

**Virginia Save Our Streams (SOS): Volunteers' Motivations for Participation and
Suggestions for Program Improvement**

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(ABSTRACT)

Concern about water quality has become an important environmental issue in the world, the United States, and Virginia. Volunteers have increasingly stepped forward to assist in the water quality monitoring task, and both state and federal protection agencies increasingly depend upon such voluntary assistance. The Izaak Walton League's Save Our Streams (SOS) is one such volunteer citizen water quality monitoring program. Recruiting, training, organizing and retaining volunteers are among the most resource intensive tasks of volunteer organizations. The purpose of this thesis is to document the motivations of SOS volunteers and the primary causes of their attrition in order to improve the SOS program as well as to enhance the experience of SOS volunteers. We also compared motivations of SOS volunteers, differences in SOS volunteers' evaluation of the program, and suggestions for improvements by varying participation levels in volunteerism.

We found that SOS volunteers are primarily motivated by a desire to protect streams and to improve water quality. Learning about streams and teaching these concepts to others were also important motivations. Volunteers cited not enough time and having too many other obligations as the main reasons why they stopped participating in SOS activities. Recruitment and retention of SOS volunteers may be aided by providing feedback about how volunteer data are being used by protection agencies to protect streams, and providing opportunities for learning about streams and teaching these concepts to others. Lastly, we found that those volunteers who were most active in SOS differed in their motivations for participating, tended to be the most critical of the services and materials, and were most adamant about their data being used to protect streams.

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CHAPTER 1. INTRODUCTION

Concern about water quality has become a very important environmental issue in the world, the United States, and especially in Virginia. For example, due to the mounting concern over decreasing water resources worldwide, the Global Environmental Facility and several national governments, in January, 2000 pooled together \$14 million to assess the quality of the world's water. According to Laurence Mee of the Plymouth Environmental Research Center at the University of Plymouth in England, "Water is critical to humanity, and yet, 20 percent of the world's rivers flow into dams, sewage flows unchecked into rivers and oceans, and toxic waste has been dumped at sea for years...This is the legacy which will challenge us this millennium, and we are only just starting to investigate whether the degradation of our water supply is reversible" (Environmental News Network Staff 2000) (p.1). Scientists from around the world will investigate eight aspects of the global water crisis: sources of environmental pollution, effects of pollution, habitats and ecosystems, fisheries, the freshwater environment and laws, institutions, and public participation (Environmental News Network Staff 2000).

In the United States, the water crisis is just as grim. Despite the passage of the 1972 Clean Water Act, whose purpose partly was to restore and maintain the chemical, physical and biological integrity of the nation's surface waters to make them "fishable and swimmable", huge problems still exist. For example, according to the United States Environmental Protection Agency (2000), almost 40% of the freshwater ecosystems in the United States are still not fit to swim or fish in, and less than 2% of the 3.6 million stream miles are healthy enough to be considered high quality.

The United States Environmental Protection Agency (EPA) in its report, *The Quality of our Nation's Waters: 1998 Report to Congress* assessed the quality of 23 percent of the 3,662,255 miles of rivers and streams in the United States. Agriculture was the most widespread source of pollution in these rivers and streams. Agricultural activities may introduce silt, nutrients, pesticides, and organic matter that deplete oxygen in surface water. Other leading sources of pollution in these rivers include hydromodifications, such as flow regulation and modification, channelization, dredging, and construction of dams (which may alter a river's

habitat in such a way that it becomes less suitable for aquatic life), and urban area runoff and storm sewer discharges (United States EPA 2000).

At a more local level, the issues and problems regarding water quality in Virginia are just as severe and diverse. The rapid development of northern Virginia counties near Washington D.C. has degraded water flows and quality. For example, large construction projects on Sugarland Run in Fairfax county have made its water more turbid and have negatively affected biological life. In addition, according to the *1998 305(b) Water Quality Assessment Report* prepared by the Virginia Department of Environmental Quality, 103 miles of the South River and South Fork Shenandoah River are under a fish consumption restriction due to mercury pollution. No more than one meal per week of fish from these rivers should be consumed, and small children and pregnant women should not eat any fish containing mercury (Virginia Department of Environmental Quality 1998).

The Big Sandy watershed in the far southwest part of Virginia is another important example of water quality problems and management. Due to a combination of activities (e.g., mountain top removal for mineral excavation and timber extraction), water quality in the watershed has been declining. Efforts to address water quality problems have faced a number of unique management issues in the Big Sandy watershed. First, since the watershed includes land in three states (i.e., Virginia, Kentucky, and West Virginia), there are tremendous challenges in coordinating water quality improvements with federal, state, and local interests. Second, there is the challenge of working in an economically depressed area (e.g., 19% unemployment rate) that has been dependent on coal and gas mining and timber industries for so long. Lastly is the challenge of educating people about the importance of water and environmental quality, and how it affects their lives.

Agriculture in Virginia, including waste from hog and poultry farms, is polluting surface and ground water. For example, poultry houses in the Muddy Creek watershed in Rockingham County produce some 63,146 tons of manure each year (Virginia SOS Staff 2000). In addition, across the state, there are problems with agricultural run-off (e.g., pesticides and herbicides), livestock grazing in riparian areas, excessive litter, industrial dumping, bacteria (e.g., fecal

coliforms and salmonella) and parasites (e.g., giardia), erosion and sedimentation, city-based pollution and urban sprawl, and run-off from impervious surfaces (e.g., roads and roofs). Consequently, the need for efficient and effective stream water quality monitoring has become evident.

In summary, water quality problems are everywhere, and will only grow in importance in the future. Local, state, and federal agencies, and the private sector are all working to improve water quality. Numerous regulations have been passed since the Clean Water Act, and there are increasingly more funds to support activities aimed at improving water quality in the United States. State and federal agencies and the private sector spend between \$63 billion and \$65 billion dollars each year to improve and protect water quality (United States EPA 2000). However, by no means do state and federal protection agencies have enough people or resources to monitor *all* the waterways in the United States, and that is why volunteers are so important.

Volunteers have increasingly stepped forward to assist in the monitoring task. Environmental protection agencies more and more depend upon such voluntary assistance. Faced with increasingly complex tasks, personnel ceilings, heightened public involvement and awareness, and forced to compensate for reduced budgets, water protection agencies across the state are increasingly turning to volunteers as a way of carrying out the complex array of water quality monitoring activities involved in caring for Virginia's streams. Volunteer water quality monitoring can build awareness of pollution problems, create public advocates, provide opportunities for effective outreach, provide an educational tool to teach children about ecology and land use, provide data for waters that are not currently being monitored by either state or federal agencies, and increase the amount of water quality information available to decision makers. The data volunteers collect can be used for problem identification, to assist state agencies in locating potential pollution sources, and to enhance studies on impaired streams to determine the source of impairment (Virginia Department of Environmental Quality 1999b). The Izaak Walton League of America's (IWLA) Save Our Streams (SOS) is just one of many volunteer water monitoring programs within the state.

The importance of volunteer water quality data to Virginia state agencies has recently taken on greater importance because of two cooperative agreements: the Declaration for

Virginia's Rivers and Tidal Waters and a three-way letter of agreement signed by the Virginia Department of Environmental Quality (DEQ), The Virginia Department of Conservation and Recreation (DCR), and the Virginia Division of the Izaak Walton League's, Virginia Save Our Streams Program (SOS). The Declaration for Virginia's Rivers and Tidal Waters was presented to the Secretary of Natural Resources on February 5, 1999. It was signed by 52 state (e.g., the Virginia Chapter of the Sierra Club), regional (e.g., Shenandoah State Scenic River Advisory Board), and local (e.g., Friends of the Moormans River) groups whose primary interest is restoring the quality of Virginia's waters. One major objective of this effort is for state agencies to identify effective water quality monitoring protocol, quality assurance/quality control procedures, and effective reporting systems *so that citizen data can be used and easily accessed by state and federal agencies* (Virginia Save Our Streams Staff 2000).

The 1999 three-way letter of agreement among the Virginia DCR, the Virginia DEQ, and the Izaak Walton League's SOS notes state agencies' increasing dedication to supporting citizen monitoring efforts throughout the Commonwealth for the purpose of collecting useful water quality information and encouraging environmental stewardship (Virginia Department of Environmental Quality 1999a). "We are working to find meaningful uses for quality assured citizen generated data. We hope to make this resource more specific and useful on both the state and local level," said DEQ director Dennis Treacy (Virginia Department of Environmental Quality 1999a) (p.1). Citizen monitoring data collected under an approved quality assurance/quality control project plan can now be used by DEQ to develop water quality assessment reports. For example, citizen data will be included in the biannual *305(b) Water Quality Report*, and the DCR also will continue to use citizen data in its *Nonpoint Source Assessment Report* (Gilliam 2000). To sum up, volunteer water monitoring organizations are increasingly essential in order to protect Virginia's waterways.

We chose to study Save Our Streams volunteers for several reasons. The Virginia Water Resources Research Center funded the study and it has strong interest in the Save Our Streams program. Second, the SOS procedure is the dominant and preferred biological water monitoring technique in Virginia used by environmental volunteer associations. Third, as discussed above, the SOS program is strongly linked to and supported by both the Virginia DEQ and DCR.

Lastly, Virginia Tech University and the Virginia Museum of Natural History in Blacksburg have an active population of Save Our Streams volunteers. It was convenient to study this volunteer group.

Problem Statement

Volunteers are key players in the IWLA Save Our Streams program. Consequently, effectively recruiting, training, organizing, and retaining these volunteers are essential for the continued success of the program. According to Heidrich (1990), to recruit new volunteers, organizations must spend money and time that otherwise could be devoted to the achievement of service or program goals. The recruiting and retaining of volunteers are therefore *vital tasks to many volunteer organizations*. The problem is that there is an overall lack of information about how best to recruit, motivate, and retain volunteers and what strategies are more appropriate for people at varying levels of participation in volunteerism. The purpose of this thesis is to document the motivations of SOS volunteers, to identify the primary causes of their attrition, and to assess preferences for program components that might enhance satisfaction and retention among volunteers. This information should increase the effectiveness of the SOS program as well as improve the experiences of SOS volunteers.

Objectives

The objectives of this research were to:

1. To identify why people volunteer in Save Our Streams.
2. To determine SOS volunteers' evaluation of the Save Our Streams program and suggestions for program improvements.
3. To determine whether motivations, evaluation of the SOS program and preferences for program improvements vary by participation levels in volunteerism.
4. To determine why SOS volunteers drop out of the program.
5. To suggest strategies for recruitment and retention of SOS volunteers.

CHAPTER 2. BACKGROUND

The Izaak Walton League of America (IWLA)

The Izaak Walton League of America was established in 1922 as a national organization of hunters, anglers, and other conservation-minded outdoor enthusiasts. Its conservation mission is “To conserve, maintain, protect and restore the soil, forest, water and other natural resources of the United States and other lands; to promote means and opportunities for the education of the public with respect to such resources and their enjoyment and wholesome utilization” (Izaak Walton League Staff 2000). Currently, the IWLA has more than 350 local chapters in thirty-two states. Its membership is a diverse group of 50,000 men and women dedicated to protecting the nation’s soil, air, woods, waters and wildlife. Its 27 local chapters with over 7,000 members who love outdoor recreation and work in various ways to promote the responsible use of our natural resources and public lands. One of the many programs of the IWLA is Save Our Streams (SOS).

The National Save Our Streams (SOS) Program

Save Our Streams, a grassroots watershed conservation program of the IWLA, is a nationwide citizen volunteer water quality monitoring association. The IWLA established the Save Our Streams program in Maryland in 1969 in response to a growing concern among its members that water quality was deteriorating throughout the nation. The IWLA desired a means for members to document this degradation of water quality, and to establish a basis for action to improve the health of local waterways. The biological (macroinvertebrate) stream monitoring method became SOS’s preferred procedure to monitor and measure the health of a stream over time.

The Virginia Save Our Streams Program

The Virginia Save Our Streams program is a non-profit, non-governmental volunteer association within the Virginia division of the IWLA. There are six primary goals of the Virginia Save Our Streams program (Virginia SOS Staff 2000):

- (1) To foster citizen stewardship of the water resources of the Commonwealth of Virginia.

- (2) To encourage appropriate public participation in the process of watershed management through education, on-site training, and example, using macroinvertebrate and other monitoring, as a base for action.
- (3) To coordinate activities and cooperate with other groups monitoring and managing water resources in this state, creating partnerships that work toward mutually beneficial goals.
- (4) To promote good management decisions, based on objective observations, that will allow future generations to enjoy improved and protected streams, rivers, and estuaries across Virginia.
- (5) To provide, or assist in finding, "user friendly" water quality assessment procedures to the localities that request them for decision-making and advocacy.
- (6) To expose people, young and old, to the ecology of flowing water.

The Save Our Streams program is funded by state money through the Department of Conservation and Recreation and grants from key donors including the Virginia Environmental Endowment, the Chesapeake Bay Fund, and the Beirne Carter Foundation (Virginia SOS Staff 2000). However, volunteers play a crucial role in reaching the missions and goals of the SOS program.

Biological Water Quality Monitoring

Biological water quality monitoring is the preferred method of stream monitoring used by SOS volunteers. This method is based on a few simple premises. First, in every body of water there exists a variety of creatures, from multitudes of microscopic bacteria, algae, and protozoa, to vertebrates like fish, salamanders and even air-breathing birds and mammals. In between are a large variety of macroinvertebrates, animals without backbones, visible to the naked eye that live in various parts of streams, lakes, or estuarine areas. The second premise is that in healthy waterways these macroinvertebrates are found in abundance, but when waters deteriorate, their populations change in predictable and measurable ways. The third premise is that some stream-bottom macroinvertebrates cannot survive in polluted waters (e.g., stoneflies, water pennies, hellgramites, and caddisflies) while others can survive and even thrive in polluted water (e.g., aquatic worms, black flies, leeches, and midge flies).

Consequently, in a healthy stream, the stream-bottom community will include a variety of pollution-sensitive macroinvertebrates. On the other hand, in an unhealthy stream, there may be only a few types of nonsensitive macroinvertebrates present (Virginia SOS Staff 2000). Therefore, it is possible for volunteers who are able to identify the different orders of macroinvertebrates to accurately assess the health of a stream based on the types and numbers of macroinvertebrates found in a stream. Thus, monitoring macroinvertebrates is a sensitive test of water quality through time that does not require the continuous measuring and relatively expensive equipment needed for chemical or microbiological testing (Virginia SOS Staff 2000).

There are two types of macroinvertebrate testing: the rocky bottom sample and the muddy bottom sampling method. In the rocky bottom method, to properly assess the water quality, one needs a riffle in a stream or river. A good riffle for sampling will have cobble-sized stones, fast-moving water, and a depth of 3 to 12 inches (Virginia SOS Staff 2000). The volunteers, after rubbing the rocks and doing the “river dance” to dislodge any bugs on them, use a kick-seine (net) to collect, sort and identify, and finally count the macroinvertebrates. The muddy bottom sampling method is used for streams with slow moving waters (no riffles) and muddy bottoms, and has a slightly different procedure. The vast majority of Virginia SOS volunteers use the rocky bottom method to sample the health of their stream.

Becoming a SOS Volunteer

Becoming a Save Our Streams volunteer in many ways involves more time and physical and mental energy than required of the typical supporter of one of the big ten environmental voluntary associations (e.g., Sierra Club or The Wilderness Society). This high level of commitment and dedication is one unique aspect of a SOS volunteer. There are basically three steps or stages to the typical SOS volunteer training program.

First, the volunteers attend an initial training session where they learn about the IWLA and the SOS program. The initial training session usually lasts approximately four hours, and includes slides, videos, and hands on (in-the-stream) experience. The volunteers specifically learn about stream ecosystems, the importance of clean water, how to tell whether a stream is impaired, and about the macroinvertebrate life in the stream (Virginia SOS Staff 2000). In

addition, SOS leaders take the volunteers out to a stream and demonstrate how to properly perform an in-stream macroinvertebrate water quality sample. The SOS leader demonstrates all phases of the monitoring process: stirring up the water, collecting the bugs, identifying the bugs, and the correct way to fill out the sample record and assessment form.

The second step in becoming a Save Our Streams volunteer is the certification process. There are two phases in becoming a certified SOS monitor. First, the volunteer must demonstrate to the leader that he/she is able to properly perform a stream sample. The volunteers must perform a sample, start to finish, identify as many of the macroinvertebrates as they can, and fill out the SOS Survey Form. The second phase of becoming a certified SOS volunteer is the written bug identification quiz. Volunteers must properly identify 17 out of 20 macroinvertebrate samples presented to them. Volunteers are allowed to use any identification sheets or macroinvertebrate identification keys they choose. If they pass the quiz and have a solid understanding of the sampling method, they become a certified SOS monitor.

Lastly, the volunteers are asked to monitor their stream site four times a year (e.g., January, April, July, and October), record the data onto the Stream Quality Survey, and send their data into the SOS regional coordinator. Recording the data onto the Stream Quality Survey (Appendix A) involves three steps. First, volunteers designate their sampled insects according to diversity of orders (e.g., Plecoptera, Decapoda, Hirudinea) within each pollution categories (e.g., sensitive, somewhat sensitive, & tolerant). Second, the volunteers count *how many* individual macroinvertebrates are in each order. Lastly, from these counts, the volunteer is able to assign the stream an index value of excellent, good, fair, or poor. These data, if collected and recorded properly, assist state agencies, local governments, and concerned citizens in obtaining necessary resources and taking appropriate action to improve local environmental conditions related to water quality.

CHAPTER 3. LITERATURE REVIEW

Volunteerism and volunteer work represent important ways in which individuals can contribute to society and address the problems facing the world (Clary, Snyder, Copeland, & French 1994). Many people engage in volunteer work. For example, an estimated 94.2 million American adults- 51 percent of the adult population- performed some volunteer work in 1991 (Independent Sector 1992). Many different kinds of people with many different motivations engage in volunteer work. Consequently, why individuals spend their time volunteering, what volunteers like and dislike about volunteer programs, how volunteers motivations and preferences change, and why volunteers drop out are all important questions researchers, volunteer coordinators, and program managers have been striving to answer for some time.

Why People Volunteer

First, it is important to understand why people volunteer their time and energy into volunteer organizations. The reasons or motivations people have for volunteering are important to know because it will help volunteer coordinators more fully understand why volunteers are joining their organization and how better to keep them satisfied and active in the program for as long as possible. Gittell (1980) suggests that we need to know more about *why* people join organizations and what encourages them to devote time and energy to the organizations' aims. Consequently, one possible way to attract and then retain volunteers more effectively would be to understand and appeal to their motives.

Social Exchange and Political Economy Theories

Social exchange (Blau 1964; Homans 1974) and political economy theories (Moe 1980; Rich 1980) are often used to explain why people volunteer, why they remain in voluntary associations, and why they discontinue. Social exchange and political economy theories both propose that individuals will or will not participate in voluntary associations depending on the benefits and costs of participation. Homans's (1974) social exchange principles suggest that individuals will participate if (a) the benefits are greater than the costs, and (b) benefits are varied and thus more valuable. For example, one will continue participation in a voluntary association only if the benefits (e.g., social interaction, career enhancement, and increased self-

worth) are greater than the costs (e.g., time away from work or family). Political economy theory further stipulates that, to be effective as incentives, benefits should be selective or private in that they specifically reward members for their individual contributions and are only obtainable by those who actually participate (Rich 1980). Much of the following literature on motivations are based on these two theories, and attempt to explain why people volunteer, remain active, and lastly why people discontinue participation in voluntary associations.

Volunteers' Motivation

Numerous studies have shown that people volunteer not for single reason, but a combination of many different reasons (Cnaan & Goldberg-Glen 1991; Klandermans 1984; Smith, D., Macaulay, J. & Associates 1980; Van Til 1985). Career development (Chapman 1985), a desire to feel useful (Moore 1978), and enjoyment of the work are all examples of volunteer motivations. However, there seem to be three main motivations that are consistent across different types of volunteer organizations and different volunteers that are supported in the volunteer literature. These three motivations are volunteering to serve (i.e., altruism), for social contact, and to promote the goals of the particular voluntary organization (Pearce 1993).

Traditionally, volunteering for altruistic purposes (unselfish behavior or sacrifice for others) was thought to be the most common reason for volunteering (Allen & Rushton 1983; Quick 1985). There are a number of studies that concluded that altruism is an important motivation for many volunteers in many different volunteer organizations (Gora & Nemerowicz 1991; Latting 1990; Perkins 1989; Sundeen 1992). For example, Florin, Jones & Wandersman (1986) found that making a contribution and helping others were more important than self interest or personal gains. Volunteering is seen as a way to help others, to be of service to the community (Gora & Nemerowicz 1985), and to assist the less fortunate. Volunteering was considered to be a sacrifice of one's time, energy, and finances. Saying one volunteered for selfish reasons (e.g., for career networking or for gaining new skills) on surveys and interviews was seen as socially undesirable. For example, Smith (1981) concluded that volunteers' self reports "at most, tell us about socioculturally accepted reasons people tend to give. Not surprisingly, the giving of altruistic reasons for involvement is fairly popular" (p. 25).

Consequently, there has been a great deal of debate recently concerning whether pure altruism even exists, how prevalent altruistic motives really are, and how important nonaltruistic motivations are to volunteers (Ellis 1986; Shulman 1982; Smith 1981; Van Til 1988). Many researchers are beginning to uncover the many nonaltruistic motivations of volunteers that before were difficult to assess in surveys and questionnaires (Fitch 1987; Flynn & Webb 1975; Gidron 1977; Gluck 1979; Smith 1981). For example, Gluck (1979) studied 50 Democratic and Republican volunteer precinct committee persons, and found that by far the most frequent and powerful motivations were self-oriented, whether tangible or intangible. Smith (1981) in a convincing paper concerning the importance of nonaltruistic motivations suggests that, “Volunteers are not angelic humanitarians in any sense. They are human beings, engaging in unpaid, uncoerced activities for various kinds of tangible and intangible incentives, with psychic or intangible incentives being especially important” (p.33).

In regards to the altruism debate, researchers currently have come to some conclusions that seem to satisfy both camps. Now, the more accurate term “prosocial” is used in place of altruism. To be altruistic implies self-sacrifice or actions that are contrary to the actor’s best interest. In contrast, prosocial acts are those designed to produce and maintain the well-being of others without the restriction in other kinds of potential payoffs for the actors themselves (Rushton & Sorrentino 1981). Hence, with prosocial motives volunteers are no longer required to be self-sacrificial, the discovery of social or other self-interested motives no longer serves to destroy the assertion that service motives also play a role (Pearce 1993). In summary, altruism is a very important motivation for many volunteers; however, volunteers also are motivated by many other “selfish” reasons such as career enhancement, to learn new skills, and for social interaction.

Second, social reasons for volunteering across divergent tasks and types of volunteers have been consistently supported and upheld in the literature (Fitch 1987; Latting 1990; Pearce 1983b; Sharp 1978). Social contact can take many forms: being asked or encouraged to join by a friend (Berger 1991), friendship with other volunteer members or staff (Henderson 1981; Pearce 1983b; Perkins 1989; Wandersman, Florin, Friedmann & Meier 1987), with family (Serow 1991), and social interaction with those the volunteer is serving or helping. For example, in

Gora and Nemerowicz's (1985) study of emergency squad volunteers, "the [emergency] squad itself becomes, for most volunteers, a primary group, characterized by shared experiences and face-to-face interaction. Like friends and family, squad members socialize, reward, and sustain one another in their volunteer roles..." (p.37). Social interaction is an important motivation for volunteers in a wide range of voluntary associations.

Lastly, many volunteers are attracted to particular organization because they want to help achieve its goals or objectives. Many volunteers join volunteer associations because they believe in the goals and missions of the voluntary organization, and desire to be a part of it (Latting 1990; Lopez & Getzel 1987; Tihanyi 1989). The majority of volunteers give their time and effort to a cause having some personal meaning, whether it is to save a threatened bay, alleviating poverty, or supporting the arts (Pearce 1993). In summary, altruism, social interaction, and a desire to help achieve the goals of a volunteer association are important motivations for the majority of volunteers. Since our Save Our Streams research involves water quality monitors, we wanted to ascertain specifically why people volunteer in environmental volunteer organizations.

Environmental Volunteers' Motivations

Several studies have found that strong beliefs about the seriousness of environmental problems (Milbrath 1981), exposure to an environmental problem (Heiland 1983), increased levels of environmental concern (Tucker 1978; Weigel & Weigel 1978), a belief that one can influence environmental policy (Milbrath 1984), a belief that one can have direct, tangible positive effects on the environment (Ross 1994), and a desire for educational benefits (Kellert 1980) are all factors contributing to participation in environmental volunteer associations.

Westphal (1993) found that urban forestry volunteers in a TreeKeepers training course in Chicago were motivated to volunteer more by aesthetic, emotional, and spiritual values of trees than by practical benefits (e.g., reduced temperatures or increased property value). Also, others have found that searching for a deeper connection with nature, a passion to help the urban forest, a feeling that trees and forests are threatened or vulnerable in the urban environment, and helping

one's neighborhood were all important motivations for volunteers in urban forestry (Dwyer, Schroeder, & Gobster 1992; Still & Gerhold 1997; Westphal 1995).

There have also been several studies dealing with volunteer motivations for ecological restoration. Having the ability to do something tangible to help the environment (Grese, Kaplan, Ryan, & Buxton 2000), recognizing the aesthetic and emotional benefits of nature, being part of a larger community of volunteers (Drinkin 1996; Ellis 1994), and having fun (McCarthy 1991) were all important motivations for ecological restoration. Also, having a sense of urgency about the fragility of nature and the impending loss of native sites and species (Schroeder 1998a), learning experientially about nature and acquiring new skills (Fisk 1995; Grese et al. 2000), building a positive relationship with place (Jordan 1989), and a desire to help preserve natural landscapes for future generations (Schroeder 1998b) were all reasons volunteers became involved in ecosystem restoration.

What Volunteers Prefer in Volunteer Programs

Another of our objectives was to determine what SOS volunteers desire in a volunteer program. An analysis of what people in other voluntary associations seek from their volunteer organization illustrated three areas of general consensus: appreciation or recognition, goal setting, and involvement in the planning and decision making process.

There is general consensus in the volunteer literature that most volunteers desire some form of recognition or appreciation of their efforts (Johnson 1995; Still & Gerhold 1997). Recognition may be in the form of awards, banquets, and certificates. Many volunteers are hesitant to say they desire recognition because volunteering ought to be strictly altruistic, as previously discussed. However, the literature suggests that properly recognizing volunteer efforts is important, and that many volunteers desire some form of recognition. For example, Gora and Nemerowicz's (1985) study of emergency squad volunteers found that they desired recognition and community support, and it was a major source of dissatisfaction and low morale when they did not get it.

Second, many authors have examined the value of setting goals for volunteer projects. Research has shown that volunteer motivation and retention are enhanced when small, clear steps are planned that lead to the group's goals (Ilsley 1990; Monear 1994; Phillips 1993). For example, Still and Gerhold (1997), in their study of urban forestry volunteers, found that volunteers (especially those just starting out) preferred short-term one-day projects to longer projects. Volunteers involved in one-day tree plantings were able to see the results of their efforts and were able to feel a sense of accomplishment when the day was done.

Burke and Lindsay (1985) suggest four key components of success for volunteer associations in regards to setting goals. Goals must be specific, and they should be clearly defined. Next, progress towards a goal must be subject to achievement measures that can be easily measured and understood. Lastly, there must be frequent and useful feedback between the manager and volunteer on how efforts are progressing towards achievement of the goal. Clearly understanding the goals and missions of a voluntary association helps volunteers know what is expected of them, how their efforts are contributing to the goals, and helps them feel a sense of accomplishment when they have reached their goals.

Lastly, there are a number of studies that talk about the importance volunteers place on being involved with the planning and decision-making of the voluntary association (Knoke 1981; Schindler-Rainman 1985; Westphal & Childs 1994). This involvement may include designing training procedures or job descriptions, providing input regarding how to recruit new volunteers or what the goals and missions of the voluntary organization should be. For example, Nelson, Pratt, Carpenter and Walter (1995) studied volunteer nursing home advocates and found that volunteer satisfaction can be "enhanced by allowing volunteers to design their own training and jobs, by encouraging them [volunteers] to participate in planning and problem-solving processes, and by involving them in the general shaping of the organizational culture" (p. 230). In conclusion, volunteers seem to be most motivated and satisfied when they are properly recognized and appreciated, are provided with clear, measurable, and attainable goals, and are involved in the planning and decision-making processes of the voluntary association.

Reasons Why People Stop Volunteering

Our next objective was to determine why volunteers discontinue participation in voluntary associations. The volunteer literature suggest numerous reasons why volunteers stop participating. Martinez's (1998) recent study of the Rocky Mountain Elk Foundation and the Appalachian Trail Conference found that one of the main reason people stopped volunteering was because they perceived their efforts lacked relevance. Volunteers perceived irrelevance when their efforts seemed only tangential to the organization's success or mission and when the organization itself was perceived as being ineffective at achieving its stated goals. Additionally, Ball (1986) found that many urban forestry volunteers became discouraged by the lack of opportunity for responsibility and recognition. Knoke (1981) found that detachment occurs when there is an inability to influence organizational activities and policies, and finally Wandersman et al. (1987) found that feeling a sense of frustration from lack of progress could lead to discontinued participation.

Other reasons volunteers became inactive included the failure of the volunteering activity to help the volunteer meet people of similar interest, learn new skills, and/or have fun (Martinez 1998). Lastly, personal limitations on time and energies (Newton 1995; Wandersman, Jakubus, Giamartino 1981), increased family and work obligations (Wandersman et al. 1987), time conflicts with other activities (Syme & Nancarrow 1992), losing interest in the volunteer work (Gora & Nemerowicz 1985), and situational variables (e.g., moving, getting married, or poor health) are all additional reasons for discontinuing participation in volunteer activities.

However, knowing only why people volunteer, what they desire in a volunteer program, and why they may discontinue participation misses how volunteers might change (e.g., their motives for continued participation or preferences for program management might evolve) the longer they stay in the volunteer program or the more active they become. Pearce (1993) concluded that, "In spite of decades of speculation and assessment of volunteers' motives, we know surprisingly little about the experience of volunteers once they are within organizations" (p. 81).

Participation of Volunteers

Volunteers and their motivations, perceptions, and preferences are not as simple as we have implied in the first section of our literature review. Not all volunteers have the same reasons for volunteering, and these motivations seem to change across time and participation levels. In addition, not all volunteers prefer the same elements in a volunteer program, nor do they all have similar reasons for dropping out of a voluntary association. Hence, volunteers' motivations for participation, the benefits they receive from volunteering, how they perceive or evaluate the volunteer program, and their preferences for program management all may appear to change depending on both volunteers' level of participation and how long they have been in the voluntary association. Understanding that volunteers may be motivated differently depending on their participation intensity level or length of time in the program may make the difference between a successful or unsuccessful volunteer program. In addition, realizing that volunteers may seek different benefits at different stages in their volunteer career may increase how long managers can keep them interested in volunteer activities.

Volunteer Motivations/Benefits among Active and Non-Active Volunteers

Research suggests that level of motivation shapes how active a volunteer is in an organization and the benefits they seek. For example, Clark and Wilson's (1961) typology of material, solidary, and purposive motives is a cornerstone study on motives and benefits, and has been applied to the empirical study of volunteer organizations (Knoke & Wood 1981; Rich 1980; Wandersman et al. 1987). *Material benefits* refer to tangible rewards that can be translated into monetary value and include increased property value and information. *Solidary benefits* are largely derived from social interactions and include socializing, status, group identification, and recognition. *Purposive benefits* are derived from suprapersonal goals of the organization and include bettering the community, doing one's civic duty, and fulfilling a sense of responsibility (Prestby, Wandersman, Florin, Rich & Chavis 1990).

Building on Clark and Wilson's (1961) work, the available research concerning volunteerism suggests that the most active participants (e.g., leaders) in voluntary organizations

are primarily motivated by purposive benefits such as working toward the improvement of the community (Rich 1980; Silloway & McPherson 1986). On the other hand, material motives were found to play a relatively minimal role as motivators for the most active participants (Colony, Chen, & Andrews 1987).

There are also a number of studies regarding level of participation and environmental volunteer organizations (Dennis & Zube 1988; Huebner & Lipsey 1981). For example, again building on the research of Clark & Wilson (1961), Caldwell and Andereck (1994) looked at volunteer motivations of those individuals involved in the North Carolina Zoological Society. Similar to previous work, they found that the more active participants received more personal and social benefits than did less active participants. In addition, Manzo and Weinstein (1987) found that active members of the Sierra Club were more likely than non-active members to believe they personally or people close to them have suffered harm from an environmental problem, to have joined other organizations, to have a social network within the club, and to believe that their volunteer actions would have an impact. In summary, it appears that active volunteers have different motives for participation (e.g., purposive and solidary) and get more out of their volunteer experience than those volunteers who are not as active. However, regardless of the frequency of volunteerism, volunteers' motives may also change or evolve the longer individuals are in the volunteer association.

Volunteer Motivations and Length of Time in Voluntary Association

There is mixed evidence on whether volunteers' motivations change from time of decision to join compared to their motivations for their later involvement. Pearce's (1983b) study of volunteer firefighters, school volunteers, and volunteer visitors to the elderly found that these individuals joined the organization for predominantly service reasons, but friendships and social interaction were more influential in their decision to continue. Pearce (1983b) concluded that "the rewards individuals expected from volunteering are often not the rewards most salient to them once they have become volunteers" (p. 148). Similarly, in a study of volunteers to local governmental programs, the importance attached by participants to doing something useful or benefiting a family member or friend dropped over time, but interest in or enjoyment of the work grew as a motivation (Sundeen 1989). Lastly, in the realm of political parties, perhaps the most

frequently cited shift in motivations involves the increasing significance of solidary motives (e.g., friendships) for sustaining party work (Clarke, Price, Stewart, & Krause 1978; Conway & Feigert 1968).

Martinez (1998) studied volunteers from the Rocky Mountain Elk Foundation and the Appalachian Trail Conference and, similar to Pearce's and Sundeen's conclusions, found that reasons for volunteerism change soon after the volunteer becomes involved in the actual volunteering activities. Personal values and concerns about "contact with nature" or "making the world a better place" explained why some people joined the organization, but not whether they became active volunteers. The romantic ideals behind volunteering quickly wane and are replaced by concerns about doing relevant and meaningful tasks, by the desire to be working with friends, by the need to have clear and achievable objectives, and by having opportunities for learning and personal growth.

In contrast to these studies, Gallup Organization (1986) surveys indicate that the reasons most frequently mentioned for continuing to volunteer are the *same* reasons most frequently mentioned for first becoming involved in a volunteer activity. In addition, the Caldwell and Andereck (1994) study of volunteers from the North Carolina Zoological Society found that contributing to society (purposive benefits) was most important for both joining and continuing membership. Clearly, more research is needed to fully understand the possible differences between volunteers' motivations for initially joining and their motivations for continued participation.

Participation Levels and Volunteer Program Benefits and Preferences

As discussed above, there is a body of research in the volunteer literature looking at the difference between those volunteers who are active versus those who are not. There also is research comparing members and nonmembers (Dennis & Zube 1988), leaders and members, volunteers from different organizations (e.g., mental health, religious, and health care), or employees and volunteers (Pearce 1983a) on such things as actual and perceived costs and benefits of volunteering, preferred incentives (Friedmann, Florin, Wandersman, & Meier 1988; Oliver 1984), and attitudes, perceptions, and values (Newton 1995; Sundeen 1992). However,

there seems to be need for research that goes beyond classifying volunteers as dichotomous (e.g., active/inactive or leaders/members) and instead looks at volunteers with varying levels of participation. Prestby et al.'s (1990) study on block community organizations and Clarke et al.'s (1978) study on Canadian political parties are two studies that do look at different participation levels as a continuum.

Prestby et al. (1990), in their study of benefits, costs, and incentive management for volunteers and how these variables may promote empowerment, classified volunteers into five levels of participation based on the role they played in community block organizations *and* the degree of participation of each respondent. These levels were labeled: max leaders, active leaders, worker members, active members, and nominal members.

The most active participants (max leaders and active leaders) received a greater variety of benefits, thus increasing the likelihood that the benefits were perceived as valuable, than less active participants. They defined benefits slightly different than did Clark and Wilson (1961), and described two types of benefits: personal and social/communal. Personal benefits focused on personal, self-oriented goals such as learning new skills. On the other hand, the social/communal benefits focused on communal goals such as helping others or improving the neighborhood. Although both benefit types distinguished active participants from less active participants, personal benefits better differentiated level of participation. For example, such personal benefits as learning new skills appear to be contingent on participation, in that one can only receive them through active participation (Prestby et al. 1990). Their conclusions were that the most active participants receive a variety of benefits (e.g., social, communal, and personal), receive significantly more of them than less active participants (nominal and active members), and are further distinguished by their greater share of personal benefits.

Prestby et al. (1990) conclude that benefits and costs of collective action are directly related to participation level and thereby provide a potentially powerful means by which to facilitate participation and thereby individual empowerment. Since benefits are positively associated with high levels of participation, the benefits of participation appear to facilitate individual empowerment. Consequently, since participation is an important ingredient for the

development of individual empowerment, it is imperative that we understand what promotes and what hinders participation.

Clarke et al. (1978) described motivations of individuals for initiating and sustaining activity in the Ontario Liberal Party, and examined relationships between motivational variables and differential participation within this provincial party organization. They noted the need for looking at participation levels: "...to the limited extent that scholars have studied patterns of party work, the focus has been on the role orientations (e.g., leader/member) or type of activity performed *rather than the amount of activity*" (p. 139, emphasis added). Consequently, to measure differential participation, these researchers developed an index consisting of time spent on party affairs and a subjective rating by the respondents of their level of party activity. For example, for time spent on party affairs, respondents chose from: some time every week, some time every month, and elections only. The subjective rating options were: very active; moderately active; or slightly active. To obtain an overall measure of differential participation, data for the two questions were combined into a five-point additive index.

The authors concluded that socio-demographic variables (e.g., education, income), initiating or sustaining motives, parental political activity, party competition, and inter-party competition variables were all relatively ineffective predictors of differential participation. More generally, the data suggest that variables useful for explaining who becomes a party activist may be of considerably less significance for understanding rates of activity within party organizations (Clarke et al. 1978). In essence, none of the variables used in their study, singly or taken together, provided an adequate explanation of differential participation.

So, although there are some studies dealing with participation levels and volunteerism, the results seem inconclusive regarding what variables best explain different participation levels across time of involvement. In addition, besides looking at motivations across participation levels, we also are interested in looking at how the evaluation of the volunteer program and preferences for program management differ across participation levels. To our knowledge, there is a lack of research in the volunteer literature and especially regarding volunteerism in

environmental organizations on how *varying participation levels* affect perception and evaluation of volunteer programs and support for possible changes in such programs.

Characterizing Participation Levels

While the volunteerism literature seems to have devoted little attention to the meaning and measurement of past and current levels of participation, the outdoor recreation literature has. Volunteerism and recreation are closely linked, and in many regards people have similar motivations for both volunteering and recreating (Henderson 1981, Henderson 1984; Parker 1992). Researchers there have found that participation level is a multidimensional construct, and its predictive power improves upon recognition of this fact. For example, Hammitt and McDonald (1983) looked at nonwhitewater innertube floaters on three rivers in the Southeast (the Hiwassee, Deep Creek, and Chattahoochee Rivers). Their objectives were to create an experience index and then determine how it was related to user perceptions of river environmental disturbances, expressed need of management to control adverse environmental impacts, and support for possible management practices. They ultimately used four items in creating their experience index: total experience floating, frequency of floating in the current year, total experience floating on river where sampled, and frequency of floating on river sampled in the current year. They concluded that this participation index was a meaningful measure of user experience and was related to user sensitivity and perception toward given levels of resource disturbances and their management (Hammitt & McDonald 1983). For example, more experienced users were more sensitive to resource disturbances such as excessive litter along the riverbanks or trampling of natural vegetation than less experienced users.

Schreyer, Lime, and Williams (1984) developed an Experience Use History (EUH) measure of white-water recreationists on rivers in the West. EUH represents the amount and extent of participation by the individual in relevant recreation pursuits. They predicted that persons with differing EUH would differ in their on-site behaviors, their motives for participation, their subjective evaluations of recreation experience, and their attitudes toward management. The three variables the authors used to create their EUH index were the number of times the respondent had floated the study river, the number of rivers the respondent had floated, and the total number of river trips the respondent had made. Based on the EUH index, they

segmented their population into six categories: novices, beginners, locals, collectors, visitors, and veterans.

The authors found that river floaters with varying EUH differed significantly in their behaviors (e.g., the type of trip they took), the relative importance of various motives for participation, the subjective evaluation of the wildness of the environment, their satisfaction with the trip, perceptions of conflict, and attitudes toward managerial control of the resource (Schreyer et al. 1984). For example, they found that the motives that expressed a sense of achievement, self-worth, or personal meaning were most important for veterans, while for novices, to experience new things, and being with family were most important. In addition, current managerial control actions were most favorably evaluated by novices and beginners (i.e., least experienced), and least favorably evaluated by locals and veterans (i.e., most experienced). In conclusion, it appears from the recreation literature that participation levels *are* important in predicting motives and program preferences. However, participation must be characterized as a complex variable having meaning beyond simple number of incidences of participation.

CHAPTER 4. METHODS

The first step of our research was to gain a deeper understanding of the Save Our Streams program: its goals; its history; its organization; its methods and procedures; its apparent successes and failures; and its political, social, and environmental context. As part of this effort we gathered information about the Save Our Streams program from the Izaak Walton League, we interviewed past and/or current state and regional coordinators of SOS, and we attended local SOS meetings and accompanied local SOS groups on their monitoring exercises. For example, we conducted personal interviews with Karen Firehock (who started the Virginia SOS program), Jay Gilliam (current VA SOS coordinator), and Wayne Teel (current VA SOS science and education director).

Focus Groups

Our next step in gaining a better understanding of SOS volunteers and the SOS program was to hold focus group discussions. Focus groups are group discussions led by a moderator. We chose to use focus groups to collect these data because they are quick and inexpensive (Wells 1974), they bring the researcher into direct contact with the subject of the research (Kingsley, Brock, & DeBald 1988), the moderator/group discussion format facilitates more complete identification and understanding of relevant issues, and they provided us a guide for the design of our subsequent mail-out questionnaire.

We held six focus group meetings with SOS volunteers throughout the state to identify critical variables that shape recruitment, active participation, and retention of volunteers. The focus groups were completely voluntary and confidential. The regional coordinators chose the focus group participants, after we explained we were looking for volunteers in a variety of different stages in the Save Our Streams program. The six focus groups were held in Blacksburg, Grundy, Charlottesville, Harrisonburg, and two in Fairfax. We held two focus groups in Fairfax because of the high interest among the volunteers there to participate in such a discussion. We were unable to hold a focus group in two major geographic area (the Richmond area and the Eastern Shore) of the state. This was due in part to the lack of organized SOS volunteers/regional coordinators in the areas.

The six different focus groups took place between January 27, 1999 and March 12, 1999. There were between five and nine volunteers at each focus group, and the focus groups ranged from one to three and one-half hours long. For the most part, each focus group had volunteers who varied in participation levels in the program (Table 1). For example, some volunteers in our focus groups were currently active in stream monitoring and others no longer monitored. We also had some volunteers who were SOS certified, some who were currently involved in the certification process, and some that were never certified. Discussions were tape-recorded (except for those in Harrisonburg and Grundy) and then analyzed to identify key themes and insights concerning volunteer motivations, things volunteers liked and disliked about the program, and possible reasons some may have stopped participating.

Focus Group Data Collection Procedure

Typically, focus group participants received a phone call explaining the general purpose and timing of the meeting at least two weeks prior to the focus groups.

The focus group discussions had the following sequence:

1. Introductions and explanation of the study took a few minutes. Focus group participants were asked to sign an “informed consent” form in which they were guaranteed anonymity and confidentiality.
2. Participants were asked to complete a brief eight-question survey in which they provided contact information (so we could send them our longer survey later), and information about how involved they were with Save Our Streams program.
3. A tape recorder was turned on. As noted above, focus group discussions were not tape recorded in Grundy and Harrisonburg.
4. The interviewer then proceeded to ask five key general questions relating to motivations, recruitment, and retention of Save Our Streams volunteers:
 - a. Why did you become involved in Save Our Streams initially?
 - b. For current volunteers, what keeps you involved in Save Our Streams?
 - c. For past volunteers, what kept you coming back to stream monitoring and Save Our Streams during your time of participation?
 - d. For those who do not currently monitor a stream or are not in Save Our Streams, why did you stop participating or leave the program?

- e. What could the Save Our Streams program do more of to encourage you to volunteer or continue to volunteer?
5. Notes were taken by the moderator or his assistant during the focus group discussions.
6. At the conclusion of the focus groups, the interviewer provided an opportunity for the participants to add or clarify anything that was said during the meeting.

Throughout this thesis, we will interject various comments made by SOS volunteers during the focus groups to demonstrate, in a more personal way, feelings regarding the Save Our Streams program, stream monitoring, and what motivates the volunteers to do what they do. We will also use focus group comments to help us better understand the results from the questionnaire survey.

Survey Methodology

We used the data from the six focus groups, our review of the literature, and interviews with SOS leaders to construct a 12-page mail-back questionnaire. This survey instrument was designed to measure: (1) participation in the Save Our Streams program and volunteer activity in general, (2) motivations for volunteering to do stream quality monitoring, (3) evaluation of current services and materials provided by the SOS program to its volunteers, (4) suggestions on how SOS might improve its program, (5) reasons for stopping participation in the SOS program, (6) general socio-demographic information about SOS volunteers, and (7) additional comments by SOS volunteers about how to improve the SOS program. See Appendix B for copy of the questionnaire.

Questionnaire booklets, cover letters, and postage-paid return envelopes were initially mailed in July 1999 to 526 SOS volunteers throughout the state, who varied in their level of commitment and participation in the SOS program. The SOS state coordinator's office provided the up-to-date list of program volunteers, and it included individuals who had simply received SOS training, others who were currently actively monitoring, and some others who had monitored in the past but who were apparently now no longer active.

Our survey instrument was administered according to principles described by Dillman (1978) to encourage a higher response rate. A follow-up postcard reminder was sent to all

sampled individuals approximately one week after the initial mailing. Next, approximately five weeks after the initial mailing, nonrespondents were mailed another copy of the survey, a postage-paid return envelope, and a stronger cover letter encouraging them to return their completed survey. Finally, seven weeks after the initial mailing, nonrespondents received another copy of the questionnaire, a postage-paid return envelope, and a final cover letter informing them of the pending closure of the survey process and again encouraging them to complete the survey.

Volunteer Level of Participation Index

As previously discussed in the literature review, volunteers at different participation levels do sometimes appear to differ in their volunteer motivations (Caldwell & Andereck 1994; Ilsley 1990; Pearce 1983b), the benefits they seek (Prestby et al. 1990), their evaluation of current conditions (Schreyer et al. 1984), and their preferences for management actions (Hammit & McDonald 1983; Hammit, Knauf & Noe 1989). In our study, we explored whether motivations for participating in Save Our Streams activities, the evaluation of the current services and materials provided by SOS, and support for changes to the SOS program would also significantly differ among volunteers at different participation levels.

Because of time and money constraints, we were unable to track individual volunteers as they progressed through different levels of participation of the SOS program to see how their motivations, evaluation of the program, and support for management programs change. In addition, we were leery about asking the volunteers to recall their motivations for initially becoming involved because it is possible that we might actually be measuring why they retrospectively thought they joined rather than why they did at the time (Caldwell & Andereck 1994). Pearce (1983b) also expresses caution about such a technique: “Retrospective reports are influenced by the respondent’s current opinions, and even the ability to accurately remember what was important” (p. 155). Consequently, in order to compare motivations and program preferences across participation levels, we created a participation index and then compared *each group* of volunteers in the different participation level groups to draw our conclusions. One limitation of this approach is that we are comparing different individuals at different participation levels instead of the same individuals at different participation levels; however, we

feel it is a more accurate technique than asking volunteers to remember back to when they initially became involved.

Consequently, we created our own SOS volunteer participation index based on the past recreation (Schreyer et al. 1984) and volunteerism literature (Prestby et al. 1990; Clarke et al. 1978), our focus groups, and our 12-page mail-back survey. In creating our participation index, we used the following five questions from our survey (Appendix B):

- (1) Approximately how long have you been involved with the Save Our Streams program?
(Question #8)
- (2) Approximately how many times a year do you monitor your stream using SOS procedures?
(Not individual samples per sampling session but monitoring sessions per year.) (Question #9)
- (3) Approximately how many hours do you volunteer in the Save Our Streams program?
(Include stream monitoring as well as all other SOS activities.) (Question #10)
- (4) Are you currently involved with any other water quality monitoring volunteer organizations?
(Question #16)
- (5) How much time do you currently contribute to all other volunteer organizations besides SOS? (such as, church group, scouts, hospital, PTA, or other environmental.) (Question #17)

We used factor analysis with varimax rotation to reduce these five questions into three unique factors that were used to define our participation indices (Table 2):

- SOS intensity
- General volunteer activity
- Length of involvement in SOS

The factor we labeled “Save Our Streams intensity” included Questions 9 and 10. Question 9 measured the frequency of stream monitoring, while Question 10 measured the amount of time devoted to SOS monitoring. Factor two (general volunteer activity) included Questions 16 and 17 from our survey. These two questions dealt with how many other volunteer associations one belonged to and how much time one contributed to them. Lastly, factor three (length of

involvement in SOS) included only Question 8. The three factors explained a respectable 79.0 percent of the total variability among the participation items.

The next step in creating our level of participation index was to compute scores for each respondent for each of the three participation factors. In order to combine Questions 9 and 10 for the SOS intensity factor, and Questions 16 and 17 for the general volunteer activity factor, the data were first standardized. Standardizing all the items was essential because we wanted each question to contribute equally to its factor, and because the questions were measured in different units (e.g., years, hours per month, # of volunteer organizations). Once standardization was complete, we were then able to give each volunteer a score for each of the three factors.

For Question 16, respondents received a 0 if they marked that they were not involved in any other water quality monitoring volunteer organization, and then a 1 if they marked one other organization, 2 if they marked two other organizations and so forth. Then for the general volunteer activity factor we averaged their standardized scores for Questions 16 and 17. Similarly, for the variable SOS intensity we averaged standardized scores for Questions 9 and 10 to get the volunteer's mean score for the factor SOS intensity. Lastly, since length of involvement in SOS activities only included one question, it was not necessary to add across items. The question acted as a "factor."

Once our participation indices were created, we used K-means cluster analysis to attempt to cluster volunteers with similar levels of participation. K-means cluster analysis was used instead of Hierarchical cluster analysis because of our large number (200 or more) of cases (i.e., respondents). Cluster analysis is a multivariate procedure for detecting unique groupings of respondents on multiple variables. Our objective was to classify our population to determine if there were any sub-populations within our sample of volunteers based on the three participation variables (i.e., SOS intensity, general volunteer activity, and length of involvement in SOS). We chose to use four clusters because after running the cluster analysis requesting two, three, and five clusters, we found that four clusters had a large enough number of people in each cluster and produced the most interpretable results.

We then assigned ratings to each cluster based on all three participation factors (i.e., SOS intensity, general volunteer activity, and length of involvement in SOS). The labels low, low/medium, medium, and high were assigned to each cluster for the different participation variables (Table 3). We used an ANOVA test followed by Duncan's multiple range test, if appropriate, at the $p = 0.05$ level to determine if and how these clusters differed on the three participation factors. We first performed the analysis on each of the five individual questions in the index (Table 4), and then on the combined participation factors (Table 5) to determine how different clusters were from each other. For SOS intensity, each cluster was significantly different so we assigned each a different rating (i.e., low, low/medium, medium, or high). For the general volunteer activity variable, we found clusters 2 and 3 to be similar, while the others were significantly different from each other. For length of involvement in SOS, clusters 2 and 4 were similar, but the rest were again significantly different from each other.

Lastly, we chose appropriate descriptive labels for each of the four clusters based on these ratings. The descriptive labels for each cluster for the purpose of imageable identification were:

Disinterested Rookies (cluster 1) – Persons who were low for both length of involvement in SOS and general volunteer experience, and low/medium for SOS activity.

Fading Veterans (cluster 2) – Persons who have been in the SOS program a relatively long time, but who are not very active in SOS activities and only mildly active in other volunteer activities.

Active Veterans (cluster 3) – Persons who are moderately active in both SOS activities and other volunteer activities, and who have been active in the SOS program the longest.

All-Stars (cluster 4) – Persons who are the most active in both SOS activities and general volunteer activities, and who have been involved with the SOS program a medium length of time.

Statistical Analysis

The SPSS Base 8.0 statistical software program was used to analyze survey results. Data were first summarized by developing descriptive summaries of responses to survey items relevant to study objectives for the sample as a whole. The motivation items were subjected to

an orthogonal factor analysis (varimax rotation) to discover unique dimensions or factors among the item pool. To classify study respondents by level of participation in volunteerism, a K-means cluster analysis was used. One-way analysis of variance (ANOVA) was used to compare volunteer motivations, ratings of current services and materials, and support for suggested changes to the SOS program across participation levels. When significant ANOVA differences were found, we completed post hoc analyses to see which participation level cluster differed from the others.

CHAPTER 5. RESULTS

Survey Response Rate

We sent out a total of 526 surveys to possible Save Our Streams volunteers over the 12-week data collection period. Completed questionnaires were returned by 318 respondents. Another fifty questionnaires were undeliverable either because of a wrong address or the individual was never part of the Save Our Streams program. Using the deliverable questionnaire sample as a base, our response rate was 67 percent.

Social and Demographic Profile of SOS Volunteers

The volunteers in our sample were on average middle aged ($M = 41$ years old), married (68%), had high incomes ($M = \$45,000/\text{year}$), were high in occupational prestige (56% professional managers or executives), highly educated (78% had completed at least a bachelor's degree), mostly all white (98%), and long term community residents (72% had been in their community 5 or more years) (Tables 6-11). In addition, our sample of volunteers were made up of slightly more females than males (52% and 48%, respectively) (Table 12). We also asked the volunteers their job title and kind of company or organization they worked for, and found that just over 30% of the volunteers had careers that were in some way connected to education (e.g., biology teacher, student, or administrator).

Motivations

Research objectives #1 and #3 were to identify why people volunteer for SOS activities and to compare motivations of SOS volunteers across different participation levels. To determine what motivates SOS volunteers, we asked respondents how important each of 39 reasons were to their participation in SOS water quality monitoring. Volunteers were asked to respond on a 5-point Likert-type scale ranging from 1 = Not at all important to 5 = Very important (Table 13). We then used factor analysis to identify unique dimensions or factors among the 39-item pool. Nine items that were unique (e.g., didn't load highly on any factor) or loaded highly on more than one factor were eliminated. The nine items we discarded with their mean importance scores were:

- I love the scenic beauty of streams ($M = 4.34$)
- I feel a deep connection with nature ($M = 4.33$)
- I am concerned about drinking water quality ($M = 4.29$)
- Stream monitoring is fun ($M = 3.63$)
- To network with natural resource professionals ($M = 3.24$)
- To teach my children about streams ($M = 3.06$)
- To do something more fulfilling than my current job ($M = 2.52$)
- To spend time with family ($M = 2.21$)
- It is part of my religious beliefs or practices ($M = 1.84$)

Factor analysis produced eight motivational factors that we characterized and labeled:

- To protect the environment
- Learning
- Teaching
- To be of service
- For nature enjoyment
- Social
- To guard against local threats
- Career growth.

These eight factors accounted for sixty-five percent of the total variability. Also, Cronbach's Alpha Coefficients (assessing the internal consistency of the items constituting a factor) ranged from .65 (protect the environment) to .85 (to be of service), suggesting that the factors are relatively reliable (Tables 14-15).

Factor 1 (to be of service) consisted of seven items dealing with being useful and how volunteer efforts would produce some type of positive results. Factor 2 (teaching) consisted of three items dealing with teaching stream monitoring to others. Factor 3 (to guard against local threats) consisted of six items dealing with volunteers' concern about local industry and other potential threats to water quality. Factor 4 (social) consisted of four items dealing with volunteering with friends and meeting new people with similar interests (Table 14). Factor 5

(nature enjoyment) consisted of three items related to spending time outdoors and opportunities for escape and reflection. Factor 6 (learning) consisted of three items referring to learning about streams, water quality, and stream organisms. Factor 7 (protect the environment) involved two items dealing with protecting streams and improving water quality. Lastly, Factor 8 (career growth) contained two items dealing with gaining practical work experience and enhancing one's resume (Table 15). In addition, to provide understanding and interpretation of what these factors are really measuring, we have included quotes from volunteers in our focus group discussions that seem to illustrate each of the 8 factors previously identified by our factor analysis results.

To be of Service

First in regards to the “to be of service” factor, focus group respondents expressed a desire to participate in a volunteer activity where they felt a sense of accomplishment, felt like they were doing something useful for the environment, felt like they could make a difference in their community, and where they saw tangible results from their volunteer activities. Save Our Streams water quality monitoring provided them with an opportunity to actually get in the stream, and do some real hands-on work.

“We were looking for a project that was hands on opposed to just complaining about things...this [stream monitoring] was something we could really do something, and make a contribution.”

“It is good to know that we are helping something...the [stream] monitoring that I do is because we think we can help somebody, somewhere, along the way, and that is how it was presented to us, that this work is doing some good, and instead of just going out and enjoying it we are actually doing something to be active in helping other people enjoy it, that is part of our motivation.”

Teaching

Second, the “teaching” motivation was also expressed in our focus group discussions. There was a genuine desire by the volunteers to teach stream monitoring, stream ecology, and water quality to their spouses, families, and especially children.

“That [stream monitoring] does a lot to help the kids know what kind of impact they have on ecosystems and the environment, is real valuable.”

“I have been active with two groups of home-schoolers...and I take them monitoring, and I think it is nice when you take children because they are the future stewards in this country, and I think it is really important to educate

children to the environment because so many children and adults are totally out of touch with the streams and land around them.”

To Guard Against Local Threats

Third, in reference to “guard against local threats”, a number of volunteers expressed in the focus groups that they were motivated to get involved with the Save Our Streams program because of a variety of concerns over local threats to a stream. Many volunteers were concerned about the health of their family and neighbors because of the potential environmental threats. Some of the environmental threats that were discussed in our focus groups included new housing developments, the creation of a new golf course, industrial dumping into streams, hog and chicken farms, timber harvesting, and mineral extraction. The emphasis of this motivation is that volunteers were concerned about streams on their property or in their community, and the impact local industry, development, and agriculture had on the health of their family and friends.

“We were interested in monitoring, because our homes were back there...and we knew there was ground water pollution, and we were curious how the stream water was affected.”

“The one thing that intrigued me was the opportunity to do the testing, at the river just down stream of where I am, because I also have a stream on my property... for me it was interesting to test the river just down stream of that.”

“The reason I got involved was because my husband and I bought a house, and directly behind our house is park-land, with a stream in it that I could monitor...it’s sort of like a natural area, it’s not playgrounds and that sort of thing, my husband and I decided to organize a stream clean up, because we noticed the stream was littered, especially plastic items. Once we actually physically got in the stream, and started picking up stuff, we were appalled at the degradation of the stream, and started really noticing the development that was taking place in our area, and how that was affecting the degradation of our stream.”

Social

Fourth, the “social” element of stream monitoring was also very important to many of the Save Our Streams volunteers in our focus groups. Volunteers enjoyed spending time with friends, family, and neighbors while sampling a stream. Also, volunteering for SOS activities was a way to meet new people with similar interests. For example, some focus group participants said:

“I would monitor if it was just me, if my husband was not interested, but I would have hooked up with someone [another monitor], who is a friend of mine, but she

and I just enjoy each other's company, and I would have no problem having her as a partner."

"I was new to the community...and I thought it [stream monitoring] would be a good way to get out and meet people..."

Nature Enjoyment

Fifth, "nature enjoyment" in our focus group discussions included such things as enjoying the outdoors, having fun in the streams, watching wildlife, escaping the stress and demands of every day life, and an opportunity for solitude and reflection. For example, the volunteers from our focus groups expressed how stream monitoring provides them the opportunity to enjoy nature.

"We get to go outside, away from campus, and away from the hustle, and it is so quiet out there."

"When I went this summer with all the girls, they were just the most fun, some of them were like yuck, yuck, yuck, but others were like this is so awesome, so it was fun to see them having a good time..."

"I have to say, I am going to be honest here and say that the days that we planned to do stream monitoring, I'm kind of grumbling, I'm like oh Gosh, I was going to do this, and do that and you almost are like, I made this commitment, so okay we got to go do it, but I am kind of grumbling the whole way, and then I put my boots on, and we walk down there and get in the stream again, and you are like a little kid again, you're splashing around...and you feel like you are doing something worth while, but your really just having fun playing. It's like being a kid but your pretending to be grown up...so I always enjoy it by the end."

Learning

Sixth, "learning" to identify macroinvertebrates, to be able to properly perform a stream sample, and to learn about water quality were all motivations for Save Our Streams volunteers that were discussed in the focus group discussions. Some volunteers expressed a desire to learn about stream ecosystems and water quality in general. For example:

"I was just fascinated with the inter-connectability between what was taking place between individuals on the bank and how it affected the stream bed itself and what was in the stream bed."

"I really didn't understand until I became educated about SOS that you really could determine the quality of water from the bugs..."

Others were more interested in the specific task of identifying and learning the

many microinvertebrates and the details of biological stream sampling. For example:

“I was real excited about it, and feel passionate about it, I feel excited about the possibility of learning more of the technical aspects of it, which I am really limited on...”

“I asked a fellow monitor how do you identify all of these invertebrates? And he said to me you look at them one time, a second time, and a third time and you just look at them and look at them and look at them, and that’s how you learn.”

Protect the Environment

Seventh, in support of the “protect the environment” factor, volunteers in our focus groups expressed a concern for protecting streams and other waterways in Virginia. For example:

“I had goals of cleaning up the environment...I wanted to find an outlet in my life where I could still contribute to environmental protection...”

“I don’t do it [stream monitoring] for outdoor recreation...I think of outdoor recreation as taking a hike or birding...it [stream monitoring] is fun, and it is great that it is outdoors...however, [stream monitoring] is more *conservation, and stewardship...*” (emphasis added).

Career Growth

Lastly, “career growth” was a motivation expressed in our focus group discussions by some of the younger volunteers, especially those currently attending college or those in the process of a career change. For example:

“ I don’t think I would do it [stream monitoring], even with my interest, I really enjoy it and find it interesting, but generally that is not enough to pull me away from work. But, because it is community service, and because it will look very good, when I leave college and say, hey I did this, that is another big reason why I make time for it, if it didn’t have the certification and acknowledgments that it has, I wouldn’t be doing it.”

“I wanted to transition fairly quickly into something that provides me with some money, but I don’t have any practical experience. So I have been volunteering my efforts to get hands-on experience as soon as possible, and as much as possible.”

Finally, we then assigned each volunteer a score for each factor by summing all the scores for items in each factor and then taking the mean. Each item within the factor contributed equally, because all of the items were based on the same 5-point Likert-type scale. We were then able to perform descriptive statistics for all of the volunteers and for each factor to

determine which of the eight motivations were most important (Table 16). Protecting the environment was by far the most important motivation to the group ($M = 4.60$) on a 1 = not at all important to 5 = very important scale, followed by learning ($M = 4.00$), teaching ($M = 3.67$), to be of service ($M = 3.65$), for nature enjoyment ($M = 3.00$), social ($M = 2.76$), to guard against local threats ($M = 2.64$), and lastly, for career growth ($M = 1.83$).

Motivations Across Participation Levels

To test for significant differences in motivations across the four participation levels, we used one-way analysis of variance with Duncan's multiple range test at the $p = 0.05$ level (Table 17). Five out of the eight motivations were significantly different between at least two groups:

- To guard against local threats
- Social
- To be of service
- Teaching
- Learning

All-Stars rated significantly higher than one or both of the Disinterested Rookies and Fading Veterans on all five motivation variables. Active Veterans were higher than Disinterested Rookies on "learning" and teaching," and higher than the Fading Veterans on "to be of service."

Evaluation of the Current Services and Materials

The first part of objective # 2 called for determining how SOS volunteers evaluate the current services and materials provided by the SOS program. Volunteers evaluated the services and materials the Save Our Streams program currently provides by rating 14 items on a 1-5 Likert-type scale (1 = Poor, 2 = Fair, 3 = Average, 4 = Good, 5 = Excellent) and also a response category of "Don't know". Overall, Table 18 shows that the volunteers ranked all the items above average (>3.0) except for two: feedback from SOS leaders about how volunteer data are being used to protect streams ($M = 2.89$), and advertising/promotion of the SOS program ($M = .81$). Not providing enough feedback about how volunteer data were being used to protect streams was also a major concern that came up repeatedly in our focus group discussions. For example:

“I guess it is a little bit of a mystery to me...we turn in the clipboard at the end of the monitoring, where actually does it go? I know it is being compiled somewhere, somehow...it would be cool to see how all this is being used, because it would make it a lot more real to me.”

“We need feedback, every so often, like the newsletter is great because you are reading about other people’s reports in the area that you are working in...you feel like part of something...it gives you a feeling that if someone so chooses to use the data in some form, for some study, you have contributed.”

“If you could go out one week and collect all this [water quality] information, and then the next month, there it would be on some web site...and then I could say, wow, I helped create that information.”

In addition, the item “The effective distribution of collected volunteer data to those who can use it (e.g., DEQ, DCR)” generated the largest “Don’t know” response. For this item, 177 out of 293 (60%) respondents checked the “Don’t know” category suggesting there is general confusion about where citizen data are going and how the data are being used. The volunteers in our focus group discussions also discussed the importance and confusion over how their data are being used, if at all.

“We need to know that the things we do lead to something, and what we are doing has validity and somebody is doing something with it [data], or at least recording it and using it...that they [resource agencies] begin to use it is very important.”

“With all this information [citizen water quality data] going into an agency like the DEQ, is it getting lost in the bureaucratic shuffle or is something being done with it.”

“I think in a program like this there is an interconnectedness of the people and knowing that the things you do lead to something... We need to know that what we are doing has validity and somebody is doing something with it, or at least recording it and using it...that they [state protection agencies] begin to use it is very important.”

“I personally think that the [citizen data] results should go to, not only to the county, but to the state, and the national level...lets take sewage treatment plants, lets take the major users of water in the area, and have them take a look at our stream monitoring data...”

In summary, volunteers in general feel that the current services and materials provided by the Save Our Streams program are relatively good. However, many volunteers seem unsure how the

product of their efforts (e.g., water quality data) are being used, and desire more information from SOS leaders concerning how their efforts are helping protect streams in Virginia.

Evaluation of the Current Services and Materials Across Participation Levels

Volunteers classified by different participation levels rated very few of the current services and materials provided by the Save Our Streams program differently (Table 19). First, in regards to being properly appreciated and recognized for one's volunteer efforts by SOS leaders, the All-Stars scored significantly lower ($M = 3.10$) than the Disinterested Rookies. In addition, the Fading Veterans and the All-Stars evaluated "communication between SOS leaders and their volunteers" significantly lower than the Disinterested Rookies. In summary, participation level groups don't differ much in their evaluation of the current services or materials provided by the Save Our Streams program.

Support for Possible Changes to the SOS Program

We listed fourteen different items on possible changes to the Save Our Streams program, and asked the respondents how much they would support them using a 5-point Likert-type scale (1 = Strongly oppose, 2 = Oppose, 3 = Neutral, 4 = Support, and 5 = Strongly support). Table 20 demonstrates that most of the suggested changes to the SOS program were supported by volunteers except for two:

- Focus monitoring efforts on the state's most impaired stream sections, rather than letting volunteers pick their own stream ($M = 2.82$)
- An easier certification test ($M = 2.18$)

Overall, standardized training procedures across Virginia ($M = 4.13$) and lobbying government agencies to use volunteer data in stream decision-making ($M = 4.03$) were the most strongly supported changes to the Save Our Streams program. Again drawing from our focus group discussions, volunteers emphasized how important having standardized procedures regarding stream sampling were to their participation in Save Our Streams.

"I think if the [stream] sampling was not standardized, and there wasn't a protocol, and certification involved, I would be a lot less interested, because having a little bit of background [as a biologist], I realize how critical that is, the validity of the data, it makes all the data we collect a lot more credible."

“...I know there are other groups all throughout the country doing those same [data] sheets, so I like it, there is logic and consistency to it, I’m not a scientist or anything, but that gives you a good feeling that it is all being done the same...”

Support for Possible Changes in the SOS Program Across Participation Levels

Save Our Streams volunteers who differed in their participation levels also differed significantly on their support for 6 of 14 possible changes in the program across participation levels (Table 21). In regards to social activities, providing social events like picnics or potlucks for volunteers was significantly less important ($M = 3.14$) for the Active Veterans than for other groups. Second, having annual meetings with other volunteer water monitoring groups in Virginia was more strongly supported ($M = 4.18$) by the All-Stars than all other participation level groups.

In regards to stream monitoring changes there were some significant differences among the participation level groups. First, the All-Stars significantly supported more strongly ($M = 4.24$) the suggestion of lobbying government agencies to use volunteer data in stream decision-making than did both the Active and Fading Veterans. Second, the All-Stars more strongly opposed ($M = 2.37$) the suggestion of focusing monitoring efforts on the state’s most impaired stream sections, rather than letting volunteers pick their own stream than the Disinterested Rookies and Fading Veterans.

Next, the All-Stars significantly supported a Virginia SOS newsletter more ($M = 4.32$) than did the other three participation level groups. Lastly, those most active in the SOS program (i.e., All-Stars) were significantly more opposed ($M = 1.81$) to an easier certification test than were all other participation level groups.

Recruitment of SOS Volunteers

Our last study objective was to suggest strategies for recruitment and retention of SOS volunteers. One way we went about determining the most effective ways to recruit SOS volunteers was to ask our respondents how they got involved with the Save Our Streams program. First, we asked them how they first heard about the Save Our Streams program. Word of mouth (e.g., friend or family) was most common, with 25% selecting that option. The next most common responses were (Table 22):

- Through an environmental organization other than IWLA (20.6 %);
- Through the Izaak Walton League of America (18.7 %);
- Through the media (e.g., newspaper, internet, television, magazines) (10.5 %);
- Through a governmental agency (7.0 %);
- Through a youth, school, or church group (5.7 %);
- Don't remember (3.5 %).

Initially learning about the SOS program by word of mouth also was discussed in our focus group discussions. Here is an example of one volunteer's account of how information about Save Our Streams is spread in the community:

“I was at a local nature talk a couple of Sundays ago, and the topic was aquatic insects, and I asked a couple too many questions, and it became evident that I was into this monitoring thing, so the woman next to me asked me how I knew all this stuff, and in the end, she joined me [in a monitoring session]. So that really is a nice kind of way to get this [SOS program] to grow.”

We next asked volunteers who was the most influential person in their decision to get involved with SOS monitoring. We provided eleven possible choices and found that “I sought out activity on my own” was the most common response (35.5%) (Table 23). The next most common responses were:

- A friend (24.1 %);
- Co-worker (11.4 %);
- Spouse or partner (8.8 %);
- Teacher (5.2 %);
- Child (2.3 %);
- Public figure (2.0 %);
- Parent (1.6 %).

Reasons for Dropping out of the SOS Program

Research objective # 4 was to identify why SOS volunteers discontinue active participation. The survey asked those volunteers who had *not monitored a stream in the past 12 months* why they stopped participation in SOS activities. All other volunteers skipped this question on our survey. One hundred twenty-two of the 318 (38%) volunteers who turned in completed surveys answered this question. We provided 33 possible reasons for dropping out of

the SOS program and had respondents rate each item on a 5-point Likert-type importance scale (1 = Not at all important, 2 = Slightly important, 3 = Somewhat important, 4 = Moderately important, and 5 = Very important).

Two items regarding limited time and being too busy (I had too many other obligations) ($M = 3.14$) and I didn't have enough time ($M = 3.07$) were the most important reasons volunteers gave for stopping participating in SOS activities, and they were only somewhat important (Table 24). Although these ratings are only somewhat important on the importance scale, volunteers rated them by far the most important reasons for dropping out of the SOS program, relative to the other 31 items. It appears that many volunteers just have too many things going on in their lives, and are forced to give up activities that are not of highest priority. Focus group participants similarly expressed lack of time and other responsibilities as important reasons for discontinuing SOS participation.

“You can only do so much, and once you learn how to say no, then it is OK ... you are a mother, Sunday school teacher, a girl scout leader, and this great naturalist, there is only so much you can do.”

“But then it [the decision to stop monitoring] was more a question of time, I really didn't have the time to offer a commitment to stay active...”

CHAPTER 6. CONCLUSIONS

Describing SOS Volunteers in General

Help the Environment

The results of our analysis of responses about motives demonstrate that protecting the environment is by far the most important motivation for SOS volunteers. A number of other researchers studying environmental volunteers have reached similar conclusions. For example, Grese et al. (2000) found that “helping the environment” was the greatest motivation for volunteers in ecological stewardship programs. Similarly, Schroeder (1998a) found that to preserve, protect, and restore nature was the main motivation for ecosystem restoration volunteers. It is not surprising that volunteers would be concerned about protecting the environment, considering conservation/preservation/protection are some of the key missions and objectives of the Save Our Streams program. In fact, it would seem unusual if protecting the environment were not one of the major motivations for environmental volunteers.

However, Save Our Streams volunteers’ motivation to protect the environment likely goes well beyond this generic statement, and here is displayed in very real, hands-on, practical ways. Stream monitoring fits well into the motto to “think globally, act locally,” which has become increasingly popular with citizen groups (Dwyer et al. 1992). For example, Save Our Streams volunteers want to personally make a difference in protecting the environment by actively getting out in their stream and doing the “nitty-gritty” hands on work. One of our focus group discussants said:

“We were looking for a project that was hands-on opposed to just complaining about things...this [SOS] was something we could really do, and make a contribution...”

Thus, protecting the environment for these volunteers translates into practical, hands-on action. Volunteers’ participation in stream monitoring may be more satisfying experience than other more common ways of contributing to environmental groups (e.g., sending money). They sweat, get wet and cold, and suffer in the heat, all for the purpose of protecting the environment.

Education

Motive factor scores demonstrate how important education, both learning and teaching, are to the Save Our Streams volunteers in our sample. It may seem inevitable that when over 30% of volunteers were in some way connected to the formal educational system (e.g., teacher or student) that education would be a top motivation. In addition, because of the educational nature of the Save Our Streams program (e.g., species identification and certification test), it is again no surprise that education would be a strong motivation for participation. These findings are consistent with McCabe's (1994) research that recommends that volunteer programs provide a healthy learning environment because training and education can be an incentive, with Kellert's (1980) finding that conservation organization members cited educational benefits as a primary inducement for joining, and lastly with Still and Gerhold's (1997) research on urban forestry volunteers. In addition, Dennis and Zube (1988) state, "the relationships of intellectual pursuit as an incentive for [voluntary] group membership and as a motivation for outdoor recreation are clear" (p. 242). Save Our Streams volunteers seem to enjoy learning about water-based ecosystems, the challenge of identifying macroinvertebrates, and better understanding the relationship between industry, agriculture, or development and water quality. Once they have some knowledge about these matters, many desire to share and teach it to their family, friends, and students.

Known Utility of Volunteer Effort

Our data also suggest how important feedback is for Save Our Streams volunteers. Feedback can come in many different ways concerning many different issues. For example, we found in our questionnaire that volunteers felt they were not getting enough feedback *about how volunteer data were being used to protect streams*. In addition, feedback may include information about when and where training occurs, information on new local environmental problems (e.g., a new housing development), constructive criticism on a monitor's sampling technique, appropriate recognition, or simple reminders from Save Our Streams leaders to monitor a stream. Respondents from our focus group discussions described the importance of feedback in the form of simple reminders:

"Before you [the regional coordinator] would call. I would get a call from you about three times a year to say let's get together again as a team, and then there would be phone calling back and forth, until we all found a date, and now I guess, I don't know if that is going to happen again. It had not occurred to me to pick up

the phone and call you, and say do we need to do another sample, it is not on my plate, it is not on my screen, so I don't know when I will go out again, I don't know how that will happen.”

“I will continue to monitor, but I am sort of passive at this point, waiting for [the regional coordinator] to call next time, but I don't know if there is a framework for that to happen again.”

“I believe and enjoy the program. In retrospect, I think I would be more active if asked or reminded to monitor my stream. I took and passed the certification program but never received anything. Maybe the word should be feedback. More feedback and some push to the volunteers would help.”

Our findings concerning the importance of feedback from volunteer managers are supported by Nelson, Pratt, Carpenter, and Walter (1995) who state that positive feedback and negative feedback offered motivationally are both important to empowering volunteers with a sense of self-efficacy, which is a guarantee of future performance.

Quality Control

In our study, the Save Our Streams volunteers overall were opposed to an easier certification test. As stated earlier, the certification process currently includes a bug identification quiz, and volunteers must demonstrate proper stream sampling techniques. In our mail-back questionnaire, we did not specify what exactly would be made easier on the test, but it seems clear that volunteers were against the idea of an easier test ($M = 218$). However, they were about neutral ($M = 3.29$) about a more rigorous certification test, suggesting that the level of difficulty concerning the certification test was about right for these volunteers. One possible reason volunteers were opposed to an easier certification test again relates to the quality of their data. We speculate that these volunteer might feel having an easier certification test could result in lower quality volunteer data, and less knowledgeable volunteers about stream insects and water quality. Consequently, state and federal protection agencies might not take volunteer data as seriously. Since having their data used in some way appears to be important for many volunteers, making the test a little easier may not be worth the possibility of having their data seem less credible.

Just Ask

In regards to recruitment of Save Our Streams volunteers, a number of interesting conclusions can be drawn. First, our finding that “word of mouth” was the most common way 25% of volunteers hear about the Save Our Streams program is consistent with similar environmental volunteer literature (Lipkis & Lipkis 1990; Still & Gerhold 1997). It may sound like old news, or like a cliché, but the best way to obtain volunteers is still *simply to ask* (Independent Sector 1990). In fact, the Gallup Organization survey, *Giving and Volunteering in the United States*, found that people were more than three times as likely to volunteer when asked than when not asked (Gallup Organization 1992). Enthusiastic currently-active Save Our Streams volunteers sharing with others their joys and experiences of stream monitoring still seems a common technique to recruiting new volunteers.

We also learned that 35% of individuals, when asked who most influenced them to get involved in SOS monitoring, chose “sought out the activity on my own.” It appears that many of the current SOS volunteers are self-motivated in seeking volunteer involvement. Still and Gerhold (1997) found similar results with urban forestry volunteers who said they had not been asked to join, but sought the activity (i.e. tree volunteering) on their own. Consequently, Still and Gerhold (1997) conclude, “...this suggests that many of the tree volunteers were self-motivated to become involved...however, personally asking potential volunteers is an effective recruitment technique for expanding the pool of volunteers beyond this self-selected group” (p. 125). In summary, it appears that many volunteers did hear about the SOS program by “word of mouth.” However, they then took the initiative on their own to seek out Save Our Streams activities.

Lack of Time

Lastly, it appears that the main reasons people are discontinuing participation in the Save Our Streams program are because of lack of time, or other obligations pull them away from their stream monitoring. Volunteers may become active with their children’s sports leagues, school clubs, scouting activities, or church activities. Increased time demands of the job and career advancement may also take up time that was once set aside for stream monitoring. In one regard, SOS leaders can take a certain amount of pride in the fact that volunteers who drop out, most do so because of circumstances in their lives, not because of some problem with the Save Our Streams

program. On the other hand, this may be frustrating for volunteer coordinators and managers because there is not much they can do to change volunteers' busy lifestyles.

Differences in Volunteers' Motivations by Participation Level

Purposive Motivations

In regard to volunteer motivations, we found that those individuals most active in volunteering (i.e., All-Stars & Active Veterans) tended to rate the motivational factors to “to guard against local threats,” “social,” “to be of service,” “teaching,” and “learning” somewhat higher than one or more of those groups not as active. In many ways our findings are consistent with the motivation/benefit volunteer literature discussed previously (Caldwell & Andereck 1994; Rich 1980). For example, these authors conclude that purposive motives (i.e., based on global concerns of a suprapersonal nature) were most important for those most active, while material motives (i.e., tangible rewards that can be translated into monetary value) played a minimal role. Our motivational factors like “to be of service” and “teaching” seem to be purposive motives as described by these authors. For instance, “I feel an obligation to help the community” was one item in the service motivational factor. Within these factors, there is a sense of looking beyond oneself, a concern for the community, doing one's civic duty, and fulfilling a sense of responsibility. The factor “to protect the environment” seems to be a purposive motive; however, there were no significant differences among participation level groups on this factor. In summary, our study provides some support for previous literature that concluded that purposive motives were most important for volunteers most active.

Social

In regards to the social element of volunteering, Knoke & Prensky (1984) found that for the most active members of voluntary associations, purposive and solidary motivations were most important. As previously noted, solidary motives are largely derived from social interaction and include socializing, status, group identification, and recognition (Prestby et al. 1990). One of the most consistent finding across the majority of studies dealing with volunteer motivations is that solidary motives increase with both increased activity and the longer one

stays in a voluntary association (Clarke et al. 1978; Pearce 1983). Relationships with other volunteers, paid staff, and the individuals the volunteers are helping tend to become more important over time and the more active the volunteer becomes. Our survey data partly support this literature because for those most active in volunteering (i.e., All-Stars), the social motivation of being with friends and meeting new people was significantly more important than the Disinterested Rookies.

The results from our focus group discussions also appear to support the conclusion of the importance of social interaction for SOS volunteers. For example, one volunteer from our focus group discussions explains the social aspect of monitoring with a friend:

“I have a girlfriend, who is in the training stage, but to be honest, it [stream sampling] is like my day away, my day out. I know it sounds loony, but is just the two of us, sitting around, sorting bugs, and chatting...”

The activity of stream monitoring is very social in itself. Stream monitoring cannot be done individually and usually takes 2-4 individuals. Many volunteers monitor with their family or friends. Social interaction during the sampling process is inevitable and appears to be an important motivation for some volunteers. Again drawing from our focus group discussions, here is what participants had to say about the social aspect of stream sampling:

“...I went with my boyfriend, and he is not into that kind of stuff [bugs] as much...and it was December and he did not think there were going to be any bugs in the creek, and he was really surprised, and it was kind of neat because he thought it was neat.”

“...one thing I do think is really important about this monitoring, I find that it often is a family enterprise, because you can't monitor by yourself, you can't hold the net and move the rocks, you must have a partner, and if that partner is in your family, its real easy to decide on the time when you are going to monitor...”

In conclusion, the results from our study partly support much of the previous literature that concludes that purposive and solidary benefits are more important for those volunteers with higher participation levels.

Local Threats

Regarding motivations, we found that the motivational factor “to guard against local threats” was significantly more important for those with the highest participation level (i.e., All-

Stars) than those with lower participation levels (i.e., Disinterested Rookies and Fading Veterans). To guard against local threats included the items:

- I am worried about my property value
- I do not trust governmental agencies to do a good job of monitoring streams
- To become a “watchdog” on local industry
- Because a stream in my community was threatened
- I wanted to help protect a special place of my youth
- I am worried about the health of my family and neighbors.

In many ways, the “to guard against local threats” motivational factor seems more like a material benefit than a purposive benefit. Hence, our finding that the material motivation “to guard against local threats” was more important for those with higher participation levels is contrary to some of the previous literature (Knoke & Prensky 1984).

One possible explanation for why the motivation “to guard against local threats” is relatively more important for those with higher participation levels relates to the nature of stream monitoring. For example, it may be that those most affected by some type of local environmental issue (e.g., a hog farm upstream) are the ones who have the highest participation level because they are the most directly affected. Since the environmental threat has potential to negatively affect the health of their family or friends directly, it makes sense that they would become the most active in finding a solution to the problem. There is more of a sense of urgency and immediacy for those who perceive that they are in some way directly in danger from environmental threats. Hence, this may explain why they became highly active in the Save Our Streams program, and why guarding against local threats is such an important motivation, relative to the other groups, for those with the highest participation level.

Differences in Volunteers’ Evaluation of the Current Materials or Services by Participation Levels

Need for Recognition

In terms of volunteers’ evaluation of the current services and materials the SOS program provides, we found that overall there were very few differences among the groups with different

participation levels. However, one interesting finding was that the groups with the highest participation levels (i.e., the All-Stars) rated recognition and appreciation of volunteers significantly lower than did the Disinterested Rookies. Those volunteers who are most active in SOS activities are not as satisfied with how they are being recognized.

Managers of volunteers have a responsibility to all of their volunteers. However, since those most involved tend to do the most work and carry most of the burden of the organization on their shoulders, special consideration in our opinion should be paid to how they evaluate the program. Properly recognizing and appreciating volunteers is potentially one area where the SOS program could be improved. Consequently, it would be wise for program managers to reward participation in Save Our Streams activities with recognition.

Building on this concept of recognition and appreciation, we found that when we asked respondents if they preferred to be recognized for their efforts, the majority (64%) of responses were “I do not need to be recognized for my efforts”, while the rest of volunteers, in some way, want to be recognized for their efforts (Table 25). These results should not necessarily be taken at face value because the literature suggests that since most people feel that volunteer work should be altruistic in nature, responding otherwise would sound self-satisfying (and hence selfish), and would be socially unacceptable (Smith 1981). There is some research that supports this contention. For example, Still and Gerhold (1997) summarize by saying, “...that recognizing volunteer efforts enhances volunteer support and commitment *despite the low importance volunteers ascribe to it*” (emphasis added) (p. 127). In summary, our research suggests that some type of recognition is important for 36% of SOS volunteers, and the literature suggests that it may be important for some of those who responded in the survey that it is not.

Critical of SOS Program

Our results regarding differences in the evaluation of the SOS program by participation level suggest that those volunteers who are most active (i.e., the All-Stars) tend to be the most critical of the current services and materials. In the two items that were in some way significantly different across participation levels, the All-Stars rated the service or material lower than the Disinterested Rookies. These results are consistent with models of participation which

view those with the greatest amount of information as being the most critical, perhaps because of a greater frame of reference from which to evaluate the situation (Heberlein 1977; Schreyer 1976). For example, those who are the most active in Save Our Streams and have been in the program a medium length of time (i.e., All-Stars) may have more information because training is quite fresh in their minds and they are currently monitoring their stream the most, in contrast to the Disinterested Rookies who have also recently been through training but are rarely putting it to use.

For example, when we just look at how the overall group of volunteers evaluated the current services and materials provided by the SOS program, only two of the items were rated below average (< 3.0): advertising/promotion of SOS program and providing feedback from SOS leaders about how volunteer data are being used to protect streams. However, when we segment our sample based on participation level, we found that those most active in SOS (i.e., Active Veterans or All-Stars) evaluated five items below average:

- Recruitment of new stream monitoring volunteers
- Feedback from SOS leaders about how volunteer data are being used to protect streams
- The effective distribution of collected volunteer data to those who can use it
- Advertising/promotion of SOS program
- Provision of materials to educate others about SOS.

In summary, it appears that some active volunteers tend to be more critical of the current services and materials SOS provides than some less active volunteers; however, overall there is much consistency among the different participation level groups on their evaluation of the current services and materials.

Differences in Volunteers Support for Possible Changes to the SOS Program by Participation Level

Ability for Volunteers to Pick their own Streams

There are a number of important conclusions that can be drawn from the volunteers' responses concerning their support for possible changes to the SOS program. First, although we

have seen how important improving water quality and protecting streams in Virginia is for the most active volunteers. However, when we offered them a suggestion that might increase the effectiveness of their volunteering efforts (i.e., to focus monitoring efforts on the state's most impaired stream sections, rather than letting volunteers pick their own stream), those with the highest participation levels were the *most opposed to it*.

One possible explanation may be that even though this suggestion may be a more effective use of volunteer efforts, one important reason volunteers join SOS is because of this ability to monitor the stream of their choice. Many volunteers want to monitor the streams on their property, in their neighborhood, a stream that has special meaning, or a stream that is logistically easy (e.g., close by or easy access) for them. Again, a focus group discussion member stated:

“The reason I got involved [in stream monitoring] was because my husband and I bought a house, and directly behind our house is park-land, with a stream in it...my husband and I decided to organize a stream clean up, because we noticed the stream was littered, especially with plastic in it.”

Consequently, even though targeting the most impaired streams may be a more effective method to improve stream quality in Virginia overall, the volunteers with the highest participation level feel quite strongly about retaining their ability to pick their own stream to monitor.

Use of Data by State and Federal Protection Agencies

The All-Stars want the data they collect to be credible, reliable, and thus used by state agency (e.g., DEQ, DCR) to assist in protecting streams in Virginia. For example, they significantly supported “lobbying government agencies to use volunteer data in stream decision-making” more than both the Active Veterans and Fading Veterans. While all groups support lobbying governmental agencies to use volunteer data, it makes sense that those volunteers who faithfully monitor their stream would have a higher desire that something useful come from their sampling efforts.

The volunteers who participated in our six focus group discussions also put a great deal of emphasis on the water quality data they collect and its use by government agencies. As just seen in the survey results, volunteers feel very strongly about having their data used in some way

by state and federal protection agencies to promote improved water quality or to help protect streams. In addition to our results from the questionnaire, we found in our focus group discussions that having their data used, in some way, by state and federal protection agencies is extremely important to Save Our Streams volunteers. For example:

“I would like to hear from the DEQ something like, we used your data for this project or we appreciate you going out every couple of months.”

“It is really discouraging...when they [state protection agencies] say that citizen data is unreliable, that makes me mad, that makes me really mad that they don't take the citizen data seriously.”

“I think in a program like this there is an interconnectedness of the people and knowing that the things you do lead to something... We need to know that what we are doing has validity and somebody is doing something with it, or at least recording it and using it...that they [state protection agencies] begin to use it is very important.”

“When the data is being used, it makes us feel like that we are doing some good, we are actually going out there and doing something that other people are using that information to plan programs, to set policies...having it [citizen data] recognized on the federal level even, is kind of a motivation, that, hey this stuff is important, people are looking at it, it kind of gives you a little prompting to keep going with it, instead of just, no one is looking at it, so I can skip it this time.”

Newsletter

The All-Stars supported “a Virginia newsletter” significantly more strongly than all other participation levels. A newsletter is a perfect opportunity to communicate with volunteers about when and where the next training sessions will be, how citizen volunteer data are being used, and success stories about improving water quality problems within the state. For example, one focus group participant said:

“We need feedback, every so often, like the newsletter is a great idea because you are reading about other people's reports in the area that you are working in...you feel like a part of something...it gives you a feeling that if someone so chooses to use that data in some form, for some study, you have contributed...”

The Save Our Streams program along with the Virginia Department of Environmental Quality and Department of Conservation and Recreation, to their credit, have recently created the first issue of *The Riffle*, which is a newsletter for citizen monitors and environmental organizations across Virginia.

Meetings

The All-Stars also supported “annual meetings with other volunteer water monitoring groups in Virginia” significantly more strongly than all other participation level groups. Again, these meetings with other volunteer water quality monitoring groups could offer the opportunity for volunteers to hear about other water quality issues from around the state, perhaps to learn new stream monitoring techniques (e.g., chemical testing), to meet new people with similar interests, and to offer suggestions as well as accept them, concerning their own streams. Again drawing from our focus group discussions, one participant said:

“One of the things I like is getting to meet periodically with people who are doing the same thing [stream monitoring]. To me it is important because I don’t want to feel that I am the only person out there when it is really cold and miserable, out there freezing my hands in the stream, I want to know there are other people...”

In conclusion, continuing *The Riffle* newsletter and providing opportunities to meet with other volunteer water quality monitoring groups in Virginia are potential techniques for retaining those volunteers with the greatest participation levels longer.

Certification Test

Lastly, even though all participation level groups opposed an easier certification test, the All-Stars were significantly more opposed to it than all other participation levels. The fact that the All-Stars were significantly more opposed to an easier certification test suggests that it would not be a good change to implement. Again, we are guessing that the reason volunteers, and especially those most active, oppose an easier certification test is because an easier certification test could possibly lessen the value of their data in the eyes of state and federal protection agencies and other voluntary associations.

In conclusion, we must acknowledge that while we have pointed out differences among SOS volunteers by participation level index, such differences are in fact few. The differences that were found across participation levels concerning motivations and support for possible changes of the SOS program were for the most part found with the All-Stars. Overall, there were not many differences between the Disinterested Rookies, Fading Veterans, and Active Veterans. The biggest differences were found between the All-Stars and the other three less active groups.

CHAPTER 7. IMPLICATIONS/RECOMMENDATIONS

Given the cost and difficulty of initial recruiting and training of volunteers, retaining them and maximizing their performance are a high priority for volunteer managers. In fact, a national survey of the training needs of volunteer administrators conducted by Brudney and Brown (1990) found that the top needs for basic seminars centered on *recruitment* and the general issues of *motivation, recognition, and retention* of volunteers. We feel our study has some useful and relevant implications and recommendations for volunteer coordinators about how to best recruit and retain volunteers that can help the SOS program, grassroots organizations, environmental organizations, and voluntary associations in general. These recommendations include:

1. Show volunteers how their efforts are making a difference in protecting streams and improving water quality throughout Virginia.
2. Continue to offer a variety of opportunities for environmental restoration activities where volunteers can see immediate and tangible results.
3. Understand the specific motivations of volunteers at different levels of participation.
4. Provide continued opportunities for learning about streams and water quality.
5. Focus recruiting efforts on the formal education system.
6. Asking people to join is currently the most effective way to recruit potential SOS volunteers.
7. Understand volunteers are busy and have limited time, and be flexible concerning SOS activities in order to meet the needs and schedules of SOS volunteers.
8. Appropriately recognize volunteers for their efforts with both traditional forms of recognition (e.g., awards) or simply by recognizing the usefulness of their water quality data.
9. Provide full-time paid regional coordinators.

Show that SOS Makes a Difference

SOS volunteers need to be shown and reminded that their efforts are in fact making a difference in protecting streams and improving water quality throughout Virginia. Pearce (1993) states, “If individuals are going to spend their free time organizing, participating in, or working toward a goal, they *must feel that these efforts will be effective*. Individuals must believe in the efficacy of their actions before they will undertake or persist in volunteer work” (emphasis added) (p. 80). From our survey results, we know how important the motivation protecting the environment is to SOS volunteers. Consequently, volunteers need to understand the six purposes/missions/goals of the Save Our Streams program discussed earlier in this paper and how their volunteer work is contributing to further these goals. Volunteer managers ideally should describe and explain the mission of SOS at the first contact with potential volunteers. In clearly stating the purpose, one has the opportunity to show why the volunteer is important to the purpose and how their efforts contribute to achieving the purpose. Thus, reminding volunteers about the purpose of the SOS program and how their stream monitoring contributes to achieving the purpose, is very important.

However, in many ways, it is difficult to demonstrate and show the benefits of the volunteer activity of stream monitoring. For example, it is clear that these volunteers feel strongly about improving water quality and the streams in their backyards; that is a major motivation for joining a grassroots volunteer association like Save Our Streams. Grassroots organizations, by definition, attempt to address and solve local problems. However, stream monitoring, in and of itself, does not produce immediate or tangible results the volunteer can see. For example, one focus group participant stated:

“It [stream monitoring] is not completely goal oriented, people don’t do it for the purpose of making it have excellent health, the majority of people who go out and monitor are not actually fixing it, they are just checking to see how it is doing, sending the data in...Most people don’t have the funding or the equipment to do that [fix the stream].”

In addition, some volunteers in our focus group discussions expressed concern that biological monitoring might even be having an adverse effect:

“I am concerned that obtaining Save Our Streams data results in the death of many macroinvertebrates. SOS monitoring may harm the bio-diversity of some streams instead of protecting the bio-diversity.”

Stream monitoring is different from ecological restoration activities in which volunteers can spend a day planting native trees or pulling weeds, and by the end of the day, they can see the fruits of their labor. Save Our Streams volunteers don't actually see improvements to the stream immediately or ever from stream monitoring. Since the actual activity (i.e., stream monitoring) does not help the environment immediately or directly like pulling weeds or planting trees, it is especially important for managers to provide feedback on how the data are being used. The results of stream monitoring come from how the data are used to draw attention to a degraded stream, show the possible negative effects of a new development or agricultural practices, and how the data are used by state agencies to correct water quality problems. Volunteers need to know and see the good their volunteer efforts are doing to protect Virginia's waterways.

Consequently, managers should stress ways in which Save Our Streams is protecting the environment, especially for those most active volunteers. For example, recently (April, 2000) SOS, Virginia DEQ, and Virginia DCR sent out the first issue of *The Riffle*, a newsletter for citizen monitors and environmental organizations across Virginia. In it are stories and accounts of the activities of citizen monitors in Virginia, and how their data are helping protect stream quality. Managers should continue to place stories about how volunteer data are protecting and improving stream quality in the newsletter, so volunteers can actually read about how they are making a difference. In essence, *The Riffle* should show volunteers what their efforts are doing that is consistent with the SOS mission of protecting streams, improving water quality, and educating the public.

Provide a Variety of Environmental Restoration Activities

In addition, along with stream monitoring, SOS program managers should continue to offer a variety of opportunities for restoration activities where volunteers can see immediate and tangible results. Schroeder (1998a) suggests that by designing programs to highlight the importance of restoration to the regional and global environmental picture, and providing frequent opportunities for volunteers to see the tangible outcomes of their work, managers and coordinators might be able to help maintain the motivation and enthusiasm of the volunteers. For example, stream cleanup (e.g., trash and debris), tree planting, storm-drain painting, riparian restoration, and stream bank

restoration (e.g., erosion control) are all activities in which volunteers can see the immediate fruits of their labor.

The results of our survey demonstrate that volunteers are willing to participate in activities other than stream monitoring (Table 26). Save Our Streams volunteers are most interested in stream clean-up (77.9%), tree planting (61.9%), and storm drain painting warning against pollution (34.3%). They are less interested in lobbying politicians/officials to protect streams (11.8%), providing SOS office support (5.9%), and fund raising (4.7%). Still and Gerhold (1997) also found lobbying and fund raising to be unpopular potential activities for urban forestry volunteers. It appears that there is a desire in volunteers to participate in activities, other than stream monitoring, where they can see tangible results. For example, here is a comment that was written in the qualitative section of our survey describing the desire to help in tangible ways:

“Please give us ways to improve the quality of streams- My stream is horrible [i.e. almost nothing alive there] and no one can tell me what I can do to improve it. I would like to not only monitor the stream, but to save it.”

As seen by this statement, there seems to be a willingness by at least some Save Our Streams volunteers to perform a wider range of tasks (e.g., stream clean-up and tree planting) than they have performed already, suggesting strong potential for increased participation. We recommend offering a variety of tasks to volunteers that offer tangible, direct, and immediate results *along with* stream monitoring. However, we advise caution regarding this conclusion. First, respondents who say they are interested in performing some of these alternative activities on a survey do not necessarily follow through with them. In reality, they may too busy or have other obligations. It is easy to check a box in a survey, without really considering the time and energy it will take to carry the activity out. Having these alternative restoration activities available might help those who need a break from stream monitoring, are interested in seeing immediate results of their efforts, or who simply enjoy and desire diversity in their volunteer experiences.

Understand the Diverse Motivations of SOS Volunteers

Volunteer managers should understand the apparent differences in motivations among their volunteers at different stages of participation. Our data suggest that the majority of our volunteers become active for purposive motivations (e.g., protect the environment or helping the community).

Again, similar to the first recommendation, SOS leaders would be wise to stress the importance of protecting the environment, improving water quality, and making a contribution to society. Since the most active SOS volunteers seem to be the most motivated by these purposive motives, managers should make a special effort to inform them about how their efforts are helping improve water quality in Virginia. This may help to retain them in the SOS program longer. In addition, our data also suggest that volunteers have a wide range of motivations for participating in SOS.

For example, it appears that those most active in SOS are the ones who are the most concerned about potential local environmental threats. Many volunteers seem to become active because they perceive a specific threat to their health or property. For example, a volunteer may become involved in SOS because a factory is polluting a stream that runs through their backyard where their kids swim and play. Save Our Streams leaders must then make a conscious effort to inform this volunteer about the status of the factory, about what (if anything) is being done to stop it, and lastly how the volunteers' efforts are helping protect the stream from the factory. Emphasizing the benefits of quiet reflection or having fun may be inappropriate and probably fall on deaf ears for this volunteer. In conclusion, volunteers mainly participate to improve water quality and to protect the environment; however, there are also a wide variety of motivations expressed at different stages of participation. Consequently, based on our survey results, understanding the specific motivations (e.g., fun, socializing, teaching) that volunteers have at different participation levels may help volunteer coordinators help them have accurate expectations, reach their goals, keep them satisfied in their tasks, and improve their whole volunteer experience.

Continued Education

SOS leaders must continue to provide opportunities for learning about streams and water quality. As stated earlier, protecting the environment is the most important motivation for SOS volunteers. However, the benefits (e.g., clean water, increased bio-diversity) of protecting the environment through stream monitoring are by their nature collective and thus available to all residents regardless of participation. Prestby et al. (1990) suggests that volunteer managers must also provide rewards to volunteers that require actual participation in the volunteer organization. For example, such benefits like learning how to properly identify stream macroinvertebrates, how to properly perform a stream sample, and what physical characteristics to look for when assessing

the health of a stream all are *contingent on participation* in that volunteers can only receive them through active participation.

It is clear from our data that learning about water quality, streams, and stream insects is an important motivation of SOS volunteers. Consequently, along with emphasizing how volunteer data are being used to protect and improve water quality in Virginia, we suggest that managers also emphasize the many other benefits that come from *active participation* in SOS activities such as learning about stream insects and water-based ecosystems. Save Our Streams managers can do a number of specific and practical things to continue to encourage the learning process.

First, Save Our Streams might offer special classes or seminars dealing with other aspects of water quality besides macroinvertebrate biological sampling. Other sessions could discuss how GIS data can be used in conjunction with volunteer data to create a more complete understanding of a watershed. We received a number of requests in our focus group discussions and survey for training and certification in the muddy bottom technique (where applicable) and also chemical (e.g., pH) water quality monitoring. There are many active volunteers who desire to learn about more in-depth and complex water quality issues. Again, drawing from our qualitative data, here are the learning desires of one volunteer:

“Offer an intensive course on freshwater biology and how it relates to the insects we find when we monitor. I’d like to learn more about life cycles or specific insects, what they are doing at each season of the year. I’d also like to learn how to identify more specifically, for example which caddisfly larva are more sensitive to pollution, or why do you find more helgrammites in one particular stream.”

Granted, not every volunteer desires this level of learning opportunities, but there does seem to be a general consensus for more learning opportunities. For example, our data also suggest that the volunteers were quite supportive ($M = 3.96$) of bringing in special guest speakers to discuss water and environmental quality. The key is to offer a variety of different learning experiences from which interested volunteers at different participation levels can choose. Second, use the *Riffle* (i.e., citizen monitoring newsletter) as a potential learning tool. The *Riffle* can serve as a vehicle for volunteers to contact each other regarding questions or comments, along with discussing how volunteer data are being used, informing volunteers about new techniques, discoveries, and findings

concerning water quality monitoring within the state as well as across the country. Discuss any current events regarding water quality that appear in the news. Lastly, continue to improve the existing Virginia Save Our Streams website, providing easily assessable, understandable, and current information on a variety of water quality topics. Provide links to other state and federal agency, universities, and other volunteer organizations that collect water quality data. Again, volunteers may be too busy to attend a formal all day seminar or class, but could easily, at their own leisure, explore and learn about the issues and concerns of water quality in Virginia on their computer.

Previous research on environmental volunteer associations have also concluded the importance of learning as a significant motivation for volunteers. For example, Caldwell & Andereck (1994) found learning to be a very important motivation for getting involved with the North Carolina Zoological Society, a recreation-related voluntary association. “Because there is evidence to suggest that this motive [learning] is strongly linked with membership and participation in a related voluntary association, efforts to increase or sustain membership would likely be effective *if the educational benefits associated with society membership were emphasized*” (emphasis added) (p. 41). We concur with their results and suggest that managers provide an array of learning opportunities to meet the needs of those volunteers who are most interested in putting forth the time and energy into stream monitoring.

Professional Educators Make Important Volunteers

Managers should continue to focus on recruiting volunteers from the formal education system. Save Our Streams volunteers as a group want to teach, and increasing the information, knowledge, awareness, and concern about environmental issues in our children is important. Teachers also want to provide children with positive environmental experiences, which ideally will complement their book learning and instill in them a respect and interest for protecting their environment in the future. The Save Our Streams experience is one way to provide an interactive, participatory environmental experience. Teachers are always looking for new, hands-on, outdoor activities that they can incorporate into their curriculum. Again, the Save Our Streams program can meet this need. Teachers can also provide a valuable continuous pool of volunteers to the SOS program. Although students come and go through their classes, having committed teachers

involved year after year can provide a continuous stream of new potential volunteers. In addition, children can attract parents to volunteer, then parents also may attract their spouses and friends to volunteer in the SOS program. University clubs (e.g., the Wildlife Society, the Forestry club, and the American Fisheries Society) can also provide a continuous pool of knowledgeable and enthusiastic stream volunteers for the SOS program.

Ask People to Volunteer

We suggest that even though a large percentage of our volunteers were self-motivated in seeking volunteer activity in SOS, personally asking potential volunteers is still a very effective way to recruit new potential members. It appears that an effective way to recruit potential volunteers is to *use the enthusiasm and excitement of the current active SOS volunteers*. This may include encouraging your volunteers to talk with neighbors, spouses, children, people from other volunteer organizations, church members, school friends, other IWLA members, and anyone else willing to listen to them. In regard to our focus group discussions, here is one specific example from a Fairfax County volunteer.

“I ride the commuter train to D.C. to go to work...he [a friend] walks to the trains through the woods like I do every day, so we ended up chatting one day, and he said that I should look into this stream monitoring stuff and he gave me a flier...the rest is history....”

Flexible Schedules

Volunteer managers should also focus on time management. In our study, we found that lack of time and other obligations were the main reasons volunteers gave for dropping out of the SOS program. Newton (1995) also found that volunteers leave not because of actions or attitudes of the organization but because of personal limitations on their time and energies. Volunteer managers must understand this, and make every effort to be as flexible as possible with the program. For example, they should continue to offer training sessions on the weekends or in the evenings, make equipment easily accessible, offer stream monitoring sites as close to the volunteer as possible to cut down on travel time, and make the sampling procedure as efficient as possible. For example, here is one volunteer’s suggestion from our focus group discussions:

“I am doing Sugarland Run because I live on Sugarland Run, so it is very handy...I think if you are trying to get monitors interested in staying with the

program, the closer they live to the creek the better...I think if you think it is your own watershed, you have a vested interest in taking care of it..."

However, there can be a real danger in too much emphasis on time management and efficiency at the expense of credible data. Program coordinators must balance this focus on time management with volunteers' desire to make their data as credible as possible. Again, from our focus group discussions, here is one volunteer's perspective on this balance between time and effectiveness.

"We need to do this [stream monitoring] four times a year, because if we don't, nobody is going to take our results seriously. So we are not really gaining anything going down to two samples a year. It might be easier on us, and less time, but we might as well not even do it, because nobody is going to rely on our results, or take you seriously."

Volunteer managers should likewise understand that there are cycles for both volunteer associations and their volunteers. For example, Babchuck and Booth (1969) state that, "many volunteer associations come into being to meet limited objectives and go out of existence once these objectives are realized...These types of groups with limited objectives and with relatively short life histories are highly recurrent and an enduring part of society" (p. 41). Although the SOS organization is relatively long-term and stable, some of the specific local projects (e.g., The Rivana Project near Charlottesville) that are based on specific issues (e.g., the development of a golf course) are not. The data from our focus group discussions suggested that some volunteers became involved in SOS because of a specific problem (e.g., hog farm, housing development), and once that issue was resolved no longer felt a need to monitor. However, one caveat to that conclusion is that our survey research also suggests that 92.9 % of volunteers felt that "the environmental problem I was concerned about got resolved" was *not at all important* to their decision to stop participation. Consequently, overall, not very many volunteers discontinued participation in SOS activities because the environmental problem was resolved.

Save Our Streams managers should understand that membership and activity levels may ebb and flow depending on the presence or absence of local environmental problems (e.g., a new subdivision). Managers must take advantage when there is an influx of volunteers due to a certain local environmental problem. Program and regional coordinators should try and get across the idea

to these new volunteers that SOS has value above and beyond one specific environmental problem. They should describe the many other benefits of stream monitoring (e.g., education) in order to retain these volunteers after the environmental problem has been solved or is not as important of an issue.

Babchuck and Booth (1969) also conclude that affiliation and pattern of membership in voluntary organizations are linked to family status and life cycle. For example, parents predominate in youth serving volunteer associations, and volunteer membership is greatest during the middle years. Our point is that there are some things (e.g., moving, aging, and having kids) that are out of the control of volunteer managers. In summary, a volunteer's participation or lack of participation with the SOS program is a result of many variables, and some are not under any control of volunteer managers.

Recognition and Appreciation

As a whole, we feel based on the survey results, the focus groups, past literature, and statements made by our most active volunteers that recognition and appreciation are important for SOS volunteers. We do recognize that for some volunteers the rewards for volunteering are truly intrinsic. For example, one focus group member stated:

“I don't need that [formal recognition from leaders] because all I need is little girls jumping around being happy, and that is enough for me, that's what keeps me going.”

In addition, we found in our survey that 87% of the respondents felt that not being appreciated or recognized was *not at all important* to their decision to discontinue participation. Hence, not being properly appreciated was not important reason for discontinuing participation in SOS activities. While being appreciated and recognized is important for some volunteers, it seems that not being appreciated properly is not an important enough reason for dropping out of the SOS program.

We still have data from our survey and focus groups that does suggest that some volunteers seek some kind of recognition (Table 25), especially those with the highest level of participation. Recognition and appreciation may include things like awards, certificates, or plaques, or recognition instead may be as simple as putting a story in a newsletter describing a group's efforts and how it has helped protect Virginia's waterways. Again, focus group members stated:

“If you could go out one week and collect all this information, and then the next month, there it would be on some web site...and then I could say, wow, I helped create that information.”

“I am wondering if it might have been useful for the project organizers to have sent out just a short, nothing like a whole newsletter, just a short sheet saying, *Thanks for your help*, we had so many volunteers participate over the last two years, and we got reams of data, and *this is what is happening with it [the data]*, this is what we found, and our preliminary conclusions are...I think that would have been a good thing” (emphasis added).

Our conclusion about the importance of other less common types of recognition for volunteers was also supported by Johnson’s (1995) report on urban forestry volunteers. Johnson stated, “More important [types of recognition] were newspaper and newsletter articles that recognized their activities, letters of appreciation from cooperating agencies and schools and the respect of urban forestry professionals” (p. 31). In conclusion, being recognized in some manner for their efforts is important to many SOS volunteers. Appropriately appreciating volunteers for their efforts either with traditional forms of recognition (e.g., awards) or simply by recognizing the usefulness of their water quality data.

Effective Leadership

Lastly, effective leadership in the SOS program is essential for the ongoing success of stream monitoring. The importance of strong leadership in volunteer associations has been well documented in the literature (Heiland 1983; Westphal & Childs 1994). Effective leaders need to be able to commit all their energies into the volunteer program. Some of our data (especially the focus group discussions) suggest that because of the time and energy needed to properly motivate volunteers to join, to remain active, and seek out other potential volunteers, the regional coordinators should hold full-time paid positions so they could put all their time and energies into SOS. Several focus group discussants touched on this issue:

“I think one of the big reasons I keep doing it, is because of [the regional coordinator]... she has it really well organized...I don’t think if she wasn’t writing me emails, and getting me set up with everything I needed, I probably wouldn’t do it [stream monitoring] either.”

“[the regional coordinator] goes above and beyond the call of her job description, to make sure that the program gets run properly, and I think that all volunteer organizations need some tie in with someone who is actually employed, and it is part of their job description, because people move, people get sick, people change jobs, there is got to be continuity, but when you just got volunteers, the

organization has the chance of going great for a few years, then just falling flat and disappearing...if all of us are volunteers, it just doesn't work."

In addition, when we asked our respondents if the program should "provide full-time paid SOS regional coordinators," they were moderately supportive ($M = 3.81$) of the suggestion. We suggest creating as many full-time paid leadership positions as financially feasible in as many regions within Virginia as possible. There is ample amount of work coordinating outings, collecting data, setting up training sessions, reminding volunteers to monitor, properly recognizing volunteer efforts, and recruiting new volunteers to warrant having full-time paid regional coordinators. Currently, the regional coordinators have their own full-time jobs, and must do most of the SOS activities on their own personal time. In some cases, the regional coordinators may have a job (e.g., Virginia Soil and Water District employee) that allows them to spend part of their time at work on volunteer activities. However, that still does not seem to be enough. For example, one such volunteer coordinator from our focus group discussions stated:

"It has gotten to the point where so many people want to see [the data], then there is no staff time for me to do it. I have resigned myself to the fact that this is going to be a volunteer activity of mine to put in [stream data] on the web, but I so far have not gotten that done."

In summary, in order to effectively recruit new volunteers, train and certify them, encourage and remind them to monitor, coordinate monitoring sessions, meetings, watershed groups, picnics and newsletters, retain and keep satisfied current volunteers, and properly promote and advertise the goals of Save Our Streams, we feel that full-time paid regional coordinators would help substantially in reaching these goals.

CHAPTER 8. LIMITATIONS/FUTURE RESEARCH

The first limitation for our study is our 67% response rate for our mail-back questionnaire. While this response rate is quite high for surveys of this type and complexity we conducted, we acknowledge that one-third of the SOS volunteers didn't participate. If these non-respondents all felt differently or acted differently about SOS activities, our findings regarding the SOS volunteer population may be somewhat skewed. Our financial resources did not permit telephone follow-ups of non-respondents.

Second, because of time and money constraints we were unable to take the results of our survey and focus groups back to the focus group participants to see if our interpretation of the survey results seemed appropriate. We also wanted to give them the opportunity to add or to clarify our results.

In regards to future research, we feel that the outdoor recreation literature on involvement (Havitz & Dimanche 1990; Havitz & Dimanche 1999; McIntyre 1989; McIntyre & Pigram 1992) could add considerably to our understanding of the behavior and opinions of Save Our Streams volunteers. For example, McIntyre's (1992) study on involvement described five factors of involvement: attraction, self-expression, centrality, prior experience, and familiarity. *Attraction* is the enjoyment and importance of participation; *self-expression* deals with feelings of freedom; *centrality* is the central role of the activity in individual's lives; *prior experience* is the number of years involved in the activity; and *familiarity* is the number of visits to the recreation site. We feel that we likely captured both the prior experience and familiarity variables in the participation index we created. However, we feel future research is needed to study how attraction, self-expression, and centrality variables relate to participation levels in Save Our Streams monitoring.

Next, we feel it would be extremely valuable to perform a longitudinal study of volunteers concerning motivations and program preferences. A tremendous amount of information could be obtained by tracking the same volunteers, over a 5 or 10 year period, as they progress from their initial participation in SOS, to their peak activity, and then finally to their discontinued participation. One could then more accurately assess how motivations and preferences for program management change throughout the volunteer life cycle.

Lastly, we feel there is a need to understand better some of the motivations we didn't measure well. For example, here again are the nine items we discarded from our factor analysis:

- I love the scenic beauty of streams ($M = 4.34$)
- I feel a deep connection with nature ($M = 4.33$)
- I am concerned about drinking water quality ($M = 4.29$)
- Stream monitoring is fun ($M = 3.63$)
- To network with natural resource professionals ($M = 3.24$)
- To teach my children about streams ($M = 3.06$)
- To do something more fulfilling than my current job ($M = 2.52$)
- To spend time with family ($M = 2.21$)
- It is part of my religious beliefs or practices ($M = 1.84$)

Three of the items (i.e., I am concerned about drinking water quality; I love the scenic beauty of streams; and I feel a deep connection with nature) were among the top ten reasons study participants gave for volunteering in SOS. These items may be part of a motivational construct we did not appropriately capture in our study concerning Save Our Streams volunteers.

TABLES

Table 1. Description of SOS Volunteer Focus Group Discussants by Location and Date

	Harrisonburg ¹ (4/17/99)	Fairfax #1 (3/1/99)	Fairfax #2 (3/7/99)	Blacksburg (1/27/99)	Charlottesville (3/12/99)	Grundy ¹ (3/13/99)
# of participants	6	6	7	6	9	5
# SOS certified	4	5	3	3	3	5
# not certified	2	1	4	3	6	0
# Active	6	6	5	2	8	5
# Not Active	0	0	2	4	1	0

¹ Unable to tape-record the focus group discussions

Table 2. Factor Loadings of Five Items Used in Developing a SOS Participation Level Index ¹

QUESTION	SOS INTENSITY (n = 291)	GENERAL VOLUNTEER ACTIVITY (n = 313)	LENGTH OF INVOLVEMENT IN SOS (n = 309)
Approximately how many times a year do you monitor your stream using SOS procedures?	.89		
Approximately how many hours do you volunteer in the SOS program?	.88		
How much time do you currently contribute to all other volunteer organizations besides SOS?		.86	
Are you currently involved with any other water quality monitoring volunteer organizations?		.73	
Approximately how long have you been involved with the SOS program?			.98
Cronbach's Alpha (scale reliability)	.75	.47	--- ²
Percent of variance explained	37.8%	22.6%	18.7%

¹ These three factors explained 79.0% of the total variability

² Only one question available for this factor, thus no reliability score

Table 3. SOS Volunteer Clusters based on the Three Participation Level Variables

CLUSTERS	SOS INTENSITY ¹	GENERAL VOLUNTEER ACTIVITY ¹	LENGTH OF SOS INVOLVEMENT ¹
Disinterested Rookies (n = 94)	low/medium	low	low
Fading Veterans (n = 108)	Low	medium	medium
Active Veterans (n = 43)	Medium	medium	high
All-Stars (n = 60)	High	high	medium

¹ See Tables 4 and 5 and the “Methods” section for an explanation of the values low, low/medium, medium, and high.

Table 4. Mean Ratings and Test for Differences on Variables that Define SOS Participation Level Clusters ¹

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	
Participation Level Clusters	Disinterested Rookies	Fading Veterans	Active Veterans	All-Stars	F Ratio
Participation Variables					
Length of involvement in SOS (years) ²	1.27 ^a (Low)	2.09 ^b (Medium)	3.60 ^c (High)	2.03 ^b (Medium)	274.64
Number of stream monitorings per year ³	2.55 ^b	1.71 ^a	3.50 ^c	4.83 ^d	78.11
SOS volunteer hours per month ⁴	1.41 ^b (Low)	1.04 ^a (Low)	1.93 ^c (Medium)	3.33 ^d (High)	136.63
Number of other voluntary organizations ⁵	.07 ^a	.32 ^{bc}	.47 ^{ab}	.83 ^c	18.14
Hours per month in other voluntary organizations ⁶	2.34 ^a (Low)	3.06 ^b (Medium)	2.82 ^b (Medium)	3.65 ^c (High)	9.59

¹ ANOVA test indicated all F ratios were significant at p = 0.00; Means with the same superscript are not significantly different; Duncan's multiple range test, 0.05 level.

² 1 = Less than 1 year; 2 = 1-3 years; 3 = 4-6 years; 4 = 7-10 years; 5 = More than 10 years

³ 1 = Less than once per year; 2 = 1 time a year; 3 = 2 times a year; 4 = 3 times a year; 5 = 4 times a year; 6 = More than 4 times a year

⁴ 1 = Less than 1 hour per month; 2 = 1-2 hours per month; 3 = 3-5 hours per month; 4 = 6-10 hours per month; 5 = 11-20 hours per month; 6 = More than 20 hours per month

⁵ Mean scores of number of other voluntary organizations involved with.

⁶ 1 = 0 hours per month; 2 = 1-5 hours per month; 3 = 6-10 hours per month; 4 = 11-15 hours per month; 5 = 16-20 hours per month; 6 = 21-40 hours per month; 7 = 41-80 hours per month; 8 = More than 80 hours per month

Table 5. Mean Ratings and Test for Differences on Participation Factors that Define SOS Participation Level Clusters ¹

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	
Participation Level Clusters	Disinterested Rookies	Fading Veterans	Active Veterans	All-Stars	F Ratio
Participation Factors					
Length of Involvement in Save Our Streams	1.27 ^a (Low)	2.09 ^b (Medium)	3.60 ^c (High)	2.03 ^b (Medium)	274.64
SOS Intensity ²	1.95 ^b (Low/medium)	1.37 ^a (Low)	2.76 ^c (Medium)	4.06 ^d (High)	147.09
General Volunteer Experience ²	1.21 ^a (Low)	1.68 ^b (Medium)	1.59 ^b (Medium)	2.24 ^c (High)	16.54

¹ ANOVA test indicated all F ratios were significant at $p = 0.00$; Means with the same superscript are not significantly different; Duncan's multiple range test, 0.05 level.

² These numbers in the SOS Intensity and General Volunteer Experience cells are uninterpretable as absolute values. This is because the numbers result from a combination of two variables, each of which represents a different unit of measurement. See Table 4. They do have value here in a relative context. Each value does have meaning relative to the value in other cells of a given factor.

Table 6. Marital Status of SOS Volunteers

Marital Status	Frequency (n = 311)	Percent
Single	83	26.7
Married	211	67.8
Separated/Divorced	16	5.1
Widowed	1	.3

Table 7. SOS Volunteers' Household Income Before Taxes

Income (\$)	Frequency (n = 271)	Percent
Under 19,999	52	19.2
20,000 - 29,999	21	7.7
30,000 – 39,999	40	14.8
40,000 – 49,999	28	10.3
50,000 – 59,999	33	12.2
60,000 – 74,999	35	12.9
75,000 – 99,999	32	11.8
100,000 or more	30	11.1

TABLE 8. CURRENT OCCUPATIONS OF SOS VOLUNTEERS

Type of Occupation	Frequency (n = 313)	Percent
Manager or executive	33	10.5
Professional worker	142	45.4
Owner of business or farm	23	7.3
Skilled trade or craft	11	3.5
Semi-skilled worker, laborer	1	.3
Clerical or office worker	8	2.6
Sales worker	1	.3
Service worker	3	1.0
Unemployed	4	1.3
Retired	26	8.3
Student	43	13.7
Home-maker	18	5.8

Table 9. SOS Volunteers' Highest Level of Completed Education

Level of Education	Frequency (n = 313)	Percent
Grammar School	0	0.0
Some high school	2	.6
High school diploma	5	1.6
Some college	63	20.1
Bachelor's degree or equivalent	72	23.0
Some graduate work	53	16.9
Master's degree	94	30.0
Ph.D., M.D., J.D., or equivalent	24	7.7

Table 10. Race of SOS Volunteers

Race	Frequency (n = 313)	Percent
White	307	98.1
African-American	1	.3
Hispanic	0	.3
Native American	1	.3
Asian-American	1	.3
Other	3	1.0

Table 11. SOS Volunteers' Length of Time in Present Community

Length (years)	Frequency (n = 311)	Percent
Less than 2 years	43	13.8
2 – 4 years	43	13.8
5 – 9 years	60	19.2
10 years or more	166	53.2

Table 12. Gender of SOS Volunteers

Sex	Frequency (n = 313)	Percent
Male	149	47.6
Female	164	52.4

Table 13. Importance Level of Motivations of SOS Volunteers ¹

Item	N	Mean	Standard Deviation
To protect Virginia's streams.	307	4.72	.60
To protect the bio-diversity of Virginia's streams.	304	4.54	.82
I love the scenic beauty of streams. ²	304	4.34	1.00
I feel a deep connection with nature. ²	305	4.33	.95
I am concerned about drinking water quality. ²	308	4.29	1.02
To learn more about stream quality.	304	4.19	.98
To teach children to respect the environment.	305	4.00	1.30
I feel like I am doing something useful.	300	3.91	1.10
I like to be able to identify stream organisms.	304	3.88	1.10
My data are helping governmental agencies identify threats to streams.	297	3.80	1.18
It is an opportunity to spend time outdoors.	305	3.75	1.16
Collecting stream data provides a tool to monitor industry/agriculture.	305	3.74	1.18
I felt I could make a difference.	306	3.73	1.26
I want to educate others about the importance of stream quality.	303	3.69	1.12
Stream monitoring is fun. ²	303	3.63	1.16
To learn new skills.	303	3.60	1.16
It provides a sense of personal accomplishments.	300	3.50	1.17
I feel an obligation to help the community.	302	3.46	1.16
Government agencies need volunteers to assist with stream monitoring.	300	3.45	1.30
To teach stream monitoring to other people	302	3.31	1.36
To network with natural resource professionals. ²	304	3.24	1.33
I am worried about the health of my family and neighbors.	305	3.21	1.41
Because a stream in my community was threatened	302	3.11	1.48
To teach my children about streams. ²	293	3.06	1.69
To meet new people with similar interests.	306	2.96	1.25
To become a "watchdog" on local industry.	301	2.85	1.32
I don't trust governmental agencies to do a good job of monitoring streams.	302	2.77	1.43
I like being part of a larger community of volunteers.	300	2.76	1.30
To meet other members of my community.	302	2.72	1.21
To spend time with friends.	302	2.60	1.26
To do something more fulfilling than my current job. ²	294	2.52	1.39
It provides a time for quiet reflection.	301	2.40	1.25
To spend time with family. ²	301	2.21	1.33
It provides an escape from all the demands of life.	301	2.15	1.28
I wanted to help protect a special place of my youth.	295	2.03	1.43
It will help me gain practical experience toward paid employment.	303	1.88	1.29
I am worried about my property value.	300	1.85	1.30
It is part of my religious beliefs or practices. ²	297	1.84	1.13
Volunteer experience will look good on my resume.	302	1.76	1.13

¹ Level of importance of reasons for involvement in SOS water quality monitoring (1 = Not at all important, 2 = Slightly important, 3 = Somewhat important, 4 = Moderately important, 5 = Very important).

² These items were not used in the factor analysis of the motivations of SOS volunteers

Table 14. Items and Structures of the "To be of Service," "Teaching," "To Guard Against Local Threats," and "To be Social" Motivation Factors.

Items	Factor Loading			
"To Be of Service" Motivation Factor:				
My data are helping governmental agencies identify threats to streams.	.66			
I feel like I am doing something useful.	.65			
I felt I could make a difference.	.65			
It provides a sense of personal accomplishment.	.64			
Collecting stream data provides a tool to monitor industry/agriculture development.	.60			
Government agencies need volunteers to assist with stream monitoring.	.60			
I feel an obligation to help the community.	.58			
"Teaching" Motivation Factor:				
To teach stream monitoring to other people.		.78		
I want to educate others about the importance of water quality.		.77		
To teach children to respect the environment.		.76		
It provides a sense of personal accomplishment.		.64		
"To Guard Against Local Threats" Motivation Factor:				
I am worried about my property values.			.73	
I do not trust governmental agencies to do a good job of monitoring streams.			.66	
To become a "watchdog" on local industry.			.64	
Because a stream in my community was threatened.			.57	
I wanted to help protect a special place of my youth.			.54	
I am worried about the health of my family and neighbors.			.48	
"To Be Social" Motivation Factor:				
To meet new people with similar interests.				.81
To meet other members of my community.				.80
To spend time with friends.				.60
I like being part of a larger community of volunteers.				.54
Cronbach's Alpha (scale reliability):	.85	.85	.75	.82
Percent of variance explained:	13.01%	8.79%	8.39%	8.07%

Table 15. Items and Structures of the "Nature Enjoyment," "Learning," "To Protect the Environment," and "Career Growth" Motivation Factors.

Items	Factor Loading			
"Nature Enjoyment" Motivation Factor:				
It provides an escape from all the demands of life.	.80			
It provides a time for quiet reflection.	.69			
It is an opportunity to spend time outdoors.	.61			
"Learning" Motivation Factor:				
I like to be able to identify stream organisms.		.63		
To learn more about stream quality.		.61		
To learn new skills.		.54		
"To Protect the Environment" Motivation Factor:				
To protect Virginia's streams.			.77	
To protect the biodiversity of Virginia's streams.			.76	
"Career Growth" Motivation Factor:				
Volunteer experience will look good on my resume.				.87
It will help me gain practical experience toward paid employment.				.86
Cronbach's Alpha (scale reliability):	.79	.70	.65	.80
Percent of variance explained:	7.59%	6.77%	6.77%	5.67%

Table 16. SOS Volunteers' Importance Scores of Eight Motivation Factors

MOTIVATIONAL FACTORS	MEAN IMPORTANCE ¹
To protect the environment	4.63
Learning	4.00
Teaching	3.67
To be of service	3.65
For nature enjoyment	3.00
Social	2.76
To guard against local threats	2.64
For career growth	1.83

¹ 1 = Not at all important, 2 = Slightly important, 3 = Somewhat important, 4 = Moderately important, 5 = Very important

Table 17. A Comparison of the Mean Level of Motivations Across Different Participation Level Clusters ^{1,2}

Participation Level Clusters	Disinterested Rookies N = 94	Fading Veterans n = 108	Active Veterans n = 43	All-Stars n = 60	F-value
Motivations					
Learning	3.61 ^a	3.77 ^{ab}	4.03 ^b	3.97 ^b	2.85 *
To guard against local threats	2.50 ^a	2.51 ^a	2.74 ^{ab}	2.93 ^b	3.50 *
Nature enjoyment	3.11	2.89	3.08	3.00	.99
Teaching	3.33 ^a	3.64 ^{ab}	4.04 ^b	3.91 ^b	5.35 *
Social	2.78 ^{ab}	2.60 ^a	2.88 ^{ab}	3.01 ^b	2.21 *
To protect the environment	4.58	4.54	4.72	4.76	1.98
Career growth	2.03	1.70	1.71	1.89	1.62
To be of service	3.55 ^{ab}	3.51 ^a	3.82 ^{bc}	3.97 ^c	5.35 *

* Significant at p = 0.05

¹ Mean values based on a 5-point Likert-type response format, where 1= Not at all important and 5 = Very important.

² Means with the same superscript are not significantly different; Duncan's multiple range test, p=0.05 level.

Table 18. Overall SOS Volunteers' Evaluation of the Current Services or Materials

Current Service or Material	N	Mean ¹	Standard Deviation	Don't Know ² (percent)
The effectiveness of your initial training sessions to prepare you to properly monitor a stream.	264	4.13	.82	10.5
The effectiveness of the certification test to measure a volunteer's ability to monitor.	185	4.05	.78	37.6
The way the certification test is administered.	171	4.01	.73	41.9
The usefulness of the current field guide materials to confidently identify stream organisms.	258	3.84	.91	12.2
Availability of stream monitoring equipment (e.g., waders and mesh nets).	230	3.47	1.25	22.3
Opportunities for additional training and refresher courses for monitors.	199	3.44	1.17	32.4
Opportunities to meet other SOS volunteers.	191	3.42	1.15	22.0
Recognition/appreciation of its volunteers.	229	3.41	1.14	34.9
Communication between SOS leaders and their volunteers (such as, about upcoming events or when to monitor next).	219	3.22	1.38	25.9
The effective distribution of collected volunteer data to those who can use it (e.g., DEQ, DCR).	116	3.12	1.31	60.4
Recruitment of new stream monitoring volunteers.	171	3.05	1.15	41.9
Provision of materials to educate others about SOS.	188	3.02	1.12	36.1
Feedback from SOS leaders about how volunteer data are being used to protect streams.	219	2.89	1.32	25.7
Advertising/promotion of SOS program.	203	2.81	1.15	30.6

¹ Evaluation of current services or materials based on: 1 = Poor, 2 = Fair, 3 = Average, 4 = Good, 5 = Excellent.

² Percent of respondents who checked the "Don't Know" category.

Table 19. A Comparison of the Volunteers' Evaluation of the Current Services or Materials Provided by the SOS Program Across Participation Level Clusters ¹

Participation Level Clusters	Disinterested Rookies	Fading Veterans	Active Veterans	All-Stars	F-value
The effectiveness of the certification test to measure a volunteer's ability to monitor.	4.10	4.07	4.20	3.93	.91
The way the certification test is administered.	4.00	4.04	4.14	3.96	.38
Availability of stream monitoring equipment.	3.62	3.50	3.63	3.21	1.22
Recognition/appreciation of its volunteers.	3.68 ^b	3.52 ^{ab}	3.45 ^{ab}	3.10 ^a	2.36 *
The effectiveness of your initial training sessions to prepare you to properly monitor a stream.	4.04	4.12	4.33	4.11	1.06
The usefulness of the current field guide materials to confidently identify stream organisms.	3.68	3.90	4.11	3.75	2.08
Opportunities for additional training and refresher courses for monitors.	3.61	3.44	3.45	3.24	.83
Opportunities to meet other SOS volunteers.	3.65	3.29	3.55	3.24	1.79
Feedback from SOS leaders about how volunteer data are being used to protect streams.	3.23	2.71	2.78	2.71	1.84
The effective distribution of collected volunteer data to those who can use it.	3.46	3.09	3.14	2.91	.81
Communication between SOS leaders and their volunteers.	3.76 ^b	2.78 ^a	3.32 ^{ab}	3.19 ^a	5.72 *
Recruitment of new stream monitoring volunteers.	3.31	2.93	3.20	2.85	1.56
Advertising/promotion of SOS program.	3.06	2.83	2.77	2.55	1.63
Provision of materials to educate others about SOS.	3.18	3.02	3.20	2.77	1.41

¹ Mean values based on a 5-point Likert-type response format, where 1 = poor and 5 = excellent.

* Significant at $p = 0.05$; Means with the same superscript are not significantly different; Duncan's multiple range test.

Table 20. Volunteers' Support for Possible Changes to the SOS Program

Potential Changes	N	Mean ¹	Standard Deviation
Standardized training procedures across Virginia.	295	4.13	.70
Lobbying government agencies to use volunteer data in stream decision-making.	292	4.03	.75
A Virginia SOS newsletter.	293	4.01	.72
Special guest speakers about water and environmental quality.	295	3.96	.64
Annual meeting with other volunteer water monitoring groups in Virginia.	291	3.86	.74
Provide full-time paid SOS regional coordinators.	288	3.81	.85
Random field spot-checks of SOS volunteers to assure quality data.	295	3.80	.73
Require re-certification testing (e.g., every 3 years) to assure high quality stream monitoring data.	291	3.66	.86
Social events like picnics or potlucks for volunteers.	292	3.40	.71
To minimize redundancy/boredom, have periodic monitoring of other volunteers' streams.	295	3.38	.78
A more rigorous certification test.	287	3.29	.71
Awards, certificates, or plaques for volunteers.	293	3.16	.83
Focus monitoring efforts on the state's most impaired stream sections, rather than letting volunteers pick their own stream.	294	2.81	1.12
An easier certification test.	282	2.18	.83

¹ Support for the SOS program: 1 = Strongly oppose, 2 = Oppose, 3 = Neutral, 4 = Support, 5 = Strongly support.

Table 21. A Comparison of Support for Potential Changes to the SOS Program Across Participation Level Clusters ¹

Participation Level Clusters	Disinterested Rookies	Fading Veterans	Active Veterans	All-Stars	F-value
Changes to the SOS program					
Provide full-time paid SOS regional coordinators.	3.67	3.83	4.03	3.89	1.78
An easier certification test.	2.41 ^b	2.16 ^b	2.26 ^b	1.81 ^a	5.88 *
A more rigorous certification test.	3.25	3.32	3.08	3.42	1.94
Require re-certification testing to assure high quality stream data.	3.67	3.66	3.63	3.65	.023
Annual meeting with other volunteer monitoring groups in Virginia.	3.74 ^a	3.80 ^a	3.88 ^a	4.18 ^b	4.42 *
A Virginia SOS newsletter.	3.81 ^a	4.02 ^a	4.02 ^a	4.32 ^b	5.89 *
Awards, certificates, or plaques for volunteers.	3.12	3.16	3.05	3.33	1.06
Social events like picnics or potlucks for volunteers.	3.40 ^b	3.42 ^b	3.14 ^a	3.53 ^b	2.42 *
Standardized training procedures across Virginia.	4.00	4.21	4.19	4.17	1.60
Special guest speakers about environmental quality.	3.96	3.93	3.88	4.10	1.22
Focus monitoring efforts on the state's most impaired streams, rather than letting volunteers pick their own stream.	3.18 ^c	2.81 ^{bc}	2.72 ^{ab}	2.37 ^a	6.31 *
Lobbying government agencies to use volunteer data in stream decision making.	4.06 ^{ab}	3.93 ^a	3.93 ^a	4.24 ^b	2.42 *
Random field spot-checks of SOS volunteers.	3.81	3.78	3.80	3.80	.03
To minimize redundancy, have periodic monitoring of other volunteers streams.	3.32	3.44	3.49	3.32	.69

¹ Mean values based on a 5-point Likert-type response format, where 1 = Strongly oppose and 5 = Strongly support.

* Significant at $p = 0.05$; Means with the same superscript are not significantly different; Duncan's multiple range test.

Table 22. How Volunteers First Heard About the SOS Program

Item	Percent
Word of mouth	25.4
Through an environmental organization other than the Izaak Walton League	20.6
Through the Izaak Walton League of America	18.7
Through the media (e.g., newspaper, internet, television, magazine)	10.5
Other	8.6
Through a governmental agency (such as, DEQ, EPA, DCR)	7.0
Through a youth, school, or church group (e.g., Girl Scouts, 4-H)	5.7
Don't remember	3.5

Table 23. Most Influential Person in Getting Volunteers Involved with SOS

Item	Percent
Sought out activity on my own	35.5
Friend	24.1
Other	13
Co-worker	11.4
Spouse or partner	8.8
Teacher	5.2
Child	2.3
Public figure	2.0
Parent	1.6
Sibling	0.0
Religious leader	0.0

Table 24. Importance of SOS Volunteers' Reasons for Discontinuing Participation

Reasons for Dropping out	N	Mean ¹	Standard Deviation	% Not at all Important ²
I had too many other obligations.	127	3.14	1.68	30.7
I did not have enough time.	127	3.07	1.67	33.1
I moved.	126	1.95	1.66	74.6
Stream monitoring took too much time.	127	1.94	1.40	62.2
There was not enough feedback from SOS leaders.	126	1.87	1.41	66.7
There was not enough direction from SOS leaders.	126	1.84	1.39	68.3
The program lacked effective leadership.	126	1.81	1.33	66.7
It was difficult to find a time when my monitoring partner (s) could meet.	126	1.79	1.31	68.3
I became active in other environmental organizations.	127	1.64	1.23	74.8
I didn't see any tangible results from my monitoring efforts.	127	1.58	1.19	78.0
I felt I was not adequately trained.	126	1.51	1.10	78.6
I did not feel my data were being used effectively.	125	1.47	1.08	80.0
I felt Virginia's protection agencies were not taking my data seriously.	127	1.45	1.04	81.9
The training did not give me the skills to monitor my stream properly.	126	1.44	1.12	83.3
The stream I monitored was too far away.	127	1.42	1.06	84.3
There were not enough opportunities to meet other volunteers.	127	1.34	1.04	82.7
I had health problems.	127	1.34	.83	89.0
I had done my volunteer duty.	127	1.33	.90	85.8
SOS leadership didn't seem to appreciate volunteers very much.	127	1.28	.87	86.6
My monitoring partner (s) quit.	127	1.27	.84	89.0
The environmental problems became too overwhelming.	126	1.25	.74	87.3
I felt there was little cooperation with other volunteer monitoring groups.	127	1.24	.74	89.0
Monitoring became boring.	127	1.23	.78	86.6
The certification test was too difficult.	127	1.23	.63	90.6
I didn't see any improvements in the quality of my stream.	127	1.20	.66	90.6
My marital status changed.	127	1.17	.72	94.5
My children grew up.	127	1.17	.63	92.9
I didn't make the friendships I had hoped.	126	1.13	.61	94.4
The environmental problem I was concerned about got resolved.	127	1.13	.54	92.9
There were not enough leadership opportunities.	127	1.11	.54	95.3
The certification test was too intimidating.	126	1.10	.52	95.2
I didn't like the stream to which I was assigned.	126	1.07	.44	96.8
I didn't get along with my monitoring partner (s).	127	1.04	.26	97.6

¹ Importance of reasons for stopping participation in SOS: 1 = Not at all important, 2 = Slightly important, 3 = Somewhat important, 4 = Moderately important, 5 = Very important.

² Percent of volunteers who checked 1 = Not at all Important

Table 25. SOS Volunteers' Preferences for Recognition for Volunteer Efforts

Type of Recognition	Percent ¹
Recognition certificates	9.9
A verbal or written "Thank You" from SOS leaders	9.0
Awards banquet	3.2
It doesn't matter how I am recognized, but it is important	15.4
I do not need to be recognized for my efforts	63.7

¹ Respondents were able to mark all that apply, thus columns do not add up to 100%.

Table 26. SOS Volunteers' Willingness to Participate in other Stream Activities

Activity ¹	Percent ²
Stream clean-up (e.g., trash and debris clean-up)	77.9
Tree planting	61.9
Storm drain painting warning against pollution	34.7
Stream bank restoration (e.g., erosion control)	34.5
Lobbying politicians/officials to protect streams	11.8
SOS office support	5.9
Fund raising	4.7

¹ All items had N = 312

² Respondents were asked to select all that apply, thus columns do not add up to 100%.

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APPENDIX A:
Virginia SOS Stream Quality Survey

Virginia Save Our Streams

Stream Quality Survey

Sponsored by the Virginia Division of the Izaak Walton League

Name: _____ Date: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and the standard operating procedures to learn how to trap and identify stream macroinvertebrates and how to complete this form. It is assumed that you are using a rocky bottom sampling strategy, you select three riffle-testing sites where water depth is between 3 and 12 inches, of moderate speed, and the bed consists primarily of cobble-sized stones. Sampling size should be 3 X 3 feet.

Stream: _____ Station: _____ # of participants: _____

County: _____ State: ____ Group: _____

Location: _____

Latitude: _____ Longitude: _____ Flow: High__ Normal __ Low __

Weather conditions (last 72 hours): _____

Average stream width: _____ ft. Average stream depth: _____ inches or feet

Water temperature: _____ F or C. Water depth in riffle: _____ inches or feet

Macroinvertebrate count:

Use the stream monitoring instructions to conduct a macroinvertebrate count. The three columns, numbered 1,2, and 3 are for the three samples. The three categories of macroinvertebrate orders are divided based on the organism's sensitivity to pollution. Use letter codes (A= 1-9, B= 10-99, C = 100 or more) to record the number of organisms found in each sampling site. Add up the number of letters in each column and multiply by the indicated index value. Use the data from the same sample in all three categories that has highest diversity and score to calculate the index value.

<p>Sensitive 1 2 3</p> <p>_____ caddisfly larvae</p> <p>_____ hellgrammite</p> <p>_____ mayfly nymphs</p> <p>_____ gilled snails</p> <p>_____ riffle beetle adult</p> <p>_____ stonefly nymphs</p> <p>_____ water penny larvae</p>	<p>Somewhat Sensitive 1 2 3</p> <p>_____ beetle larvae</p> <p>_____ clams</p> <p>_____ crane fly larvae</p> <p>_____ crayfish</p> <p>_____ dragonfly nymphs</p> <p>_____ damselfly nymphs</p> <p>_____ scuds</p> <p>_____ sowbugs</p> <p>_____ fishfly larvae</p> <p>_____ alderfly larvae</p> <p>_____ atherix</p>	<p>Tolerant 1 2 3</p> <p>_____ aquatic worms</p> <p>_____ blackfly larvae</p> <p>_____ leeches</p> <p>_____ midge larvae</p> <p>_____ pouch (and other snails)</p>
<p>_____ highest count x 3 =</p> <p>_____ index value</p>	<p>_____ highest count x 2 =</p> <p>_____ index value</p>	<p>_____ highest count x 1 =</p> <p>_____ index value</p>

Now add together the three index values from each column for your total and place it in one of the following water quality rating categories:

_____ Excellent (>22) _____ Good (17-22) _____ Fair (11-16) _____ Poor (<11)

Fish water quality indicators <ul style="list-style-type: none"> • scattered individuals • scattered schools • trout (pollution sensitive) • bass (somewhat sensitive) • catfish (pollution tolerant) • carp (pollution tolerant) 	Barriers to fish movement <ul style="list-style-type: none"> • beaver dams • man-made dams • waterfalls (>1ft.) • other • none 	Surface water appearance <ul style="list-style-type: none"> • clear • clear, tea colored • colored sheen (oily) • foamy • milky • muddy • black • gray • other
Stream bed deposit (bottom) <ul style="list-style-type: none"> • gray • orange/red • yellow • black • brown • silt • sand • other _____ 	Odor: <ul style="list-style-type: none"> • none • musky • oil • sewage • other _____ 	Stability of steam bed: Bed sinks beneath your feet in: <ul style="list-style-type: none"> • no spots • a few spots • many spots
Algae color: <ul style="list-style-type: none"> • light green • dark green • brown coated • matted on stream bed • hairy 	Algae located: <ul style="list-style-type: none"> • everywhere • in spots _____ % bed covered 	Stream Channel Shade: <ul style="list-style-type: none"> • >75% full • 50%-74% high • 25%-49% moderate • 1%-24% slight • none
Stream bank composition _____ % trees _____ % shrubs _____ % grass _____ % bare soil _____ % rocks _____ % other _____	Stream bank erosion potential <ul style="list-style-type: none"> • >75% severe • 50%-75% high • 25%-49% moderate • 1% - 24% slight • none 	Riffle composition (=100%) _____ % silt (mud) _____ % sand (1/64"-1/4" grains) _____ % gravel (1/4"-2" stones) _____ % cobbles (2"-10" stones) _____ % boulders (>10" stones)

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), or slight (S) potential to impact the quality of your steam. (Leave the space blank if there is no impact or if the land use is not present in your watershed.) Refer to the SOS standard operating procedures to determine how to assess H, M, or S.

<input type="checkbox"/> Oil & gas drilling <input type="checkbox"/> Housing developments <input type="checkbox"/> Forest <input type="checkbox"/> Logging <input type="checkbox"/> Urban uses (parking lots, highways, etc.)	<input type="checkbox"/> Sanitary landfill <input type="checkbox"/> Active construction <input type="checkbox"/> Mining (types) _____ <input type="checkbox"/> Cropland (types) _____	<input type="checkbox"/> Trash dump <input type="checkbox"/> Fields <input type="checkbox"/> Livestock pasture <input type="checkbox"/> Other _____ _____ _____
---	--	--

Describe the amount of litter in and around the stream. Also describe the type of litter in and around the stream.

Comments: Indicate what you think are the current and potential threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

Send one copy of completed survey forms to your regional SOS coordinator or to:

IWLA Virginia SOS Program
 7598 Lee Highway
 Raphine, VA 24472

APPENDIX B:

Virginia SOS Volunteer Characteristics Questionnaire

Please take a few minutes to answer the following questions. **Your answers will be completely confidential.**

Section 1: The following questions ask about your involvement in the Save Our Streams (SOS) program and your volunteer activity in general.

1. What is your **current** level of involvement in the SOS program? (Mark one.)
 - Just becoming interested in water quality monitoring
 - Involved in the training process
 - Occasionally monitor a stream (3 or fewer times a year)
 - Regularly monitor a stream (more than 3 times a year)
 - No longer involved with SOS
 - Other: _____

2. What is your **primary** purpose for learning/using SOS monitoring procedures? (Mark one.)
 - So I can teach stream ecology to school children
 - So I can learn about stream ecology
 - To collect data to help in long term stream protection
 - Other: _____

3. How did you **first** hear about the Save Our Streams program? (Mark one.)
 - Word of mouth (for example, friend or family)
 - Through the media (such as, newspaper, internet, television, magazine)
 - Through the Izaak Walton League of America
 - Through an environmental organization **other** than the Izaak Walton League
Please list: _____
 - Through a youth, school, or church group (for example, Girl Scouts, 4-H)
Please list: _____
 - Through a governmental agency (such as, Department of Environmental Quality, Environmental Protection Agency)
Please list: _____
 - Don't remember
 - Other: _____

4. Which **one person** most influenced you to get involved with SOS monitoring?

(Mark one.)

- | | |
|--|--|
| <input type="checkbox"/> Parent | <input type="checkbox"/> Public figure |
| <input type="checkbox"/> Sibling | <input type="checkbox"/> Religious leader |
| <input type="checkbox"/> Child | <input type="checkbox"/> Co-worker |
| <input type="checkbox"/> Spouse or partner | <input type="checkbox"/> Sought out activity on my own |
| <input type="checkbox"/> Friend | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Teacher | |

5. How much training have you received in the SOS program? (Mark one.)

- No training (**Go to question 8**)
- Have some stream monitoring training
- Have completed the training, but not yet certified
- A certified SOS stream monitor
- Certified to train and test other volunteers

6. About how many hours of initial training (**before certification test**) have you received in the SOS program?

- | | |
|------------------------------------|---|
| <input type="checkbox"/> 0 hours | <input type="checkbox"/> 7-10 hours |
| <input type="checkbox"/> 1-3 hours | <input type="checkbox"/> 11-15 hours |
| <input type="checkbox"/> 4-6 hours | <input type="checkbox"/> More than 15 hours |

7. In which region of Virginia did you receive your initial training? (Mark one.)

- Northern Virginia (for example, Alexandria, Fairfax, Fredericksburg)
- Hampton Roads (for example, Chesapeake, Norfolk, Virginia Beach)
- Tidewater
- Eastern Shore
- Richmond/Petersburg
- Northern Piedmont/Charlottesville
- Southern Piedmont (for example, Danville, Martinsville)
- Shenandoah Valley
- Roanoke/Lynchburg
- Blacksburg/Radford
- Southwest Virginia
- Other: _____

14. How do you prefer to be recognized for your volunteer efforts?

(Mark all that apply.)

- Recognition certificates
- A verbal or written "Thank You" from SOS leaders
- Awards banquet
- It doesn't matter how I am recognized, but it is important
- I do not need to be recognized for my efforts
- Other: _____

15. Which activities would you be willing to participate in as a SOS volunteer?

(Mark all that apply.)

- | | |
|--|---|
| <input type="checkbox"/> Stream clean-up
(such as, trash and debris clean-up) | <input type="checkbox"/> Fund raising |
| <input type="checkbox"/> Tree planting | <input type="checkbox"/> SOS office support |
| <input type="checkbox"/> Storm drain painting warning
against pollution | <input type="checkbox"/> Lobbying politicians/officials
to protect streams |
| <input type="checkbox"/> Stream bank restoration
(for example, erosion control) | <input type="checkbox"/> Other: _____
_____ |

16. Are you currently involved with any other water quality monitoring volunteer organizations? (Mark all that apply.)

- | | |
|--|--|
| <input type="checkbox"/> No | <input type="checkbox"/> River Network |
| <input type="checkbox"/> Friends of the Shenandoah River | <input type="checkbox"/> Friends of Page Valley |
| <input type="checkbox"/> Headwaters Association, Inc. | <input type="checkbox"/> Friends of Sugarland Run |
| <input type="checkbox"/> Friends of the Rappahannock | <input type="checkbox"/> Friends of the North River |
| <input type="checkbox"/> Alliance for the Chesapeake Bay | <input type="checkbox"/> Friends of Dragon Run, Inc. |
| <input type="checkbox"/> Friends of Urbanna Creek | <input type="checkbox"/> Elizabeth River Association |
| <input type="checkbox"/> Sierra Club, Virginia Chapter | <input type="checkbox"/> Other: _____ |

17. How much time do you currently contribute to all other volunteer organizations **besides** SOS? (such as, church group, scouts, hospital, PTA, or other environmental.)

- | | |
|--|---|
| <input type="checkbox"/> 0 hours per month | <input type="checkbox"/> 16-20 hours per month |
| <input type="checkbox"/> 1-5 hours per month | <input type="checkbox"/> 21-40 hours per month |
| <input type="checkbox"/> 6-10 hours per month | <input type="checkbox"/> 41-80 hours per month |
| <input type="checkbox"/> 11-15 hours per month | <input type="checkbox"/> More than 80 hours per month |

Section 2: Volunteers have many reasons for volunteering. The following questions ask what **motivates you** to monitor stream quality for the Save Our Streams (SOS) program.

18. How important is each of the following reasons to your involvement in **SOS water quality monitoring**.

	Not At All Important	Slightly Important	Somewhat Important	Moderately Important	Very Important
I feel a deep connection with nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To do something more fulfilling than my current job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To teach stream monitoring to other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To learn new skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To meet other members of my community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is an opportunity to spend time outdoors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To network with natural resource professionals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It will help me gain practical experience toward paid employment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To meet new people with similar interests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To protect Virginia's streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am concerned about drinking water quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To spend time with family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volunteer experience will look good on my resume.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am worried about the health of my family and neighbors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To protect the bio-diversity of Virginia's streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To spend time with friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To teach children to respect the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Because a stream in my community was threatened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued...

	Not At All Important	Slightly Important	Somewhat Important	Moderately Important	Very Important
To teach my children about streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To learn more about stream quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To become a “watchdog” on local industry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am worried about my property value.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not trust governmental agencies to do a good job of monitoring streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel an obligation to help the community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I love the scenic beauty of streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to be able to identify stream organisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt I could make a difference.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stream monitoring is fun.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collecting stream data provides a tool to monitor industry/agriculture development.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel like I am doing something useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It provides a sense of personal accomplishment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My data are helping governmental agencies identify threats to streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It provides an escape from all the demands of life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to educate others about the importance of stream quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It provides a time for quiet reflection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like being part of a larger community of volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government agencies need volunteers to assist with stream monitoring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is a part of my religious beliefs or practices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to help protect a special place of my youth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 3: To help us make recommendations on improving the Save Our Streams program, we would like you to evaluate the **current** services and materials the program provides its volunteers.

19. Please mark the appropriate box on how you would **evaluate the current services or materials** the Save Our Streams program provides its volunteers.

	Poor	Fair	Average	Good	Excellent	Don't Know
The effectiveness of the certification test to measure a volunteer's ability to monitor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The way the certification test is administered.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of stream monitoring equipment (for example, waders and mesh nets).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recognition/appreciation of its volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The effectiveness of your initial training sessions to prepare you to properly monitor a stream.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The usefulness of the current field guide materials to confidently identify stream organisms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Opportunities for additional training and refresher courses for monitors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Opportunities to meet other SOS volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feedback from SOS leaders about how volunteer data are being used to protect streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The effective distribution of collected volunteer data to those who can use it (e.g., DEQ, DCR).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication between SOS leaders and their volunteers (such as, about upcoming events or when to monitor next).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recruitment of new stream monitoring volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advertising/promotion of SOS program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of materials to educate others about SOS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 4: There have been many suggestions on how to improve and enhance the Save Our Streams program. The following questions ask you how SOS can improve its program.

20. Please mark the box that best indicates how much you would **support** these changes to the SOS program.

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
Provide full-time paid SOS regional coordinators.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An easier certification test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A more rigorous certification test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Require re-certification testing (e.g., every 3 years) to assure high quality stream monitoring data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annual meeting with other volunteer water monitoring groups in Virginia.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A Virginia SOS newsletter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Awards, certificates, or plaques for volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social events like picnics or potlucks for volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standardized training procedures across Virginia.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special guest speakers about water and environmental quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus monitoring efforts on the state's most impaired stream sections, rather than letting volunteers pick their own stream.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lobbying government agencies to use volunteer data in stream decision-making.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Random field spot-checks of SOS volunteers to assure quality data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To minimize redundancy/boredom, have periodic monitoring of other volunteers' streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OTHER SUGGESTIONS: _____

Section 5: The following questions address possible reasons why volunteers stop participation in the Save Our Streams program. **Only those SOS volunteers who have not monitored a stream in the past 12 months should answer questions in this section.** If you are still involved with Save Our Streams water quality monitoring skip to section 6 question #22 on page 11.

21. Please check the appropriate box to indicate which of the following were important in your decision to **stop participation**.

I stopped participating because...

	Not At All Important	Slightly Important	Somewhat Important	Moderately Important	Very Important
The certification test was too difficult.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had health problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't get along with my monitoring partner(s).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The stream I monitored was too far away.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stream monitoring took too much time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring became boring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was not enough direction from SOS leaders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was too difficult to find a time when my monitoring partner(s) could meet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The environmental problem I was concerned about got resolved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many other obligations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The environmental problems became too overwhelming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was not enough feedback from SOS leaders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had done my volunteer duty.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I stopped participating because...

	Not At All Important	Slightly Important	Somewhat Important	Moderately Important	Very Important
The program lacked effective leadership.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My marital status changed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I moved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became active in other environmental organizations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not feel my data were being used effectively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SOS leadership didn't seem to appreciate volunteers very much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt I was not adequately trained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There were not enough opportunities to meet other volunteers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The training did not give me the skills to monitor my stream properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't make the friendships I had hoped.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't like the stream to which I was assigned.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There were not enough leadership opportunities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't see any tangible results from my monitoring efforts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt Virginia's protection agencies were not taking my data seriously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My monitoring partner(s) quit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My children grew up.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt there was little cooperation with other volunteer water monitoring groups.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't see any improvements in the quality of my stream.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The certification test was too intimidating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER REASONS: _____					

Section 6: Finally, we would like some information about you. This information will only be used for statistical purposes to make general statements about the types of people who are part of the Save Our Streams program. **All information is voluntary and confidential, and will not be identified with your name.**

22. Your present age: _____ years
23. Are you Male or Female?
24. What is your race?
- | | |
|---|--|
| <input type="checkbox"/> White | <input type="checkbox"/> Native American |
| <input type="checkbox"/> African-American | <input type="checkbox"/> Asian-American |
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> Other_____ |
25. What is your current occupation? (Mark one.)
- | | |
|---|---|
| <input type="checkbox"/> Manager or executive | <input type="checkbox"/> Sales worker |
| <input type="checkbox"/> Professional worker | <input type="checkbox"/> Service worker |
| <input type="checkbox"/> Owner of business or farm | <input type="checkbox"/> Unemployed |
| <input type="checkbox"/> Skilled trade or craft | <input type="checkbox"/> Retired |
| <input type="checkbox"/> Semi-skilled worker, laborer | <input type="checkbox"/> Student |
| <input type="checkbox"/> Clerical or office worker | <input type="checkbox"/> Home-maker |
26. What is your job title _____ and the kind of company or organization for which you work _____?
27. What was your approximate total household income before taxes last year?
- | | |
|--|--|
| <input type="checkbox"/> under \$19,999 | <input type="checkbox"/> \$50,000-59,999 |
| <input type="checkbox"/> \$20,000-29,999 | <input type="checkbox"/> \$60,000-74,999 |
| <input type="checkbox"/> \$30,000-39,999 | <input type="checkbox"/> \$75,000-99,999 |
| <input type="checkbox"/> \$40,000-49,999 | <input type="checkbox"/> \$100,000 or more |
28. What is the highest level of education you have completed? (Mark one.)
- | | |
|--|---|
| <input type="checkbox"/> Grammar school | <input type="checkbox"/> Bachelor's degree or equivalent |
| <input type="checkbox"/> Some high school | <input type="checkbox"/> Some graduate work |
| <input type="checkbox"/> High school diploma | <input type="checkbox"/> Master's degree |
| <input type="checkbox"/> Some college | <input type="checkbox"/> Ph.D., M.D., J.D., or equivalent |

29. Your present marital status:

- Single
- Married
- Separated/Divorced
- Widowed

30. How many children do you have? _____ children

31. How many children are **currently living in your household?** _____ children

32. How long have you been residing in your present community?

- Less than 2 years
- 2-4 years
- 5-9 years
- 10 years or more

33. How long do you **intend to stay** in your present community?

- Less than 2 years
- 2-4 years
- 5-9 years
- 10 years or more

34. In what type of area do you **currently live?** (Mark one.)

- Farm or ranch
- Rural, non-farm
- Town (under 5,000)
- Town (5,000-10,000)
- City (10,000-50,000)
- Large city (50,000-100,000)
- Metropolitan area (more than 100,000)

Do you have any additional comments for the SOS leadership about how to improve the Save Our Streams program?

Thank you for your time!

VITA

Steven Christopher Haas

Steven Christopher Haas was born in Naperville, Illinois, on April 17, 1972, to Richard and Gudrun Haas. He graduated from Naperville North High School in Naperville, Illinois in 1990. He then went on to receive a Bachelors Degree in Business Administrative Management and a minor in Psychology in May, 1994 from Eastern Illinois University (EIU) in Charleston, Illinois. While an undergraduate, he spent his summers as a Park Specialist for the Lisle Park District in Lisle, Illinois. After graduating from Eastern Illinois University, he accepted a full-time position as a Park Specialist for the Lisle Park District until December 1995. In June of 1998 he received a Bachelors Degree in Fisheries and Wildlife Management from Utah State University in Logan, Utah. He also spent six months in 1997 as a Park Ranger Aide at beautiful Snow Canyon State Park in St. George, Utah.

In August of 1998, he became a Masters Degree Candidate in Natural Resource Recreation in the Department of Forestry at Virginia Polytechnic and State University, Blacksburg, Virginia. He completed his requirements in August 2000. He has recently accepted a full-time position as a Park Ranger II at Arizona's Dead Horse Ranch State Park near Cottonwood. Steve is very involved in his church, enjoys hiking with his dog Ginger, camping and backpacking in the Southwest, and is an avid reader of early frontier literature.

