup>94</sup>

The practitioners we spoke with largely agreed that it is important for organizations to create an environment in which failure is not hidden. For example, Brian Nyberg of the BC FORESTRY INITIATIVE said, the key is that “When we don't really know what we're doing, we should be prepared to admit that freely and openly, and then also make a commitment to learn how to do better. These two things go hand-in-hand and are a way of building trust and support and acceptance that we'll never get if we just try to pretend that we know what we are doing.” Likewise, his colleague Norm Bilodeau talked about how he had the ability to conduct his experimental work even in the face of budget cuts because of the support he had from his bosses, “There was pressure there, I guess. The compliment to my bosses would be that they were willing to work with the risk given that I had a good track record, and so they were willing to ride the storm.” He goes on to say:

*Interestingly, I think adaptive management provides a process for institutionalizing change and innovation. It is almost as if the adaptive management process absorbs many of these perceived risks by incrementalizing it and providing an acceptable context that actively encourages problem identification.*

The practitioners also said, however, that creating this environment is not always easy. Dale Lewis of the ZAMBIA ADMADRE PROJECT described how difficult it can be to expose your failures in an environment in which you are competing with other projects and are being judged on results:

*When you are competing for funds, you tend to be less honest and willing to expose yourself. Trying to hide your weaknesses is dangerous. You end up needing to separate your thinking — on one hand playing politics, the other doing good science. I'd like to think I can do both. If you go down just one road, you lose. You have to fight — there are people out there who will mess you up. At the end of the day you are judged on results. To play politics, you need to hide mistakes — that's what it takes. But to learn, you need to look at them out in the open.*

John Ericho of the PNG PROJECT described some of the challenges that he faced in getting national staff at RCF to speak up at meetings because the national staff were worried about speaking up in front of the expatriate staff who they perceived to be the experts. RCF ended up holding some meetings with just national staff to try to give them an environment in which they could speak up. As Ericho says, “When the expatriate staff are there, people don't talk since they are afraid that they might say the wrong thing, thereby inviting criticism. What I'm trying to do is get people to talk among themselves and express themselves in a comfortable setting. People can be afraid to speak — we need to make an environment where they can talk.”

## Principle 4: Expect Surprise and Capitalize on Crisis

Effective adaptive management also requires that a project or organization both expect the unexpected and be prepared to act quickly during periods of turmoil. Expecting surprise may sound a bit paradoxical. Yet although surprise may not be something you can really plan for, it is something you can anticipate and be open to. No matter how well we plan, in complex systems things will almost always work out different than expected. One of the keys to conducting a good experiment is being open to any results that may occur, even if they challenge deeply held beliefs. Often it is the strange and surprising results that will lead to new insights and understanding, but only if you are willing to look for them.

Big surprises can often lead to major crisis situations that occur when people lose confidence in the system. Although crisis situations can be difficult, they also present opportunities. When things are going well and there are no pressing problems, people generally have little interest in change. But when there is a crisis, people are often motivated to take immediate and decisive action to remedy the situation. If you are prepared to act, crisis situations can thus be important opportunities to make lasting changes in a system. In times of crisis, the latitude to try new things and fail is greater than under normal conditions. This usually means that people are more willing to take risks as the potential benefits outweigh the potential cost of inaction. During crises, new ideas may emerge that can form the basis for an organization to develop new activities, strategies, and directions.

All too often, however, it seems that conservation project teams try to avoid surprises and ignore observations that might contradict established doctrines. Likewise, most conservation projects are constantly facing crisis situations. These situations can be caused by external sources such as droughts, hurricanes, earthquakes, and other natural disasters, wars, *coups d'état*, and other political problems, and recessions and other economic problems. Or they can be caused by internal sources such as losses of funds or management transition problems. Unfortunately, in many projects and organizations, there seems to be a tendency to try to ignore or run away from these crisis situations.

If, however, a project or organization expects surprises and is prepared to make use of crisis, then these moments can actually provide opportunities for major changes and growth. It is at these times that project management is the most challenging, but it is also during these critical times that effective leadership, vision, and judgment come to light. If you are prepared to act during a crisis, you may be able to advance a new idea or project that will ultimately be more stable and effective.

### Use Surprises to Point to Flaws in Your Understanding

A common feature of the literature sources that we reviewed is that they expect surprising results to occur. As Holling states, “the unexpected can be expected.” Owing to the interaction between irregular cycles and the non-linear nature of many relationships, ecological systems may appear to behave according to one set of rules, but may

suddenly flip into a radically different state. For example, a fishery may currently yield a constant supply of fish, yet be on the verge of precipitous collapse. Traditional methods of monitoring or assessment can misinterpret these shifts and make them seem unexpected or perverse. Yet these surprises can also be viewed as clues that can point to a new way of looking at the system. Pirsig writes:

*In a laboratory situation, when your whole procedure goes haywire, when everything goes wrong or is indeterminate or is so screwed up by unexpected results that you can't make head or tail out of anything, you start looking laterally...lateral knowledge is knowledge that's from a wholly unexpected direction, from a direction that's not even understood as a direction until the knowledge forces itself upon one. Lateral truths point to the falseness of axioms and postulates underlying one's existing system of getting at truth.*<sup>95</sup>

In a similar fashion talking about professional practice, Schön states:

*The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomena before him, and on the prior understandings which have been implicit in his behavior. He carries out an experiment which serves to generate both a new understanding of the phenomena and a change in the situation.*<sup>96</sup>

Many of the practitioners that we interviewed agreed that surprise is a common feature of their project and a catalyst for change in their understanding of the system. For example, Doug Steventon of the BC FORESTRY INITIATIVE described how he and his colleagues “had a little biological surprise” when their data showed them that certain bird species that they were concerned about actually ended up being more abundant in timber plots that were partially cut. Likewise, Stephan Forster of the ZAMBIA KANTIPO PROJECT told us:

*We had some big surprises. The whole concept of poaching that we originally held was wrong! We thought that poaching was being driven by the big shot who has guns and who would pay villagers to get meat in combination with locals hunting “meat for their pot.” But we found that this doesn't exist. Instead, to our surprise, most poaching was done as a household activity to make money out of the meat. So, we totally shifted our approach — cash became the issue — and agricultural support at the household level became the major activity of our community-based program.*

Likewise, John Ericho of the PNG PROJECT described how in their project, they initially assumed that local people's need for cash was the most important factor driving their decisions. As a result, the project tried to develop enterprises to help people raise cash. Over time, however, they discovered that “the surprise was that we thought cash was the biggest need in the community and it wasn't.” Instead, they found that people were after things like “self-esteem” and the “development that comes from things they can see and identify with.” They found that what people wanted most was to be connected to the outside world — that once the villagers had guesthouses, they could “strut around with a worldly look.” Once the project team caught onto this surprise, they began to modify their project plans and the activities that they were undertaking.

### Use Crises as Opportunities for Action

If there is a major surprise, it can lead to a crisis situation in which existing theory crumbles and there is no guidance for action. Many of the literature sources that we reviewed state that it is precisely during these crisis

situations that it is possible to take high leverage actions. Kuhn, for instance, believes that major revolutions in scientific thinking come about during crisis periods when established theories all of a sudden no longer seem to work. He cites as an example the observations of “inconsistent” movements of the planets that contradicted the path that would be expected if they orbited the earth as described by the prevailing theory. These observations led Copernicus to reject this long prevailing theory and propose instead the theory that the earth and planets orbit the sun. Similar revolutions also occurred in chemistry before the discovery of oxygen by Priestly and Lavoisier and the development of the theory of relativity by Einstein. As Kuhn writes, “In each case, a novel theory emerged only after a pronounced failure in the normal problem-solving activity...the novel theory seems a direct response to crisis.”<sup>97</sup>

In a similar fashion, Holling describes a four-phase cycle that ecosystems go through.<sup>98</sup> There is typically a slow building phase in which the system builds up capital such as stored nutrients and also becomes more complex. This steady growth plateaus during a climax or conservation phase. The system is then suddenly transformed during a crisis or release phase such as during a forest fire. Following the crisis, there is then a reorganization phase during which the system can return to its former starting point — but also can flip up or down to a different plane in terms of the available capital. The key point in this model is that the leverage to truly impact the system comes during the critical revolution during the crisis and reorganization phases. Resource managers should be prepared to take action during crisis periods that occur when the existing policies are recognized clearly as no longer being adequate — in effect, “to learn to manage by change rather than simply to react to it.”<sup>99</sup> Although this model was originally developed to describe ecosystems, Holling and his colleagues soon realized that it could also be applied to the cycles that organizations and societies go through. For example, organizations often go through periods of steady growth that are suddenly shattered by a crisis caused by cutoffs in funding or a leadership transition. Likewise, peaceful societies can be suddenly transformed into unstable ones by crisis situations caused by natural disasters, political turmoil, and economic problems. These crisis periods provide important opportunities to leverage change within the system. An individual within an organization or a group within a society that may have no hope of impacting the system during the slow exploitation and conservation phases may suddenly get their chance during the release and reorganization phases — if they are prepared and ready to act.<sup>100</sup>

Few of the practitioners that we talked with could identify major crises in theory that had emerged in their work in the sense that Kuhn talks about it. However, all of the projects frequently faced crisis situations of the type that Holling describes — as Norm Bilodeau of the BC FORESTRY INITIATIVE said, “We thrive on crises.”

In some cases, these crises were triggered by external events. For instance, the ZAMBIA ADMADE PROJECT faced a series of food shortages in the country that forced them to look at sustainable agriculture as a way to address community needs that were causing poaching. Likewise, the BC FORESTRY INITIATIVE staff described how the provincial government faced massive budget restrictions as a result of the Asian economic crisis and the resulting reduced demand for forestry products. Norm Bilodeau described how the crisis provided a good opportunity to demonstrate to senior management how the planning that they were doing, as part of their adaptive management

regime, allowed them to work in a much more flexible and efficient manner, absorbing the budget losses by adjusting harvesting plans to reduce road construction requirements.

In other cases, these crises were triggered by internal events occurring within and between the different stakeholder groups involved in the project. For example, the ZAMBIA ADMADE PROJECT initially had decided to work with local chiefs to help implement projects because they held the most power in the communities. A minor crisis developed when it became apparent that some of the chiefs were corrupt. As a result, the project moved to creating Community Resource Boards that ended up being much stronger in the long term. In a similar fashion, the PNG PROJECT went through a crisis period during a leadership transition problem. As John Ericho states, this “crisis was a blessing in disguise” in that in solving it, they were able to restructure the organization in a more effective manner. Another crisis that this project faced was when some of the local leaders in the villages where the project was taking place planned in secret to evict the project from the area on the basis that they hadn’t delivered any tangible goods. During this developing crisis, one of the local clans came out in public and said they would “defend RCF with their lives.” This was an important statement that solidified long-term support for the project.

## Principle 5: Encourage Personal Growth

Ultimately, projects and organizations are only composed of people. So clearly, effective adaptive management requires people who have the necessary skills and experiences. It also requires individuals who have a commitment to personal growth and learning. Unless the people in the organization learn new skills and gain new experiences, it is highly unlikely that the organization will grow.

Most conservation projects and organizations are under severe pressure to achieve substantial results with limited staff and money. As a result, there can be a tendency to use all available resources to deal with short-term problems. Unfortunately, this tendency often means that projects hire the nearest available person to solve a particular problem. And it means that they do not invest in helping this person learn and grow over time.

To conduct effective adaptive management, a project or organization has to hire people who are committed to learning and growing. It also must invest in giving these people the resources, motivation, and most importantly, time to develop new skills and knowledge. Investing in staff can be expensive in terms of the upfront costs required as well as the time away from their regular work. But this investment should pay off in terms of more productive and invested staff members.

### Hire People Who Are Committed to Learning

Several of the business and organizational management sources that we reviewed emphasize personal growth. For example, Argyris and Schön write, “Organizational learning is not merely individual learning, yet organizations learn only through the experience and actions of individuals.”<sup>101</sup> In a similar fashion, Senge extensively discussed

his discipline of developing “personal mastery.” Personal mastery does not mean gaining dominance over things, but instead demands a commitment to lifelong self-learning. According to Senge, ultimately organizational learning depends on individual learning since “organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning. But without it, no organizational learning occurs.”<sup>102</sup> Senge goes on to say, “the organizations that will truly excel in the future will be the organizations that discover how to tap people’s commitment and capacity to learn at all levels in an organization.” Furthermore, this learning can never cease:

*To practice a discipline is to be a lifelong learner. You never arrive; you spend your lifetime mastering disciplines. You can never say, “We are a learning organization” any more than you can say, “I am an enlightened person.”*<sup>103</sup>

The practitioners that we spoke with agreed that personal learning is critical to good adaptive management — and ultimately to conservation success. In particular, the conservation groups we spoke with discussed the challenges that they faced in finding trained staff given the relatively low wages and benefits they can pay compared to the private sector. One way around this challenge is to hire staff who may have less experience but who are committed to both conservation and especially to learning. For example, the PNG PROJECT hires people with a business background to help them run their eco-enterprises. But they also want to find people who are good learners so they can learn about conservation. As Robert Bino said, the key is “how our business people learn. And now that I think about it, I am amazed at what they seem to learn about conservation.” Norm Bilodeau of the BC FORESTRY INITIATIVE proudly said, “I’ve been a life-long tinkerer and learner.” He went on to say “I’ve spoken to lots of professionals who tell me ‘I went to a university to do my learning — why do I have to read all that stuff now?’” Bilodeau said when he hears this, “my jaw just kind of drops.”

## Invest in Helping Staff Develop Skills and Experiences

The literature sources that we reviewed also emphasized the need for projects and organizations to invest in their staff to help them develop their skills and experiences. Senge writes that to promote personal mastery, an organization must “continually reinforce the idea that personal growth is truly valued in the organization” and it must “provide on the job training that is vital to developing personal mastery.” Senge also cautions, however, that this training must be voluntary, saying that “compulsory internal personal growth training programs” are “probably the most sure-fire way to impede the genuine spread of commitment to personal mastery in an organization.”<sup>104</sup>

Although the practitioners that we spoke with recognized the need to help their staff members develop new skills, they also emphasized that this requires a substantial investment in terms of both money and short-term opportunity costs of staff time. For example, John Ericho of the PNG PROJECT team described how they created a staff development program. As he said, “We allow staff members to do evening studies now. For example, our accountant is enrolled part-time studying at the University of Technology to improve his skills. And we’re

thinking about sending our Education Officer to India where she’ll receive specialist training in conservation education.” These training sessions obviously require substantial investments from the organization. Ericho said the key is that staff members have to be motivated and propose the training themselves:

*We tell them, ‘It’s up to you, you take the initiative. If there is a workshop that is coming that is useful, let us know — we have only so much money each year for staff development — but we will see if we can assist you to the to improve your skills so that you can become a better person giving us high productivity.’*

Traditionally, one of the challenges of providing individuals training is that once people receive training, they can leave the organization, taking their new skills with them and leaving the organization back where it started. Although this loss can be frustrating, the key is to view this as a long-term investment in the overall skill level of the society. As John Ericho of the PNG PROJECT said, “if people move on after training, we still think that it’s not a loss...we’re a training ground for conservation personnel in this country so it’s not a loss to us as much as it’s a gain to the country. So, we are happy to serve as a training ground for the good guys.” Even someone who goes on to an oil company or forestry company may over time end up in a position of power and may remember their conservation experience and be a friend you can go to in a decade or two.

## Principle 6: Create Learning Organizations and Partnerships

Effective adaptive management requires projects and organizations to capture the learning that individuals develop so that it can be used in the future. You may feel that the problems and issues that you deal with on a day-to-day basis are too trivial for anyone else to be interested in. Think back however, about what you know now relative to what you knew when you started your career. It probably would have been helpful to know then what you know now. Since you and your colleagues will not be with a project or organization forever, it is important to transfer your knowledge so that future staff members can benefit from your experiences by capitalizing on your successes and avoiding the mistakes that you made. Since most projects are implemented by alliances of different partners, it is also important to make sure that knowledge gets transferred to your partners — and that you get and use knowledge from them.

Projects and organizations are constantly changing in structure, staff, direction, and orientation. All too often, it seems that when new staff members come on board, they end up having to relearn everything and end up making the same mistakes over and over again. It also seems to be common for one group participating in a project to learn something, but not transfer the knowledge to their partners.

To overcome these problems, it is important for projects and organizations to develop ways of getting information and experiences out of the heads of individuals and into the “collective memory” of the group. Projects and organizations that are serious about learning invest in both creating documents that record their history and in

using them. Effective projects and organizations also make sure that they share information with their partners, knowing that if they get too far ahead of them, ultimately they will not be able to work together in an effective fashion. And, of course, your partners may also have a lot of information that would be helpful for you to have access to.

## Promote Organizational Learning

All of the adaptive management sources that we reviewed agreed on the importance of promoting organizational learning. Institutions are formed by groups of people who by working together, can accomplish more than they can on their own. As Lee says:

*No person, however visionary, however powerful, can live and exercise power long enough to steer the world economy from where it is now headed onto a stable long-term course...if there is a better path, it must be found or built by human institutions, organized entities that can act beyond the reach of individuals. Institutions embody ideas too detailed, too disciplined, and too rigid to reflect any single person, however powerful; but they can become the powerful reflection of many overlapping lives, almost all of them individually modest.*<sup>105</sup>

Although institutions can be more powerful than individuals, they also have a harder time learning things. Perhaps Argyris and Schön best summed up this thought when they stated that:

*Organizational learning is not the same thing as individual learning, even when the individuals who learn are members of the organization. There are too many cases in which organizations know less than their members. There are even cases in which the organization cannot seem to learn what every member knows.*<sup>106</sup>

The challenge is to help an organization learn and retain knowledge over time by combining the knowledge of the many people who make it up. As Argyris and Schön say, “Each member of the organization constructs his or her own representation, or image, of the theory-in-use of the whole. That picture is always incomplete...it is the continual, concerted meshing of individual images of self and others, of one’s own activity in the context of collective interaction, which constitutes an organization’s knowledge of its theory-in-use.”<sup>107</sup>

The practitioners that we spoke with agreed that long-term success depends on capturing individual knowledge in the organization. As Dale Lewis of the ZAMBIA ADMADDE PROJECT said, the whole point of doing adaptive management is that “once we learn something, it has to become part of our institutional knowledge.” Brian Nyberg of the BC FORESTRY INITIATIVE agreed, stating that “because people turn over so fast and because a lot of these projects are run by volunteers, we need to have some way of maintaining awareness of the project, its history, and needs for future action. So obviously there has to be some permanent record kept in the local office where the project leadership is housed.” His colleague Norm Bilodeau also agreed, saying that:

*Capturing learning isn’t a legal requirement, but it’s a bit of a social imperative so that there’s a written history — so that the person who will eventually take over my job will understand the things that I’m deciding now — that needs to be specified. These are things that we now only have between our ears. But we need to write out things like what we will do, what kind of processes will go in place if, for example, there is a significant increase in sedimentation from a certain pattern of timber harvesting. I know it up here [points to his head], but I have got to write that stuff down.*

## Build Teams of Project Partners

The business and organizational management sources that we reviewed spent a good deal of time discussing what Senge terms the discipline of “team learning.” As Senge writes, “Teams, not individuals, are the fundamental learning unit in modern organizations. This is where ‘the rubber meets the road;’ unless teams can learn, the organization cannot learn.”<sup>108</sup> He goes on to say that the key to team learning is to get the members of the team focusing their efforts in the same direction — in a state of *alignment* in which a group of people function as a whole.<sup>109</sup>

In Senge’s book, he is clearly talking about project teams within a large company. In a conservation setting, however, we can apply these same ideas to project teams that may be composed of partners from several organizations. The key here is to make sure that these various partners are all learning as a cohesive team. For example, Brian Nyberg of the BC FORESTRY INITIATIVE strongly emphasized the need for developing learning across partnerships. He said, “Participation in partnerships is absolutely essential. Anybody who is likely to be able to help or hinder the project that is being developed should be brought in early on so they understand what’s being done and why, and ideally, so they have the opportunity to find a way to participate themselves.” What you need to avoid is a situation where you “make it halfway through the project and find that somebody who doesn’t understand what you are doing has enough influence that they can put a stop to your work simply because they didn’t ever have a chance to contribute or be brought up to speed.”

The practitioners we spoke with said that investing time and energy in sharing learning with your partners can create an important sense of trust. For example, Stephan Forster of the ZAMBIA KANTIPO PROJECT said “we regularly share our monitoring data with local stakeholders and are constantly providing reports to them. As a result, the project is going along smoothly “because the stakeholders have let go. They trust us to work since they don’t feel like they have to control everything. We provide them with enough information and include them in enough meetings so that they are informed and participating and give useful feedback on the modification of the workplan.”

Interestingly, this sense of partnership can perhaps come more from sharing personal experiences rather than just work information. John Ericho of the PNG PROJECT related the story about how he would spend time with community members that didn’t relate to specific objectives or activities in the project workplan. For example, he would spend time strolling through agricultural areas and visiting with people on his day off. He said, “This type of visit is actually the thing that is keeping the project going. The planned things that we do in workshops have their importance, but the relationship that we develop with the people is critical. It’s the thing that ultimately makes our project work.” At the same time, however, the PNG PROJECT staff also said that bad personal relations can hinder partnerships. For example, they described one barrier to sharing information being a sense that you are giving away secrets to other organizations that are your competition. As Robert Bino said, one reason that RCF does not work with some groups is that “some people want to be territorial. They know the best way to do conservation and want to hold onto it.” John Ericho goes on to add, “You’re right. There are some

organizations that think they are on the right track and they don't want to share. Fortunately, there still is some sharing. I think that we should share ideas, and we really do."

Norm Bilodeau of the BC Forestry Initiative takes this optimism a step further when he said:

*Using adaptive management to build teams of partners is very important. Adaptive management and learning by doing are a bit infectious. A supplementary benefit of our efforts has been that people in other organizations (private and government) became interested in participating in the project. This has led to unexpected partnerships and even in unanticipated funding sources. This "lightning rod" aspect of adaptive management has been both surprising and satisfying.*

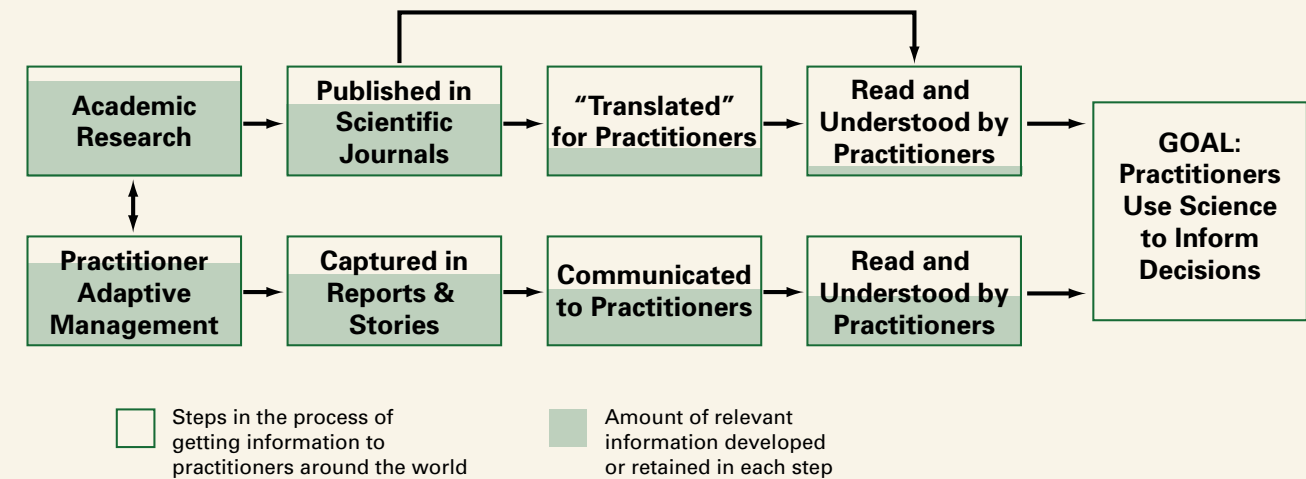
## Principle 7: Contribute to Global Learning

Effective adaptive management requires learning at personal and organizational levels. Learning is also important, however, at global levels. Practitioners all around the world are all struggling with similar problems and challenges. If each project team had to start from scratch and learn all of its own lessons, then conservation would be hopeless. If, however, we can learn from one another, then we have a huge head start in our work. Progress can be defined by the building of new knowledge on the foundation of old knowledge. The key is for each project team to make the lessons it has learned available to the rest of the world.

Often, however, practitioners feel like they do not have the skills to provide meaningful insights into the projects they manage or the situations in which they are working. They feel that research and analysis is best left to trained scientists. As a result, they don't take the time to try to share their knowledge with their peers.

We believe that some of the best and most useful learning comes from project managers with no formal science background. All it takes is a strong sense of curiosity and an eagerness to discover and share new and important insights. As project managers are often much more attune to local site conditions and circumstances and they almost intuitively know what interventions have the greatest chance for success, they are often in the best position to carry out the applied experiments necessary to adapt and learn. You never know what influences your results may have outside of your own project area, but chances are, someone will find them very useful. As shown in Figure 5, a key premise behind the approach presented in this guide is that it is practitioners like you who are in the best position to provide meaningful insights into how to do conservation. Getting your results out to the people who can use them the most is not always an easy task. One route often taken by conservation and development projects is to publish their results in journals, newsletters, and brochures. These forms of communication can often enjoy wide audiences, but they are often targeted at specific cross-sections of society. Increasingly, electronic formats such as listservs and Web sites are becoming popular methods for getting lessons out to other practitioners.

**FIGURE 5. Two Approaches to Generating and Getting Relevant Information to Practitioners**



Access to relevant information is critical to good adaptive management. But where can practitioners around the world get the information they need to do their jobs better? There are two primary avenues by which this can happen. The traditional approach (shown in the top chain in the diagram above) is that the best knowledge and learning is generated by scientists or professional researchers. Scientists, however, often conduct their research somewhat independent of the management objectives of conservation managers. Furthermore, their results are usually published in scientific journals that few practitioners have access to. At best, these technical articles and books are "translated" into more popular pieces with the idea that practitioners will read and understand these documents and then use the information to inform their decisions. The second approach (shown in the bottom chain) holds that it is more effective to have research done by practitioners themselves through adaptive management. Presumably, this research will be on topics that are relevant to practitioners. Furthermore, the results of this work are usually captured in reports, stories, and other communication products that can be easily shared with other conservation practitioners who can then use it in their work.

One of the key assumptions behind this guide is that even if academic research were of higher initial quality than the research done by adaptive managers (a proposition we might dispute), the amount of relevant information that actually reaches project managers (represented by the gray shading) might ultimately be much lower owing to the nature of the information and the problems in communicating the results of academic research to practitioners. In other words, if practitioners do adaptive management themselves, they are much more likely to use the results of their experiments in their own projects — and they will be much more effective in communicating their results to their peers. Of course, as shown by the arrow connecting academic research and adaptive management, perhaps the ideal situation is to have both professionals and practitioners doing research together — collaborating on important issues to address critical conservation concerns.

## Encourage Everybody to Do Good Science

The literature sources we reviewed emphasized that although popular conception holds that science is something that can only be done by Ph.Ds in white lab coats using all kinds of fancy research equipment, in reality anyone can do it. As Pirsig writes:

*A man conducting a gee-whiz science show with fifty thousand dollars' worth of Frankenstein equipment is not doing anything scientific if he knows beforehand what the results of his efforts are going to be. A motorcycle mechanic, on the other hand, who honks the horn to see if the battery works is informally conducting a true scientific experiment. He is testing a hypothesis by putting the question to nature.*<sup>110</sup>

Most of the practitioners that we interviewed agreed with this point. Brian Nyberg of the BC FORESTRY INITIATIVE said quite directly “I certainly believe it is important to contribute to global learning...we want to leave a legacy of learning.” Charlotte Harland of the ZAMBIA ADMADE PROJECT agreed, saying that although we haven’t really done it yet, it is important to have better dissemination. She feels that doing so “would serve to give us access to other info that would help us do our work — we’ll get others to share with us if we share with them.” And John Ericho of the PNG PROJECT said that “everyone has to be continually sharing that information, the experience that everyone is gaining from a certain project.” He then went on to proudly describe how Crater Mountain project representatives have presented papers at scientific conferences around the world.

Taking the time to share your learning with other people can also pay unexpected dividends in terms of building your project team’s self-esteem. For example, the PNG PROJECT had visitors come from landowners in different parts of the country. As Robert Bino related, “These people went in and talked with the Crater Mountain landowners. We were very impressed with the way the Crater Mountain residents interacted with the visitors. In particular, we got the sense that the locals got a sense of pride to see someone coming from a far away place to seek their advice. And, I think in terms of conservation, it just reinforces the idea that everyone has something to offer — other landowners from different parts of PNG can learn from talking to the Crater Mountain landowners, getting ideas and experience that they can use.”

However, the folks we interviewed also warned that you need to target your lessons and that if they are too general, they become meaningless. Perhaps Dale Lewis of the ZAMBIA ADMADE PROJECT said it best:

*I’ve been in Zambia a long time — I think I know what motivates people here — it is structures that fit their particular context. This detail is probably boring for anyone else. If you teach the whole world, then it becomes too general. This is why I left academia. My audience is these people in Zambia. I’m here for Zambia right now — a staging ground for Zambian research.*

Likewise, Brian Nyberg of the BC FORESTRY INITIATIVE said “the challenge, I think, for every organization, is how to get the word out to everybody who is potentially interested, without overwhelming people with more than they need.” He feels that “a lot of practitioners are just overwhelmed by the blizzard of stuff that comes on to their desks, and they don’t know how to sort the wheat from the chaff.”

## Get the Word Out to Help Other People Find You



One potential benefit of making your results available is that it may alert other people to the work you are doing and prompt them to contact you for more information or even to give you more business. As John Ericho of the PNG PROJECT said “we have a good education officer who used to work with a national newspaper. She’s used her contacts to really get the word out about what is going on at Crater Mountain about how we have learned a lot and can share a lot with other people. As a result, now people are knocking on our office door and saying, ‘Now, can you come and help us set up our conservation project?’” Likewise, Charlotte Harland of the ZAMBIA ADMADE PROJECT stated that better information dissemination will help their fundraising efforts. Brian Nyberg of the BC FORESTRY INITIATIVE noted that we (the authors of this guide) found out about his work through the information that his project had posted on the Internet.

Making contacts is only helpful up to a point. If you focus too much on getting the word out, you may soon find that you can spend all your time providing information for other people and have no time to do the work that is directly related to your primary mission. For example, Ericho continued his story above by saying “we now have about twenty-three requests for us to come help people set up conservation NGOs or to promote conservation in their areas. This is a good thing, but we don’t have the staff or money to help them and it takes a lot of time.” His colleague Robert Bino continues, “It can be frustrating when we are unable to assist people who come to our door for help — particularly after we have informed the public concerning the nature of our activities, successes, goals and the mission statement of our organization — because of our limited resources and an existing mammoth task already on our hands to accomplish.”

## Principle 8: Practice the Art of Adaptive Management

Up until now, we have been talking about the “science” of doing effective adaptive management. We’ve outlined a series of steps that you need to undertake to achieve adaptive management. And we’ve presented a series of principles that describe characteristics of projects and organizations that are effective adaptive managers. Our hope is that if you follow these steps and pay attention to these principles, you will be able to improve your ability to do good adaptive management.

However, adaptive management is more than just a science. It is also an art. And like any art such as painting, you can’t just learn how to do it by reading about it. If you want to learn how to paint, you need to try painting on your own. You may also want to watch an expert paint or perhaps even serve as an apprentice to a master painter. You also need to cultivate your intuition and develop your sense of what is good and what is bad. And more than anything, you need to practice painting — to do it, look at and critique your efforts, and then try again.

As much as we hope that this guide will help you do effective adaptive management, we know that you can’t just read about adaptive management and automatically become an expert in it. Like any craft, you need to try it on your own. You need to develop and pay attention to your feelings about your work. Above all, you need to constantly practice adaptive management.

### Treat Adaptive Management as a Craft

Although they are grounded in science, the sources that we reviewed also talked extensively about the artistic aspects of the work. For example, Schön talks about the “art” of practice throughout his book:

*The practitioner gives an artistic performance. He responds to the complexity, which confuses the student, in what seems like a simple, spontaneous way. His artistry is evident in his selective management of large amounts of information, his ability to spin out long lines of invention and inference, and his capacity to hold several ways of looking at things at once without disrupting the flow of inquiry...[this] art seems to me to be, in considerable measure, a kind of reflection-in-action...a process whose underlying structure is the same: a reflective conversation with a unique and uncertain situation.*<sup>111</sup>

According to Pirsig, instead of trying to remain aloof from the system, a scientist should instead view the research process as a craft or art that is practiced over a lifetime. For Pirsig, science is as much about the journey as it is about the destination:

*The study of the art of motorcycle maintenance is really a miniature study of the art of rationality itself. Working on a motorcycle, working well, caring, is to become part of a process, to achieve an inner peace of mind. The motorcycle is primarily a mental phenomenon...the real cycle you’re working on is a cycle called yourself. The machine that appears to be “out there” and the person that appears to be “in here” are not two separate things. They grow toward Quality or fall away from Quality together.*<sup>112</sup>

The practitioners that we spoke with generally agreed that there is a strong artistic component to the work that they are doing. John Ericho of the PNG PROJECT described how much he feels he has learned over the years of doing his project. He feels that if he were to go off and start a new project, the artistic skills that he has developed means that he would be “much better trained and equipped” to carry out the work. Norm Bilodeau of the BC FORESTRY INITIATIVE agrees, saying that more than anything, his experience has given him a “framework” to approach the problem, a set of skills, and especially “an overarching vision” of how to proceed with adaptive management.

### Pay Attention to Your Intuition

Many of the literature sources that we reviewed also emphasized the need to cultivate and pay attention to your intuition. These sources particularly focused on intuition as the source of models and theories that can then be tested. For example, in discussing how a scientific hypothesis gets developed, Pirsig writes, “the true work of the inventor consists in choosing among these combinations so as to eliminate the useless ones...the rules that must guide the choice are extremely fine and delicate. It’s almost impossible to state them precisely; they must be felt rather than formulated.”<sup>113</sup> In a similar fashion, Schön writes that a reflective practitioner “arrives at a new theory of the phenomenon by articulating a feeling he has about it.”<sup>114</sup>

John Ericho of the PNG PROJECT described how they instruct their staff to write progress reports based on their impartial observations, telling their staff “in this report, please tell me what you see without feelings.” However, they also want to know from their staff “what is your gut feeling?” As Ericho said, “sometimes your gut can tell you something important, especially when you might be making a mistake.” He described one example when a tourist who had a potentially serious medical condition came to the reserve and wanted to go on a long hike. His gut told him that he should try to persuade her not to go, but in the end she insisted and she tragically ended up dying on the trip. Ericho said that although obviously he did not have the power to stop her, he wished he had listened more to his intuition and insisted more strongly that she not go.

Brian Nyberg of the BC FORESTRY INITIATIVE agreed that adaptive management involves a “creative process” and that it’s not something “that you can just study in a book.” He also cautioned, however, that by saying that adaptive management relies on intuition, it doesn’t mean you get a license to do whatever you want. As he said:

*The potential danger in this type of artistic principle gets back to the whole notion that a lot of people think adaptive management is nothing but intuition and that there’s no structure to it. I’m worried that people can say “I don’t like the way things are going here, so I’m going to try something different” and then call that adaptive management. The trick is to find some way to find a balance between science and intuition.*

## Practice, Practice, Practice

Finally, the literature sources that we reviewed said that like any art, adaptive management must be practiced to be learned. As Schön says:

*If it is true that there is an irreducible element of art in professional practice, it is also true that gifted engineers, teachers, scientists, architects, and managers sometimes display artistry in their day-to-day practice. If the art is not invariant, known, and teachable, it appears nonetheless, at least for some individuals, to be learnable. 115*

The practitioners that we spoke with also emphasized that to do good adaptive management, the learning had to be not just technical skills, but also the ability to practice the art of doing it. As Norm Bilodeau of the BC FORESTRY INITIATIVE says, to do good adaptive management as a forester “you don’t have to be an expert



how he was reluctant to try to tackle the job on his own. The engineer said to him “the only difference between my doing this job and your doing it is the number of footprints it’s going to take to get it done. So I don’t want to hear any more about it. Just start walking.” And Bilodeau told us “I’ve always thought that was really good advice.”

engineer” but you do have to be well grounded in the technology that you are using. Bilodeau also argues, however, that to be a good adaptive manager, you also need to be “able to think at multiple scales.” And finally, you need experience. But as Bilodeau says, you cannot make an excuse of not having enough experience. Bilodeau tells the story of how he was talking to a senior engineer about doing a complex job and