DETERMINING A MORE COMPLETE PROGRAM VALUATION:
INTEGRATING TOOLS FROM PROGRAM THEORY AND ECONOMICS TO
BETTER INFORM PROGRAM DECISIONS

DISSERTATION

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By

Everetta Elaine Taylor Horr, M.A.T

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Dissertation Committee: Approved by
Professor Joe E. Heimlich, Adviser
Professor Tomas Koontz
Professor Gary Mullins
Professor David Stein

Natural Resources Graduate Program
ABSTRACT

As funding for organizations and agencies continues to become more difficult to obtain, the need to validate the efficacy and value of their programming to various stakeholders in order to justify the program’s existence becomes more critical. The program, having been designed utilizing program theory, is evaluated, with the results determining the program efficacy. Administrative decisions regarding the future support of the program are based on the program efficacy. Thus, the program efficacy drives the decisions made on the various aspects of the program, including whether or not to continue supporting the program if the program efficacy is found to be minimal. Once administrative decisions are made as to the support of the program, the cycle continues.

In environmental education programs, behavioral outcomes are equally important to cognitive outcomes and are an important element of determining program efficacy. It is common for behavioral outcomes to refer to individual behaviors. When the individual behaviors are transformed to collective conservation actions, the effects of the outcomes are magnified. If the collective conservation actions are utilized in the process of determining program efficacy, the result would likely be a more complete program valuation.

Traditional cost-effectiveness methods have long been used to justify the value of programs with easily identified outcomes. More recently developed econometric methods
attempt to place a dollar market value on less easily identified program outcomes, but have not always been successful, reflecting an incomplete valuation of the program.

A technique (Gap Technique) was developed in this study with the intention to better understand and implement program aspects that contribute to and influence decisions made by administrators. The Gap Technique brings together elements of program theory, program evaluation, elements of various economic budget theories, and the determination of program efficacy. Thus, the Gap Technique bridges the gap between program theory and economic methods by using tools from each and incorporating them into one process. The Shorebirds Sister Schools Program was chosen as the case for use in this study program.
Dedicated to the strong women in my family, my husband and his family,
and my Share Sisters.
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VITA

1972 .................................................. B.S. Biology
                                       Rio Grande College
                                       Rio Grande, Ohio

2003 .................................................. M.A.T., Biological Sciences
                                       Miami University
                                       Oxford, Ohio

2003 – 2006 ................................. Graduate Teaching and Research Associate
                                       The Ohio State University
                                       Columbus, Ohio

2003-2004, 2007 ................................. Adjunct Instructor
                                       Columbus State Community College
                                       Columbus, Ohio

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Major Field: Natural Resources
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CHAPTER 1

INTRODUCTION

The Statement of the Problem

As competition for funding dollars increases, it becomes more critical to validate the efficacy and value of the program in order to better justify its existence. In formal education, government financing often continues to decrease, sometimes resulting in the elimination of what is considered non-essential educational components (Psacharopoulos, 1995) such as the arts, cultural studies, environmental education and social studies. Additionally, a greater emphasis is being attached to linking funding with proof of program efficacy (McLaughlin & Jordan, 1999). For example, the Government Performance and Results Act, passed by Congress in the late 1990s, requires all federal agencies to identify goals and to determine how to measure performance regarding desired outcomes (Hinchman, 1997). In addition, non-government organization programs rely on private funding sources, such as donations, memberships, and grants from private corporations and individuals. In the case of the World Wildlife Fund’s Windows on the Wild programming, for example, a private corporation serves as the major sponsor, with other corporate and private sponsors providing the remaining needed funds (World Wildlife Fund, 2006). However, whether an organization is funded by public or private
sources, there is a need for it to validate the efficacy of the program in order to justify the existence of the program (Gutman, 2002).

Program efficacy determination begins by performing a program evaluation, a source of measuring program performance in order to show accountability and program value and to explore ways to improve a program (McLaughlin & Jordan, 1999). The final efficacy of a program is established by comparing identified program outcomes with program goals and objectives. Program efficacy is one element that can influence administrator decisions regarding future support of the program.

When scrutinizing the elements that contribute to program decisions, it became apparent that three domains of the program would need to be explored: stakeholder perceptions as to the value of the program, how effective the program is in meeting its goals and objectives, and the overall cost of the program as determined by the present budget. The relationship between these program decision elements can be seen on the following page in Figure 1.1 on the following page. Although factors contributing to program decisions are illustrated in this diagram, the process by which the program decisions are made is not suggested in it.

**The Objective of the Study**

The objective of this study is to explore the means by which a more holistic understanding of the elements contributing to both program efficacy and the support of the program by administrators can be obtained. This is done with regard to the program decisions that are made. Furthermore, in order to most accurately determine program efficacy, all program outcomes should be identified, including any that program
When program components and stakeholders are analyzed, some linkages between the major elements of the program decision process can be detected, as seen in Figure 1.2 on the following page. This diagram indicates the cyclical nature of how decisions are made for programs. The program, having been designed utilizing program theory, is evaluated, with the results determining the program efficacy. Administrative decisions regarding the future support of the program are based on the program efficacy. Thus, the program efficacy drives the decisions made on the various aspects of the

Figure 1.1: Factors contributing to program decisions (Gap Technique)
program, including whether or not to continue supporting the program if the program efficacy is found to be minimal. Once administrative decisions are made as to the support of the program, the cycle continues.

Figure 1.2: Traditional process influencing program decisions (Gap Technique)

However, this process does not take into account the identification of overlooked conservation action outcomes. Since the administrators would base their assessment as to program efficacy in part on the program outcomes, omitting to associate a value with the overlooked conservation outcomes would result in an incomplete valuation of the program. Therefore, the modified diagram of the holistic process, seen below in Figure 1.3, was developed to incorporate these into the decision-making process.

Figure 1.3: Gap Technique explaining influences on program decisions
In this case, the overlooked conservation actions, identified in the program evaluation process, could result in a more complete valuation of the program. This, in turn, would contribute to the determination of the overall program efficacy, which, as was already discussed, can influence administrator decisions regarding future support of the program. Therefore, a more complete valuation of the program could better aid the administrator making decisions regarding the program.

In this study a variety of program evaluation techniques are used to determine the program efficacy. Part of determining program efficacy lies in developing a program model that identifies all program components and how they interact to assure the program is functioning as it was designed (Heimlich, 2006). Survey and focus group instruments are used to gather data, all of which are utilized in determining program efficacy. A major goal of the focus group is to identify any likely overlooked conservation actions that could result in a more holistic, or complete, program valuation to be implemented in the determination of the overall efficacy of the program.

**Program Valuation**

Information gathered when developing the program model can also be used to determine the financial effectiveness of a program. In a normal cost benefit or cost effectiveness study, input expenses are compared to outcome benefits to determine the relative efficacy of the program. This type of evaluation as to program efficacy has been used for a number of years in the health care field (Johannesson, 1995). For example, inputs for a program on cardiac health issues might include workshops for the public on cardiac health, marketing costs for the workshops and educational pamphlets and
brochures on specific cardiac health issues. Measurement as to the health program
efficacy might then be calculated by examining the number of persons coming into the
hospital or clinic with cardiac-related illnesses over a specific time period in which the
cardiac health program had been in place. This would, in essence, provide a measurement
as to the value of specific behavioral outcomes of the workshops as it would be assumed
that changes in behaviors should result in decreased cardiac problems. It could then be
seen whether or not the cardiac health program resulted in a drop in cardiac-related
illnesses over that time period, or an increase in them or no change in the number of
persons with cardiac-related health issues being treated. Thus, a dollar market value,
either positive or negative, would be attached to this cardiac-related health issue program
and would be used to either justify funding the program or not funding the program.

However, unlike in the health care field, for example, there is currently no easily
utilized process by which environmental education (EE) organizations can determine the
cost benefit of many of the environmental education aspects of the organization. While
the amount of money saved by the cardiac-related health issues program can easily be
calculated by comparing the monies spent on affected patients, it is more difficult to
determine the monetary value of the more intangible components of an EE program. A
number of economic and policy methods other than cost-benefit or cost-effectiveness
analysis can and are implemented to determine the funding budget for environmental
organizations and agencies. However, each of the budgeting methods explored when
planning this study had flaws that made it inappropriate for use as the study intended,
although each was appropriate in some ways.
For example, the Contingent Valuation Method (CVM) has the ability to place a market value on non-use goods such as abstract outcomes of programs (Kopp & Pease, 1997). Although this method has been used infrequently in education for overall program efficacy determination, it is used more in the areas of nature conservation studies, such as the water quality of a community. A key component of the Contingent Valuation Method is surveying the public concerning what their willingness to pay amount would be for those specific outcomes. This dollar market amount is then used to determine the market value of the said outcome. However, in order to use this method, all stakeholders must be surveyed in such a way as to determine their willingness to pay without biasing the results (Bishop et al., 1997). Planning this type of study is highly complex and requires a large amount of personnel hours, making it expensive for small organizations and agencies to implement (Carson, 2000). Additionally, the CVM requires surveying the public to determine their willingness to pay for a specific service. This is not always appropriate or feasible for many conservation organizations and agencies, since the public is not who is directly funding them. Thus, the CVM is not always, in its entirety, a completely appropriate process in justifying budgeting requests (Keeler, 2007).

A second method explored is the Planning, Programming, and Budgeting System (PPBS), developed during the 1940s and 1950s and put in use by the U.S. Department of Defense in 1961 (Johnson, 2003). By 1968, a large number of federal agencies employed the PPBS as did state and local governments, businesses and education. The emphasis of this process is to generate performance objectives in the initial planning stage, then to determine how to meet those objectives in the programming stage. Finally, the budget needed to implement the programming that was identified is set (Knezevich, 1973). The
problem in using this budgeting system is that funding is based on outcomes designed during the development of the program rather than searching for unidentified, overlooked program outcomes to give added value to a program. Additionally, this method is time-consuming and rigid in design, making it an expensive alternative for the EE organization.

A third method is the Outcome-Based Budgeting (OBB) method. This budgeting method, based upon the PPBS and other performance-based processes, utilizes the planning and programming aspects of the PPBS method as a means of optimizing an organization’s program. However, the final goal of the OBB is to improve the organization itself by improving its programs (Ngoyi et al., 2004), and it does so by surveying the public as to what is important, as in the CVM process, rather than by allowing agency personnel to determine important components of the program. Instead of budgeting for organization or agency departments, this method instead budgets for specific programs within the departments and focuses on how to obtain the best outcomes possible, not just those that have been traditionally identified (Swartz, 2005). The OBB has been successfully used in the higher education arena by extending the time period of identifying the outcomes of the university education to beyond graduation and into the former students’ professional lives (Anderers, 1995). However, even this modification of the OBB used in the study dealing with higher education is not wholly sufficient for use in associating a dollar market value to some of the environmental education outcome due to its inability to identify overlooked outcomes of the program.

The return on investment (ROI) method, developed by Kirkpatrick in 1957 and still in use today, has shown to be of great use in the human resource development field
(Nickols, 2000). As with the economic methods previously described, this system requires all costs and outcomes be identified and have a monetary amount associated with each in order to calculate a cost/benefit ratio (Smith, 2004). This system is relatively straightforward, making it appropriate for organizations and agencies without economists on staff, but does not have a mechanism in place to identify overlooked conservation action outcomes.

For example, many educational programs use cognitive learning progress measurement as a means of helping arrive at a valuation of the program. This type of measurement in the field of education has been done for decades, with multiple research design methods, such as pre-treatment test scores compared to post-treatment test scores. This gives the researcher quantitative data and is thus relatively simple to implement in the valuation process (Ary et al., 2002). However, as was pointed out earlier, cognition of EE concepts is only part of the goal of EE programming. Equally, or even more important are behavioral outcomes. Some behavioral outcomes, such as hours volunteers spend performing clerical tasks, are easily quantified. For example, the USFWS has calculated the value of volunteer hours to be $18.77/hour (Jones, 2007). Therefore, if a total of 40 hours of work per month were performed by volunteers for one USFWS program, that would result in a total increased program valuation of $187.70 for one month. When calculated for a fiscal year, the valuation of the program would increase by $2252.40, resulting in a more complete valuation of the program in question. Since few volunteers work 40 hours in one week, what would be considered a fulltime workweek, we can therefore conclude that more than one volunteer is contributing to the total amount of volunteer hours in a week. In this manner, individual behaviors are considered
to be collective conservation actions. Other conservation action outcomes that are less easily identified and quantified and may or may not be included in the program valuation. Both examples of behavioral outcomes, however, are often overlooked when the EE organization calculates its program’s valuation, resulting in an incomplete valuation for the EE program.

This illustrates the importance of identifying as many program outcomes as possible when calculating a program’s valuation. In order to do this, a complete program evaluation must be performed. If any previously overlooked outcomes are identified during this process and one could quantify them, the valuation of the EE program would be more complete and thus more accurate. Conversely, if any previously identified outcomes are not being achieved this also needs to be addressed and reflected in a more accurate valuation of the program. Thus, a focus of this study is to identify and determine a dollar market value amount for all outcomes of an EE program, including any conservation actions that have not been identified as a formal program outcome. This type of overlooked outcome can be developed as a modification or extension of the traditional program materials by the EE program administrators or by those educators using the EE program materials.

As stated earlier, identifying overlooked conservation action outcomes will require a thorough program evaluation to be performed. Including these newly identified overlooked outcomes in the valuation of an EE program will require developing a valuation process that addresses some portions of program theory and the budgeting systems previously discussed. This process will be developed from the point of view of the personnel in the conservation organization or agency rather than from an econometric
viewpoint and is not designed to replace any budgeting or econometric analysis system. Instead, the goal is to augment the budgeting process used by an organization or agency to determine the optimum valuation of their environmental education program. The goal of this valuation process is twofold: to identify any overlooked conservation action outcomes that might not be formally part of the listed program outcomes and to determine a dollar market value for said behavioral outcomes as a means of determining a more complete valuation of the EE program.

**The Importance of Environmental Education**

The primary goal of environmental education is to promote an environmentally literate populace that will choose to take positive actions with regard to conserving and protecting species and their habitats as well as with other environmental issues (North American Association for Environmental Education, 2004). Thus, the implication is plain: cognition for the sake of cognition is not adequate when discussing desired outcomes of EE programming. Instead, the behavioral outcomes resulting from participation in EE programs are of equal importance to the cognitive outcomes. The behavioral outcomes, cited as some of the goals and objectives of the program, are often found to be behaviors engaged in by individuals. However, when these individual behaviors are engaged in collectively, they become larger conservation actions, resulting in a more synergistic effect. Collective conservation actions can result in a greater benefit related to the mission of an organization or agency. For example, suppose an organization lists program participants engaging in conserving electricity use, as a means of reducing carbon dioxide emissions from coal-burning power plants, as a program
objective. The impact of this individual behavior on the environment would be minimal even though the behavior itself would reflect the program being effective in reaching that objective. If, on the other hand, program participants successfully lobbied for strict emission control standards for the power plant to be set by the state, a collective conservation action, the impact on the environment would be greatly magnified.

According the NAAEE’s Environmental Education Materials: Guidelines for Excellence (2004), these environmental education programs should be composed of hands-on activities that allow participants to discover, in their own ways and at their own times, pertinent environmentally-sound concepts. As the introductory passage of the Project WILD K-12 Curriculum Guide and Activity book states, one goal of environmental education is to teach people how to think about the environment, not what to think about it (Council for Environmental Education 2004). This type of instruction, a major goal of a number of environmental education programs, is an effective means of helping people develop critical thinking skills. Furthermore, this ability to think critically and construct one’s own understanding of complex problems is also a major goal of formal education as well.

According to the NAAEE (2004), other goals for environmental education programming are associated with the cognitive, affective, conative, and behavioral domains and lead to achieving the primary goal of developing an environmentally literate population. Environmental education materials should help learners of all ages better understand environmental issues by becoming aware of environmental concepts. Additionally, the materials should help learners explore and develop an awareness of values and attitudes regarding these environmental issues. Finally, environmental
education materials that encourage learners to actively participate in behaviors lead to the development of solutions to environmental concerns.

Many conservation organizations and agencies have developed some type of environmental education programming as one means of realizing their mission and goals. For example, the World Wildlife Fund, the largest privately supported environmental conservation group globally (World Wildlife Fund, 2006), has a series of Educator’s Guide workbooks dealing with various aspects of habitat and wildlife conservation issues. Although the environmental education Educator’s Guides are only one component of the World Wildlife Fund organization, there are a number of other conservation organizations whose primary mission is environmental education. Organizations such as Project Learning Tree and Project WET were created and developed as a means of increased information and support for both formal and nonformal educators in the field of environmental education.

Many environmental education organizations encourage the use of their materials by educators in the formal classroom setting. Many organizations, such as Project Learning Tree, provide required training workshops for educators to complete prior to their obtaining the environmental education activity workbooks. Additionally, many environmental education organizations provide information regarding how their programs are correlated to state and/or federal academic benchmark standards, an area of increasing importance for many formal educators when justifying curriculum content (American Forest Foundation, 2004).

The origins of environmental education can be traced back to nonformal sources, beginning with the nature study movement of the late 1800s and early 1900s. This was
followed by the conservation education movement in the mid-1900s that dealt primarily with wise use of natural resources. Both movements contributed to the outdoor education learning method, in which children experienced lessons pertaining to nature by participating in activities such as school camping trips (Disinger, 1998). By 1972, when the Tbilisi Declaration was written, environmental education had evolved into a hands-on experiential learning process that would introduce both formal classroom learners and nonformal free-choice learners to environmental issues, help them develop the necessary skills to make informed decisions on the issues and encourage them to take responsible environmental actions (http://www.Gdrc, 2007). A study done by Orams (1997), in which tourists interacted with dolphins, indicated that tourists’ behaviors were influenced more when the experiences with dolphins were accompanied by an educational program than when compared to only interacting with dolphins.

In formal education, classes are often taught from the top down, with teachers imparting knowledge, primarily via textbooks and lectures and with little or no integration of disciplines within the curriculum. This type of instruction does not encourage the development of critical thinking skills in learners and hampers their motivation (Volk & Cheak, 2003). However, active participation educational activities, a major component of environmental education programming, have a positive effect on student learning (Pratton & Hales, 1896). Additionally, environmental education activities are correlated within the different disciplines throughout the curriculum (Culen, 1997). Finally, many environmental education organizations correlate their activities to state and federal educational benchmarks, enhancing the appropriateness of implementing environmental educational activities in the formal classroom setting (Simmons, 2000).
The targeted audience of environmental education activities in the formal classroom is children in grades K-12. However, information from environmental education activities can transfer to parents and others who come in contact with schoolchildren who have participated in said activities, thus expanding the influence of environmental education to adults (Vaughan et al., 2003). And, in the nonformal free-choice learning arena, adults are often a major group of participants, sometimes coming to the EE program with more knowledge of global and local environmental issues (Clover, 2002). Thus, environmental education is appropriate for all ages in all types of educational settings.

An emphasis in environmental education is for individuals to “become aware of their environment and acquire knowledge, values, skills, and experiences to solve environmental problems for present and future generations” (Vaughan et al., 2003:12). For some individuals, this transformational journey progresses in a linear manner, with learning about environmental issues generating emotional feelings of caring about the issues, which in turn develops into desires to take action on the issues and, finally, to act on improving or solving the environmental issues (DiEnno & Hilton, 2005). However, for others, the process can progress from learning about the issue to taking action, with the affective component developing at a later date (Insko & Schopler, 1967). The main concern, in either case, is that conservation actions on environmental issues benefit future generations. Thus, the behavioral actions resulting from participation in EE programs are of equal importance to the cognitive outcomes.
Shorebird Sister Schools Program

The Shorebird Sister Schools Program (SSSP), an environmental education program sponsored by the U. S. Fish and Wildlife Service (USFWS), was chosen as the environmental education program case to be used in this study. The SSSP is the result of an environmental education program developed cooperatively by a middle school science teacher and the local USFWS biologist for use in the 1994 Kachemak Bay Shorebird Festival held in Homer, Alaska. This shorebirds festival was a coordinated effort of the local schools, the Homer Chamber of Commerce and the Alaska Maritime National Wildlife Refuge. The original, primary goal of the shorebirds-oriented environmental education program was to make students and local residents aware of the migratory nature of the shorebirds they observed in the summer months by linking via the Internet with schools along the Pacific Flyway used by the various shorebird species. Students in the participating schools would then make observations regarding the shorebirds as they migrated and share those with other participating schools along the flyway. It was felt that this would instill in the participating students a greater awareness of the shorebirds and their habitats, including stopover sites during migration, and thus create a greater desire to protect both. In addition, it would encourage partnerships among not only the students, but also biologists and communities along the flyway (U.S. Fish and Wildlife Service National Conservation Training Center, 2004).

By 1996 the program had grown considerably in popularity and was transferred to the Regional Office of the USFWS in Anchorage, Alaska. In November 2000, the administration of the program was then transferred to the National Conservation Training Center of the USFWS in Shepherdstown, WV and since then has been administered by
the National Coordinator on site and seven regional coordinators located in each of the USFWS regions. During this time, the *Explore the World with Shorebirds!* Educational Guide for grades 2-12 was developed from a previous version of the environmental education curriculum and made available to educators in a CD-rom format. This educational guide is provided free of charge to anyone who requests it.

The mission of the SSSP is to encourage *public participation in the conservation of shorebirds and their habitats by connecting people along flyways and increasing their awareness and knowledge of local natural resources to inspire community conservation* (Shorebird Sister Schools, 2006) and the vision of the curriculum is that *the SSSP, through education and outreach, engages public participation in the conservation of shorebird species and their wetland, grassland, and shoreline ecosystems* (U.S. Fish and Wildlife Service National Conservation Training Center, 2004). Thus, a major objective of the Shorebird Sister School Program’s environmental education program, as stated in both the website and the curriculum, reflects the importance of active participation in conservation issues. This reveals the significance of the mission-driven behavioral outcomes in environmental education programs. The implication is plain: cognition for the sake of cognition is not adequate when discussing desired outcomes of EE programming. Instead, the behavioral actions resulting from participation in EE programs are of equal importance to cognitive outcomes.

In 2003 Dawn Grafe, Supervisory Park Ranger at the Oregon Coast National Wildlife Refuge Complex and others at Oregon Coast, developed a SSSP classroom learning unit program using SSSP materials and piloted it in five local 4th and 5th grade classrooms. This program consists of four 90-minute classroom sessions, culminating in a
field trip to a local estuary. One activity of the final field trip session is an estuary clean up activity, with students competing for honors such as the-most-trash-collected or the-most-unusual-piece-of-trash-picked-up. Cleaning up the estuary during the field trip activity illustrates how individuals can make a difference in working towards restoring and/or protecting important shorebird nesting and stopover sites during migration. Thus, the act of cleaning up a wetland habitat is an important behavioral outcome as an EE concept. However, this behavioral outcome that was not developed in the original design of the Explore the World with Shorebirds! curriculum guide can also be considered an added asset of the SSSP with regards to the summative valuation of the program.

The SSSP was chosen as the environmental education program to be examined in this study on the basis of five attributes. First, the mission and vision of the SSSP reflects the importance of conservation behavioral outcomes. Second, this program has never been formally evaluated in any way as to efficacy over the entire time even though it has been edited many times from its initial inception. Thus, there are no previous evaluations to bias interpretation of the findings obtained. Third, this program focuses on shorebirds and their habitats, which are a global issue in scope due to the migratory behaviors of many shorebird species. This factor requires the study to explore a wide range of stakeholders concerned with all the different types of outcomes of the SSSP. Fourth, since the SSSP developed the Explore the World with Shorebirds! curriculum educational guide, records have been maintained of all curriculum requests from both formal and nonformal educators and other interested individuals. This allows for a complete and accurate sample frame from which to draw a representative sample of the target population that, in turn, allows for better generalization from the sample population to the
target population. Lastly, the SSSP must justify its funding requests to the USFWS, which in turn must do so to its parent agency in the federal government, the Department of the Interior. The USFWS administrators must make funding decisions based on a finite overall budget amount for the USFWS, that was itself a part of the overall Department of the Interior budget. In the hierarchy of the Department of the Interior, the SSSP is a very small, relatively minor program that could easily be cut if funding decreases were to occur. Thus, the SSSP must be able to demonstrate the efficacy of its educational outcomes to both the USFWS and to the Department of the Interior. At the same time, the SSSP, with minimum funding available, is reluctant to use the funding to hire a consultant to run a cost effectiveness analysis of the program. Therefore, a valuation model such as is the goal of this study is of great benefit to the SSSP when justifying budget-funding requests.

**Research Questions**

In exploring the idea of associating environmental education programs with economic value in order to determine the efficacy of the program and thus to rationalize funding for the program, three questions arise:

1. How does program theory relate to determining program efficacy?
2. What would be the process for conducting a more complete program evaluation?
3. Is it possible to structure a technique for incorporating a more holistic view of a program by including overlooked collective conservation actions?
Assumptions

Five assumptions were made when implementing this study. First, it is assumed that the Shorebird Sister Schools Program is an appropriate case for use in this study.

Second, it is assumed that those stakeholders who respond to the two surveys will do so in a serious and conscientious manner.

Third, those persons who agree to participate in the Data Discussion Group session have more than a casual interest in EE and/or the SSSP.

Fourth, any outcomes beyond the scope of those identified as being part of the program as it was designed are considered overlooked outcomes because they are not listed as formal outcomes of the SSSP. Specifically for this study, the overlooked outcome being identified and included in the overall program valuation is an overlooked conservation action outcome.

Finally, it is assumed that those USFWS manager/administrators responding to the USFWS Administrator Survey regarding the willingness to fund the SSSP, or projects within the SSSP, have the authority to make budget-funding decisions.

Limitations

Three issues limit the scope of this study. One limitation pertains to the failure of obtaining Email addresses for many persons who had requested the Shorebird Sister Schools Program CD-rom curriculum guide. Because of this, the number of persons receiving the SSSP Educator Survey was much fewer than initially anticipated. Thus, it becomes difficult to rationalize generalizing results from the SSSP Educator Survey as being representative of the entire population of educators who requested the curriculum.
guide. However, results from the SSSP Educator Survey may be generally indicative of educator perceptions since there was no specific reason given as to why or why not Email addresses were included in the curriculum guide requests. Instead, requests were fielded by not only the SSSP National Coordinator, but also by the seven regional coordinators. Having different people record the contact information could explain the inconsistencies in this area.

Secondly, although two stakeholder groups, educators and USFWS administrators, were surveyed for this study, a third major stakeholder group, learners, was not included. Because many of the learners participating in SSSP activities do so in nonformal programs, many of which do not record participant rosters, a large number of nonformal program learners could not be identified and would not be sent a survey. This would result in a learner population biased towards those learners who participated in SSSP activities in a formal classroom setting. Therefore, rather than introducing this possible bias towards formal program learners, it was decided to not survey any group of learners.

A third limitation is the decentralization of the administration of the various USFWS environmental education programs, making it difficult to identify all those managers/administrators who have budget-funding authority. This prevented determining the perceived valuation of environmental education programming, in general, by targeted USFWS personnel. Additionally, because each EE program within the USFWS is managed regionally, very few USFWS administrators are involved in the budget funding decision-making process. This translates into an extremely small population to receive
the USFWS Administrator Survey and thus makes it difficult to generalize results to the greater USFWS administrator population.

**Definition of Terms**

Below are listed terms that are not defined in the literature review but are used in this study:

- *Market value* refers to the monetary use value associated with a good or service.
- *Outcomes* are the final or desired result of some type of initiative. For this study, the term is associated with learning and program components.
- *Overlooked outcomes* are those intended outcomes beyond the scope of those set as formal program outcomes. These outcomes are sometimes developed as extensions by EE program administrators or by those educators using the traditional program materials.
- *Program efficacy* is the determination of the degree to which a program meets its goals and objective. Establishing the efficacy of a program requires the performance of a program evaluation.
- *Program valuation* refers to the dollar amount associated with the perceived worth of the program.
- *Program efficacy* is the determination of the degree to which a program meets its goals and objective. Establishing the efficacy of a program requires the performance of a program evaluation.
- *Program valuation* refers to the dollar amount associated with the perceived worth of the program.
CHAPTER 2

REVIEW OF THE LITERATURE

Review of the Literature Overview

The purpose of this review is twofold: first, to explore what is known about program theory, program evaluation and determining the efficacy and valuation of a program and second, to determine shortcomings in budget funding systems in present use when attempting to calculate a complete program valuation. Answering the first purpose of this review will include discussing the importance of developing a program model of the environmental education program in question, evaluating the program as to the extent to which it effectively meets its mission, goals and objectives, and determining perceptions of the various stakeholders regarding how they value the environmental education program. The second portion of this review will explore the various budgeting analysis and econometric processes to be explored for use in the arenas of both conservation and educational programming. Additionally, this review will explore the way in which the inclusion of overlooked program outcome valuations can be utilized in order to obtain a more accurate valuation of the overall program. This section will conclude with briefly examining the development of environmental education over the years and how it is presently defined.
**Program Theory and Program Evaluation**

Program theory and program evaluation are closely related, as can be seen when examining Targeting Outcomes of Programs (TOP), an evaluation method developed by Bennett (1995) and based on his hierarchy. Bennett’s method has been used extensively both in the United States and abroad as a means of developing various types of cooperative educational programming (Bennett, 1995) (Jacob & Ferrer, 2000). Briefly, the TOP program entails exploring a program by identifying various components of the program and listing desired outcomes of the program when planning the programming, and examining the same outcomes and components, just in reverse order, when evaluating the program (Bennett, 1995). When examining much of the literature on program theory, there are found numerous references to program evaluation, thus blurring the line of demarcation between the two concepts. Furthermore, the program logic model, described by Renger and Titcomb (2002) as an essential component of both program planning and program evaluation, adds to the confusion. Therefore, all three concepts will be explored and discussed separately.

Program theory refers to the desired outcomes of a program and the way in which the program should be implemented in order to generate the desired outcomes (<Http://Itclass.Heinz, 2000). A program theory explains the planned outcomes of the program and how those outcomes will be accomplished. It describes the program, explains the conditions necessary for the program to work, predicts the outcomes of the program and specifies the activities necessary to realize the predicted outcomes (Sidani & Sechrest 1999).
Weiss (2002) defines program theory as focusing on the mechanisms occurring between the implementation of the program components and the response of participants to the program components. For example, in dog agility training, there are specific behavioral outcomes listed for each level of training, such as correctly climbing the A-frame and negotiating the seesaw. The mechanism in this program theory is the knowledge the handlers and dogs gain from the training they undergo for each piece of equipment. “The mechanism of change is not the program activities per se but the response that the activities generate” (Weiss, 1997:73).

The actual training activities the dogs participate in are part of what Weiss (2002) terms the implementation theory. The focus of implementation theory is how the program is conducted. Implementation theory assumes that if the program is implemented as designed, the desired outcomes will be produced by participation in the program. According to Weiss, most programs are based in part on both program theory and implementation theory.

Weiss goes on to state that logic models are quite similar to program theory “If we take the word theory to mean the professional logic that underlies a program” (Weiss, 1997:73). A good program logic model links components of a program with program outcomes, and by doing so illustrates the program theory from which the program was designed. A program logic model should include the inputs, activities, outputs and outcomes of a program. Inputs are usually measured in terms of costs: personnel hours, office overhead expenses, equipment and supplies. Activities are the means by which program participation occurs and outputs are the parts of the program than can be quantified, such as the number of classrooms participating in the program per year.
Finally, the outcomes are the desired or intended results or behaviors that can be attributed to having participated in program activities. “Once developed, a logic model can be used in multiple ways, including evaluation planning, program design, goal setting, communication with stakeholders, and program improvement” (<http://www.Cargill>).

Environmental education programming typically follows the goals of environmental education, as set in the Tbilisi Declaration, and by major environmental education organizations, such as the North American Association for Environmental Education. Until recently, there has been no requirement for these organizations to provide evidence as to the efficacy of their environmental programs. However, funding organizations and entities, both governmental and private, are becoming more stringent in requiring proof of goals being realized. Thus, program evaluation has become an important part of decisions regarding funding requests (Norland & Wiltz, 2000).

Although program evaluation has been widely accepted in formal educational settings, in nonformal education settings acceptance of the need to evaluate a program has been less forthcoming. One reason to account for this is the lack of qualified persons within the organization or agency to perform a valid evaluation. With proper funding, an organization can hire personnel qualified to perform an evaluation as well as other duties. However, in many cases environmental education organizations “are implementing low-budget programs and lower-budget evaluations” (Norland, 2005, p. 9). Historically, program evaluation has been done by an outside evaluator due to the complex nature of the process and as a way to avoid evaluator bias. But recent evaluation techniques that have been developed are often able to be done in-house, allowing those organizations...
with fewer funding assets access to program evaluation. It must be noted, however, that with all program evaluation processes, a large component deals with the ability of the evaluator to make valid decisions and judgments (Rog, 1995).

Environmental education program evaluation is important because it is a source of measuring program performance in order to show accountability and program value to stakeholders and to explore ways to improve a program (McLaughlin & Jordan, 1999). A summative evaluation seeks to determine efficacy of the program after it has been implemented or at the end of a specific time period that has been agreed upon, bringing stakeholders into the process who are not necessarily a part of the program planning process. Thus, a summative evaluation provides information and proof of efficacy to external decision makers. On the other hand, a formative evaluation is done either preceding the implementation of a new program or during the early implementation period, and primarily involves internal decision makers. And while data collected for both evaluation processes are often the same, the way in which the evaluations are presented is different due to the different focus of each evaluation process (Healy, 2000).

There are a number of program evaluation processes from which to choose. Stufflebeam (2001) cites twenty-two approaches to classification and analysis of program components, with some approaches being more appropriate than others. However, many evaluation processes in present use list the same basic procedures listed, often in the same sequence. Since one critical issue of a program is to what extent it supports the goals and objectives of the organization, determining this support is a key component of a program evaluation. Thus, the first step in the program evaluation process is to determine what the goals and objectives of the program are, followed by analyzing a variety of outcomes
components of the program, including perceived required student knowledge, skills, values, and attitudes that would show progress towards meeting the program goals and objectives (Healy, 2000). Additionally, some program evaluation processes include economic inputs and outputs as well as outcomes geared toward meeting program goals and objectives (Bennett, 1995). Because evaluation is as multifaceted as the environmental programs that are analyzed, matching the correct evaluation method to the specific needs of an environmental program is of great importance (Patton, 2000).

One tool that is often used at the onset of a program evaluation is the development of a program logic model, which is the basis for explaining how the program is designed to work. This has increasingly become more of an issue for both governmental and public service organizations as there has been more of an emphasis placed on accountability of the organization to describe the manner in which the program works and the successes of the program (McLaughlin & Jordan, 1999). There are a number of program logic models that are used, but each determines the linkages between program goals, problems, outcomes, and impacts, making the model an important tool for both evaluation and planning (Julian, Jones & Deyo, 1995). Logic program models explore the inputs and outcomes of the program and organize them in such a way as to tell the story of how the program is supposed to work. This information is organized into a table and then converted into a flow diagram illustrating the relationship of one component to another. “The final product may be viewed as a network displaying the interconnections between the major elements of the program’s expected performance, from resources to solving an important problem” (McLaughlin & Jordan, 1999, p. 69). The program logic model chosen for use in the initial phase of this study is the FLOW model, shown in
Figure 2.1 below, a modified approach of the Bennett method developed by Joe E. Heimlich and Emmalou Norland (Heimlich, 2006). The preferred long-term impacts and inputs of the program, found at the far right and left ends of the model are listed first, with arrows from those boxes to other boxes guiding the direction of gathering program information and showing linkage between components of the program that either have an impact on or are impacted by the other linked components. When completed, this model illustrates program goals and objectives, what is needed for successful program implementation, and areas in which the implementation is successful or needs modification in order to be successful (Heimlich, 2006).

A wide variety of data gathering methods are used in program evaluation studies. These include interviews, surveys, case studies and testing. Determining which method or methods to use is guided by the type of program being evaluated and the objectives of the organization requesting the evaluation. If the focus of the evaluation is narrow, one
method is often sufficient to get an accurate evaluation. However, for a broader focus, it can be more efficient to use two or more data gathering techniques (Bennett, 1995). For purposes of this study, both survey and focus group research techniques will be explored.

A survey is “a research technique where information requirements are specified, a population is identified, a sample selected and systematically questioned, and the results analyzed, generalized to the population, and reported to meet the information needs” (Alreck & Settle, 1995, p. 456). Each of the three major types of surveys has a specific goal for types of information to be gathered and how that information will be used. This study implements two separate evaluation surveys, in which information is gathered regarding the impact of the Shorebird Sister Schools Program environmental education program (Salant & Dillman, 1994).

According to Salant and Dillman (2004), great care must be taken when designing a survey in order to collect relevant information and to prevent bias in both population sampling and in item design. Questions should be interesting and relevant to those individuals being surveyed and should be analyzed as to the importance of the information being gathered. There are a number of different forms item questions can take, such as those with a “yes or no” response, open-ended items, close-ended with ordered choices, close-ended with unordered response choices, partially close-ended, and scaled items. Good survey instruments implement a variety of item types listed in a particular sequence to obtain the best data for answering the research question (Salant & Dillman, 1994). Writing item questions that are well-worded and have a clear meaning
helps decrease the possibility of one type of survey error, measurement error (Dillman, 2000). Both quantitative and qualitative analysis techniques are often used to analyze data gathered from surveys, depending on the form of the item questions (Alreck & Settle, 1995).

The survey is a useful tool for researchers because it allows for selection of a sample of the target population rather than necessitating a census of that population. Bias in sampling can be prevented by randomly selecting individuals from the target population to compose the sample population. The number of individuals that make up the sample population varies depending on the number of persons in the general targeted population and can be calculated as to optimum sample size (Salant & Dillman, 1994). Good sampling techniques decrease both the degree of sampling error and coverage error, the two most common types of possible survey errors (Dillman, 2000).

Surveys can be face-to-face, with the surveyor asking the question items of the person being surveyed and recording the responses, or they can be mailed, either by a traditional mail service or by electronic mailing. In either case, they are self-administered by the person being surveyed. Both mailing methods require careful planning of how and when to send the survey to the individuals in the sample population. In each case, a letter should precede the survey explaining the purpose of the survey and how important it is to have responses from each person surveyed. After the survey has been sent to the sample populations, two or three brief reminders should be sent to nonrespondents in order to obtain the highest response rate possible and thus decrease nonresponse error. With the increasing use of technology and the Internet, electronically mailed surveys are gaining in popularity. While these surveys can be sent as simple Emailed instruments, a number of
web survey software companies that design surveys that are more appealing visually, with interactive components that allow for a greater range of responses. Additionally, Internet survey response rates compare favorable to those from traditional written surveys sent via the U.S. Postal Service (Dillman, 2000).

The data discussion group, a type of focus group interview, is a second data gathering technique. Focus groups are effective in both formative and summative evaluations if done properly because "they provide an environment in which disclosures are encouraged and nurtured" (Krueger, 1994, p. 15), sometimes eliciting program information beyond the scope of a prepared survey. The primary difference between a focus group interview and a data discussion group is the difference in their basic goals. A focus group interview seeks to identify consensus in individuals within the group on the item being discussed. In a data discussion group, on the other hand, the goal is to “brainstorm” in order to elicit new ideas on the item under discussion (Heimlich, 2007). In both instances, a formal script is followed, composed of questions sequenced in such a way as to provide the maximum amount of information to lead to a better understanding of the issues being studied. The script includes an introduction by the moderator, one or more round-robin opening questions, introductory questions, transition questions, key questions and finally ending questions. Data gathered are then analyzed qualitatively, to identify patterns and trends in responses (Krueger, 1994).

Using both focus group interview and survey techniques in an evaluation can be very useful in understanding gathered data. If data from both processes, independently analyzed, seem to point to the same conclusion, this indicates strong support of the conclusion. Furthermore, if data are not conclusive or if they are inconsistent, data from
one process can be used to determine reasons for the discrepancies of data from the other process. Thus, using both methods in the same evaluative study increases the validity of the study conclusions (Wolff, Knodel & Sittitrai, 1993).

Program evaluation in which an organization determines the extent to which the program meets the goals and objectives has an added importance when considering budget funding requests. Budget analysis processes such as cost effectiveness analysis and the PPBS, both of which will be discussed later, require an organization to examine in depth the degree to which a program meets its goals and objectives as a first step in the budget process (McKinney, 1995). Thus, evaluating components of the environmental education program is of key importance when justifying budget-funding requests. However, many times, essential but intangible components of programs are overlooked when determining the actual value of an environmental education program.

**Budgeting and Environmental Education**

One of the twenty-two program evaluation approaches Stufflebeam (2001) discusses explores the use of cost-benefit and cost-effectiveness analyses, traditional econometric analysis methods. Early components of cost benefit analysis have been in existence since 1844 when the French engineer, Jules Dupuit, discussed the costs and benefits with regard to public works. The Tennessee Valley Authority looked at costs and benefits in the 1930s and in 1937 the state of Oregon used the concept in connection with highway evaluation (Knezevich, 1973). In cost benefit analysis, the criterion used to evaluate the program on an economic basis is the “net advantage” of the program objectives regarding its value to society. This net advantage is calculated by listing the
advantages, or benefits, and disadvantages of the program (Ramanathan, 1982).
Additionally, any alternative means that could obtain the same objective must be
analyzed and stakeholders must choose between alternatives since the primary goal of
economic analysis is to establish guidelines for the most efficient allocation of funds
(Lamoureux, 1975). Cost effectiveness analysis is a very similar process: with both the
cost benefit and cost effectiveness economic analysis processes, all the costs associated
with program inputs and the program outputs/outcomes are calculated and compared,
resulting in a positive or negative dollar valuation of the program. The primary difference
between the two is that cost benefit analysis is useful for programs in which the inputs
and outputs are easily defined, while cost effectiveness analysis is of more use when the
outputs or outcomes of a program are not easily quantified (Heimlich, 1989). Cost
effectiveness analysis “weights the costs of a program against outcome gains (or losses)
in their natural units of measurement rather than in dollars” (Catterall, 1998 p. 62).
However, in both economic analysis processes there exists one major problem: evaluating
the contribution of a program in terms of dollar amounts when some of the benefit values
of the program do not have market values associated with them (Ramanathan, 1982).
This problem is very prevalent in any education-based programming. Indeed, the World
Bank was slow in lending funds to countries for educational programming because of the
difficulty in measuring educational benefits in economic terms. Reasoning for this was
twofold: first, many benefits are often intrinsic to humankind and not the result of an
educational program and continue to accrue throughout a person’s lifetime and, second,
these “externalities” are very difficult to quantify (Vawda et al., 2003). Even in the health
care field, which has long utilized both cost benefit and cost effectiveness economic
analysis techniques, this can be a daunting challenge. Most educational evaluators appear to have little, if any, training in cost effectiveness analysis techniques and this, when coupled with the lack of ability of the cost effectiveness to quantify many educational and conservation outcomes, has been cited as a possible reason for it not being used in the educational field (Levin, 2001). And while many argue that cost effectiveness analysis can result in a market value for outcomes difficult to quantify traditionally, the process can often be quite laborious and time-consuming, and thus expensive (Johannesson, 1995). Therefore, both the cost benefit and cost effectiveness analysis techniques are inappropriae for use in this study: cost benefit analysis because of the inability to associate a dollar market value with many educational outcomes and cost effectiveness analysis because use of it usually necessitates hiring outside professionals to implement the study. Additionally, neither method attempts to identify overlooked conservation action outcomes.

The difficulty in equating the more intangible outcomes associated with educational and environmental issues with a dollar market amount may lead to incorrect assumptions as to the comparative worth of a specific outcome (Levin, 2001) and thus to an incomplete valuation of the entire program. Therefore, an alternate method, the contingent valuation method, has been used more frequently in dealing with many of these types of issues as it is the method most acceptable in dealing with passive-use goods and services in an economic analysis. An early version of the contingent valuation method was first proposed in 1947 by Cifciacy-Wantrup, but it was not until 1961 that R. K. Davis performed a formal contingent valuation method study as part of his 1963 dissertation. These early studies explored use values but later came to measure non-use
values in the natural resources fields (Jakobsson & Dragun, 1996). This method determines the value of goods and services that are not bought and sold in the marketplace through surveying appropriate stakeholders (Carson, 2000). Because of this ability to determine the dollar market value of the more intangible program outcomes, the contingent valuation method would appear to be useful in the environmental education field.

According to Nunes (2002), there are three primary phases to the contingent valuation method. During the first phase of the process, a description of the program component being considered is developed as well as that of the contingent market. This includes an overview introductory section, a detailed description of the service or good that is being offered the stakeholder for consideration, and a section explaining the logistics of how the good or service will be provided and paid for (Carson, 2000). For adequate contingent valuation analysis, all the consequences of choice must be taken into account so stakeholders will know what was gained and what the tradeoff was (Kopp & Pease, 1997). This allows stakeholders to make informed decisions on the issue at hand. One very important aspect of the contingent valuation study design is determining the amount of information to be made available to affected stakeholders. Studies have shown that stakeholder willingness to pay increases with the amount of information provided them up to a point, but then decreases if too much information is given stakeholders. Determining the appropriate level of information to make available to stakeholders is a very difficult aspect of study design. Additionally, the method of payment can also affect stakeholder willingness to pay (Jakobsson & Dragun, 1996).
The goal of the second phase is to determine the willingness to pay for the intangible goods or services of affected stakeholders (Nunes, 2002). This is done by developing and distributing a survey instrument to determine stakeholder preferences. As with any survey, how questions are worded and otherwise designed has the potential to bias responses (Jakobsson & Dragun, 1996). Most contingent valuation surveys consist of items that allow a choice between two options. One option represents the traditional service or good and the other, the alternative one. Additionally, surveys request stakeholders to indicate how much they are willing to pay to obtain the alternative service or good, if that is their choice (Carson, 2000). It is important to frame the items such that stakeholders believe that alternative services or goods are provided as stated in order to lessen the possibility of stakeholders overstating the amount they are willing to pay. If they do not believe they will ever obtain the promised service or good and thus will never actually be required to pay any amount whatsoever the probability of obtaining an inflated amount is increased (Keeler, 2007). A second situation in which a stakeholder might overstate the actual amount he is willing to pay results from a self-esteem component: he wants to be considered as someone who is very concerned about the issue at hand (Price, 2000). Thus, it is not uncommon for the willingness to pay amount to be inflated by stakeholder survey respondents. It should also be noted, however, that there is often a correlation between the stakeholder’s willingness to pay and his/her financial ability to pay (Jakobsson & Dragun, 1996). However, sometimes it is not the stakeholder’s willingness to pay that is being surveyed but instead is the stakeholder’s willingness to accept monetary compensation in return for giving up a good or service
(Carson, 2000). In either case, stringent care should be taken when developing the survey instrument and analyzing responses.

During the third and final phase of a contingent valuation analysis, socioeconomic and demographic information on stakeholders is collected and, with survey responses, is statistically analyzed to determine stakeholder preferences (Nunes, 2002). Preferences can then be interpreted and used to correlate passive use goods with a market dollar value, giving a more accurate value for a program. A study done on the valuation of intangible cultural goods by Throsby in 2003 indicated that the results of a contingent valuation analysis could be interpreted differently when approached from the cultural viewpoint vs. the economic viewpoint, resulting in a higher calculation of program value than traditional econometric methods.

However, this survey-based method is not without its critics because it assumes, among other things, that the results reflect the equal willingness to pay of all involved stakeholders (Price, 2000). Additionally, the pareto principle, which states that the choice with the highest ranking must be of benefit to everyone since no one would highly rank a choice that is detrimental to himself, must be compared to what actually happens: even though most people will benefit from the highly ranked choice, there are some that are worse off because of it (Jakobsson & Dragun, 1996). Thus, although the contingent valuation method is based on the concept of identifying the best choice of an intangible service or good, determining stakeholder willingness to pay (or willingness to accept) and associating a value with the intangible, is not as straightforward as proponents of the
contingent valuation method would suggest. An alternative economic analysis method might need to be developed that would account for the wider dimensions associated with the intangible components of a program (Throsby, 2003).

Although the contingent valuation method could be considered appropriate for use in this study since it can be used to associate a dollar market value with the more intangible environmental education outcomes, one aspect of the technique prohibits its usage: it relies on the public as the stakeholders who are surveyed concerning their willingness to pay or willingness to accept. In this study, the “stakeholders” are those persons, the USFWS administrators, who make the funding decisions for the environmental education program. The main difference is that although these administrators have a specific amount budgeted for their agencies, they are not using their personal funds when determining what they are willing to pay for certain program outcomes. For example, in the case of a water quality study this method requires the determination of the amount of money the various stakeholders are willing to pay for increasing the quality of the water in their community. This amount is then used to determine the market value of good quality water for that community. In this study, the stakeholders being surveyed, USFWS administrators, are not basing their willingness to pay for a program on their personal income but instead on the agency’s funds (Keeler, 2007).

The Planning, Programming and Budgeting System (PPBS), developed during the mid-twentieth century, seemingly combines concepts from cost-benefits analysis, systems analysis, and operations research. Systems analysis, which can be defined as a formalized technique of logical thinking, was developed in the early 20th century in the Bell
Laboratories while operations research origins can be found in work done in British universities in the 1930s and 1940s. In 1949 the RAND Corporation, working on weapons system analysis for the United States Department of Defense, published a report citing the first known use of the formalized PPBS. In 1953 the program budgeting system was proposed for use by the U.S. Air Force and by 1955 for all U. S. military branches (Knezevich, 1973). In the early 1960s this system was put in place by then Secretary of Defense Robert McNamara as a means of coordinating and complementing, rather than duplicating, the efforts in the development of force systems by the different branches of the Armed Forces (Johnson, 2003). In 1965, President Lyndon B. Johnson proposed compelling the use of the PPBS in all federal government agencies. This effort of compulsive implementation of the PPBS in all areas of the federal government resulted in the need to hire significant numbers of persons having the ability to implement the PPBS and by 1971 resulted in abandoning the forced use of PPBS in federal government agencies (Knezevich, 1973).

Although the PPBS has undergone some minor changes since its adoption by the Department of Defense in the 1950s, the basic components have remain unchanged. “PPBS is a planning, implementing and control system” (McKinney, 1995, p. 330). It allows for multi-year and long-range planning, proper allocation of resources, and a good understanding of the program and program alternatives due to the amount of information and data that are collected (McKinney, 1995).

The planning component of the PPBS begins with first determining the goals and objectives of the organization or agency. These goals and objectives must be explicitly stated in order to plan the “strategic output programs” (McKinney, 1995, p. 330) that will
be implemented to allow the goals and objectives to be met. The planning component can often result in uncertainty as the process occurs and program alternatives are generated. However, the final result of planning is requiring the organization or agency to recognize that their goals and objectives must be central to their program. “Without planning in this sense, programming, or the clustering of activities around objectives, would be difficult if not impossible to execute in a meaningful way” (Knezevich, 1973, p. 30).

The programming component should not be attempted until all aspects of the planning step have been completed, including a general description of program outlines. This step in the process identifies how to implement a program that would allow the goals and objectives to be achieved. It requires that the tasks, materials, activities and any other components of the program be listed and any alternative approaches explored. This step acts as the bridge between planning and budgeting in two ways: it identifies all the program inputs needed to achieve program goals and objectives and determines the projected expenditures to be requested in the upcoming budget (McKinney, 1995).

The final component, budgeting, requires that all monies spent on a program are associated with the goals and objectives of the program. There are four steps in the budgeting aspect. In the first step, funding requirement requests for the program are specified. These requests are then reviewed by persons, usually associated in some way with the organization or agency, who did not participate in developing the programming or the funding request in any way. Reviewers analyze program goals and objectives and program costs. After the review, any modifications to the original budget proposal would be identified and discussed, with the final step of the budgeting process resulting in the allocation of available funds (McKinney, 1995).
Rather than viewing the PPBS as a straight-line process, it should be thought of as a cyclical one, with analysis and assessments that guide decision-making being made throughout the process. During each of the three major phases of the PPBS, analysis is done to determine the validity of the information and data that has been generated. This leads to the examination of the program and development of possible alternatives to the program as well as budgeting modifications. Analysis is also done at the beginning of a new budgeting cycle to determine the success of the previous budgeting cycle (Lamoureux, 1975).

Although the PPBS was first popularized by use in federal government agencies, it has also been used successfully in state and local government agencies. For example, when Donald W. Murphy became director of the California Department of Parks and Recreation in 1992, he implemented the PPBS in that state agency. As a result, despite a $40 million budget cut from the $200 million department budget, there was no decrease in services provided by the Department of Parks and Recreation. (Murphy, 1998) However, we do not see the PPBS embraced by the business or industry communities. Although General Motors and the Ford Motor Company used budgeting systems utilizing quantitative analysis procedures in the early and mid-20th century, neither company’s system was considered to be the PPBS (Knezevich, 1973).

At the height of its popularity, the PPBS was also being used in public elementary and secondary school districts. This was primarily due to federal government grants that were conditionally awarded to schools that agreed to implement the PPBS, at least for those activities that were federally funded. The most well-known study on the use of the PPBS in public schools was done in pilot schools throughout the nation in the 1960s and
showed enough promise that by the early 1970s many other school districts in the U.S. either implemented the PPBS outright or incorporated components of it in their budgeting processes (Knezevich, 1973, p. PG). It was also used in post-secondary institutions, but the difficulty in developing a program structure in higher education made implementation of the PPBS less successful at this educational level. However, PPBS was never implemented in education to the extent it was in federal, state and local governments.

Although there were many proponents of the PPBS, there is some criticism of the system as well. First, implementing PPBS can be quite costly due to the large number of personnel hours needed to gather the information and data needed to adequately complete the planning and programming components of the process. Additionally, the process requires that explicit goals and objectives be set in order to determine the most appropriate program. This requirement to clarify all aspects of the program makes some budgeting participants uneasy since they may not have as much flexibility in determining their budgeting needs (McKinney, 1995).

The PPBS would appear to be a contender for use in justifying budget requests for an agency or organization environmental education program. Setting goals and objectives is a major component of both the PPBS and educational programming. Also, once goals and objectives are set, in both cases the most appropriate program is developed. Finally, resources necessary to implement the program are identified and requested. However, implementing the PPBS in any type of educational setting can be difficult. Educational objectives and outcomes are often more general and vague and much more difficult to measure than those found in other disciplines (Knezevich, 1973). Also, because there is still a cost-effectiveness component underlying the PPBS (Johnson, 2003), there is still
no way to attach a market value to many of the educational program outcomes. Additionally, this method does not allow for the identification of overlooked program outcomes. Finally, the costliness of implementing the PPBS makes it prohibitive for many smaller agencies and organizations. Thus, while the PPBS has some merit for use in this study, it cannot be utilized intact in the traditional manner.

One of the most recently developed budgeting methods being utilized by many state and local governments is the outcome-based budgeting (OBB) system. This system borrows components from other earlier developed budgeting methods, such as the strategic planning and programming structure done in the PPBS (Ngoyi, Miller, Holzer &., 2004). Snohomish County, in Washington state, was among the first to experience positive results in using this system, both in a reduction of funding needed for the desired programming and in an increase in public trust. Officials in Spokane were able to close the 6% gap in the 2004 budget while at the same time convincing residents to pass a $117 million street repair levee (Swartz, 2005). Although this system is sometimes also referred to as performance-based budgeting (PBB), there is a difference between it and OBB as well as from PPBS. The major differences in these systems, although each looks at outcomes, is that the performance-based budgeting system and the PPBS both are agency-based and cost-based budget performance measures. While both processes are an improvement over the traditional line-item budgeting methods, the primary drawback is that with the PPBS and PBB outcomes are still determined by agency personnel (Howell, 2002). Additionally, the outcome focus of the PPBS and PBB is opposite that of the OBB. “Performance budgeting takes the existing set of programs for granted, measures their performance, and uses that information to make incremental changes in shaping the
budget” (Osborne & Hutchinson, 2004, p. 85). Rather than being focused on a budgetary dollar amount first, the OBB instead focuses on the desired outcomes and then determines the proper funding amount needed to realize the outcomes.

The OBB consists of three fundamental steps, with each step having a number of tasks associated with it. The first step consists of determining and prioritizing program outcomes. Like the CV method, the OBB system does this by polling affected stakeholders as to their preferences. A number of methods are used to do this; surveys, focus groups, town hall sessions, various forms of media and websites can be used to gather information from stakeholders. The outcome list should be kept short and focused, and indicators need to be determined that will later be used to measure the success to which each outcome has been realized. These indicators need to be clearly defined, able to be appropriately measured in some way in order to confidently report progress, and easily understood by affected stakeholders (Osborne & Hutchinson, 2004). For example, in the hypothetical lake water quality situation that was used as an example earlier, the concept “water quality” would need to be defined quantitatively, with maximum levels of pollutants and other non-water components being clearly specified. It would not be appropriate to just state that clearer water is the indicator for improved water quality. It should be noted here, however, that intangible outcomes are usually not included in the prioritized list due to the difficulty in finding appropriate indicators and the increased expense of attempting to do so (Howell, 2002).

Once information is gathered and outcomes are identified and prioritized, the second step would be to determine a dollar market value with each outcome. The amount associated with each outcome is not based on dollar amounts from previous budgets, but
instead each outcome would be allocated a percentage of the total budget according to its position on the prioritized list (Osborne & Hutchinson, 2004).

The third and final step of the OBB process is to implement the funding given to each prioritized outcome. There are a number of points that should be followed in doing this. First, a different purchaser should be designated to control the funding of each outcome. This should be someone not closely associated with the program, if possible. Second, a cause-and-effect map should be developed that determines the necessary inputs for each outcome and how, if at all, some inputs are necessary for more than one outcome (Osborne & Hutchinson, 2004). This cause-and-effect map is similar in some ways to the program model that is done as part of the program efficacy evaluation, but does not take into account aspects of the program other than those concerning outcomes to be used in determining the program budget. The next task in the overall budget implementation process is to solicit competitive bids from potential suppliers, and the final task would be to review all offers submitted and determine which would be the best choice for satisfying the outcome needs (Osborne & Hutchinson, 2004).

After the budget has been determined and outcomes have been funded and implemented, the entire process should be analyzed to determine accountability. Each outcome should be analyzed as to the degree to which the indicators developed in the first step of the OBB process have been attained. If indicators point to problems in reaching the outcome goals, then analysis should be further done to determine problems accounting for the poor performance of that particular outcome, and steps should be taken to rectify the shortcomings. Furthermore, if it is determined that even with modifications,
one particular outcome cannot be successfully attained, then the decision as to whether or not to discontinue funding that outcome must be made (Osborne & Hutchinson, 2004).

OBB, like PPBS, has been implemented primarily in government agencies. However, OBB has been considered an appropriate method for higher education where there has been an increased demand for “fiscal accountability, measurable outcomes, strengthened assessment processes and meaningful performance indicators all during a decline in the traditional forms of state funding support” (Anderes, 1995, p. 1). The study by Anderes in 1995 determined that the OBB could more adequately define the value of higher education by looking not only at the inputs, such as numbers of students per instructor, but also outcomes that define the extent to which students reach their educational objectives, resulting in a clearer measurement of the products of higher education. Funding allocation would then be determined not by what is perceived as need, such as personnel costs, but instead by outcomes to be funded. This idea can be extended to environmental education programs. Not all outcomes, especially those that could be considered “extracurricular” outcomes, such as volunteers cleaning up refuge sites, are given consideration when funding for a program such as the Shorebird Sister Schools Program is being budgeted. Thus, the OBB would be appropriate for this study but for two problems. First, identifying and prioritizing desired outcomes is dependent on surveying the public, just as determining the willingness to pay for an intangible good or service is in the CV method. As in the case of the CV method, this is inappropriate for this study as those surveyed regarding budgeting issues will be agency administrators.
Furthermore, neither method attempts to identify overlooked program outcomes. Second, unlike the CV method, the OBB does not attempt to associate a dollar market value with intangible outcomes.

An alternate method of determining the value of a program is found in the return on investment (ROI) system, which has been accepted and widely used by human resources development as a means of measuring the value of training programs (Smith, 2004). The ROI system was first introduced in 1957 by Donald Kirkpatrick as a series of articles, *Evaluating Training Programs*, written for the American Society of Training Directors. Kirpatrick’s ROI system lists four levels of evaluation done to determine the overall effectiveness of the training program. The first level, reactions, seeks to determine how well participants liked a training program. The goal of Kirkpatrick’s second level, learning, is to determine the new knowledge and skills learners gained from participating in the training program. The third level of this framework, behavior, identified changes training participants would make in their behaviors as they pertain to their job duties. Finally, the last level, results, covered any changes perceived in the attitudes of participants and the resultant change in the working environment, costs associated with production, and changes in employee productivity as well as any other results deemed pertinent by the evaluator (Nickols, 2000).

Kirkpatrick’s framework of ROI continued to be utilized throughout the decades of research and manipulation of different components pertaining to training programming. Organization Development, Behaviorism, Programmed Instruction, Systems Concepts, General Systems Theory, and many aspects of technology were all explored with regard to the effect of training program on employees. Each contributed to
the literature, but none totally replaced Kirkpatrick’s ROI system in evaluating training programs (Nickols, 2000).

The ROI system calculates costs of the program, including indirect costs as well as direct costs, and determines the outcomes of the program. A cost/benefit ratio is calculated by dividing the total costs of the program by the estimated benefits of the outcomes of the program. To be effective, all costs must be identified and program outcomes must be demonstrated in concrete terms so as to be quantifiable. Additionally, a baseline measure of the desired outcomes must be taken prior to implementation of the program in order to identify improvements or changes in the outcomes (Smith, 2004).

The ROI is a valuable tool for use in human resources development. However, for purposes of this study, it is less than ideal for three reasons. First, the ROI requires a basal measurement be made so that progress for specific program activities can be measured. For many programs in the environmental education and conservation field, especially those in which free-choice learners participate, this is not feasible. For example, visitors to a municipal park may choose to participate in a program on identifying spring wildflowers. However, most of these informal programs are not set up to determine the skill of the learner in identifying spring wildflowers before the program and to follow up with participants later to determine if they can better identify spring wildflowers after having participated in the program.

A second drawback of the ROI for this study is that it requires all direct and indirect costs and program outcomes be identified and quantified in monetary form. As Smith (2004) notes, while this can be a relatively easy task when dealing with the costs, it is much more difficult to associate a monetary amount with some program benefits.
Furthermore, a third shortcoming of the ROI is that there is no mechanism in place that helps the evaluator identify any of the overlooked conservation actions that are of such great importance to environmental education and conservation organizations and agencies.

However, the basic premise of the ROI, that all costs and outcomes should be included in the overall valuation of the program agrees with the literature surrounding program evaluation. The ROI system, and program theory and evaluation, emphasize the role of participant perceptions in the final evaluation of the program. Both also require the identification of all program costs and outcomes. The contention is the challenge lies in determining all program outcomes as the mechanism for identifying overlooked conservation outcomes is not addressed in any of the processes explored in this study.

Analysis of the budgeting systems explored in this study has resulted in the determination that no one system is appropriate for use in all agencies and organizations as intended for the purposes of this study. Although each process had some components that were appropriate for justifying budget requests, each also have limitations that did not adequately value all program outcomes, would entail the need to hire a professional to implement the budgeting process, or were procedurally inappropriate due to the stakeholder group to be included in the outcome valuation process. The pros and cons pertaining to the appropriateness of use of each budgeting method for this study are listed in Figure 2.2 on the following page. Although most agencies and organizations attempt to utilize these budgeting systems in some way, there is a possibility of determining an inaccurate and incomplete valuation of the program if not all the outcomes, both those identified and those overlooked, of the program are considered.
<table>
<thead>
<tr>
<th>Budget Method</th>
<th>Appropriate</th>
<th>Not Appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-benefit analysis</td>
<td>Fairly easy to perform; been used for decades with good results.</td>
<td>Does not identify overlooked behavioral program outcomes.</td>
</tr>
<tr>
<td>Cost-effectiveness analysis</td>
<td>Better than C-B analysis in determining the value of the more intangible program outcomes.</td>
<td>Difficult to perform analysis process; requires many personnel hours and thus is expensive. Does not identify overlooked conservation action outcomes.</td>
</tr>
<tr>
<td>Contingent valuation method</td>
<td>Being used for conservation issues more frequently and has been used for educational programs.</td>
<td>USFWS administrators not an appropriate stakeholder group for use for this method.</td>
</tr>
<tr>
<td>Planning, Programming and Budgeting System</td>
<td>Examines goals and objectives when developing the program budget.</td>
<td>Rigid and costly to perform. Does not identify overlooked conservation action outcomes.</td>
</tr>
<tr>
<td>Outcome-Based Budgeting</td>
<td>Basing program budget on program outcomes.</td>
<td>Does not identify overlooked conservation action outcomes.</td>
</tr>
<tr>
<td>Return on investment</td>
<td>Cost/benefit ratio is calculated by dividing the total costs of the program by the estimated benefits of the outcomes of the program.</td>
<td>Requires basal measurement, requires all direct and indirect costs and program outcomes be identified and quantified in monetary form, does not identify overlooked conservation action outcomes.</td>
</tr>
</tbody>
</table>

Figure 2.2: Comparison of budgeting methods regarding appropriateness to this study.
Environmental Education: Expected Outcomes and Impacts

Components of today’s environmental education can be traced back to the nature study movement of the late 19th century, to outdoor education that began in the 1920s, and to the conservation education movement of the 1930s (Disinger, 1998). Environmental education was first internationally recognized in 1972 in Stockholm, Sweden at the United Nations Conference on the Human Environment as a means of addressing global environmental conditions and was again discussed in 1975 at the International Environmental Workshop, held in Belgrade, Yugoslavia. This discussion resulted in the Belgrade Charter, which attempted to define environmental education in terms of being a lifelong learning process with the focus on understanding environmental issues and actively and ethically improving human life while protecting the environment. According to the Belgrade Charter page of The Global Development Research Center website, “The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones” (The Global Development Research Center, 2007).

In 1977, the Tbilisi Declaration was the product of the conference co-sponsored by the United Nations Education, Scientific, and Cultural Organization (UNESCO) and the United Nations Environment Program (UNEP). The Tbilisi Declaration formalized and expanded on the ideas and goals that were set in the Belgrade Charter, linking the interdependence of all aspects of human society, human behaviors, and the environment. (New Zealand Association for Environmental Education, 2007) The goals developed for
environmental education in Tbilisi set the foundation for the guidelines defining environmental education today: “To foster clear awareness of and concern about economic, social, political, and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; to create new patterns of behavior of individuals, groups, and society as a whole towards the environment” ("Environmental Education Materials: Guidelines for Excellence Introduction," 2007, p. 1).

O’Brien and Guerrier (1995) further expand this by implying that the environmental values supported by environmental education include an active participation, in some manner, in environmental issues. Stated more specifically, “Environmental education (EE) should be a continuous learning process where individuals become aware of their environment and acquire knowledge, values, skills, and experiences to solve environmental problems for present and future generations” (Vaughan et al. 2003:12). This illustrates the expectation of behavioral as well as cognitive outcomes as the result of participation in environmental education.

In addition to the cognitive and behavioral components and outcomes of an environmental education program, there are also affective and conative ones. These have been recognized since the ancient Greeks listed the cognitive, conative, and affective domains composing the human psyche. Cognition is associated with “learning, thinking, remembering,” (Hayes, 2006) and “coming to understand” (Jasinski, 2004) while the affective domain is associated with emotions, feelings and impressions, values, and ideas. The conative domain, which was given equal consideration to the cognitive and affective
domains until the late 19th century when behaviorist theory became more popular to explain human actions, is again gaining prominence. This domain is associated with “planning, will-power, and intentionality” (Hayes, 2006). Additionally, conation includes motivation and vigilance to sustain intellectual energy (Reitan & Wolfson, 2000). The affective domain generally refers to those evaluative feelings as being attitudes, which “are linked to behavior via cognitive relations” (Insko & Schopler, 1967, p. 365). The traditional view of this linkage is that knowledge leads to awareness of the issue, which in turn leads to action (Hungerford & Volk, 1998). However, this linkage is not a one-way process as it has been seen that the affective attitude change can and often does result from behavior change. Affective change occurs more readily when the individual does not hold strong views on the subject at hand and changes more dramatically when participating in a behavior. In fact, the findings of one study indicate there is a stronger causal link from behavioral change to affective change than vice versa (Insko & Schopler, 1967). Acknowledging the interactions between these four domains – cognitive, affective, conative, and behavioral – can greatly improve our ability to design, implement and evaluate a more effective program (Hayes, 2006).

A central goal of environmental education, as stated in the Belgrade Charter, the Tbilisi Declaration and by the North American Association for Environmental Education is to provide participants with the knowledge and skills that would encourage them to engage in environmentally positive behaviors. Additionally, one study has shown that participants in environmental educational programs need to be given the ability to
develop a sense of ownership and empowerment regarding the environmental issue in order to act in a responsible manner: knowledge alone is not always a sufficient motivator (Hungerford & Volk, 1998).

The concern here is how to best cultivate in environmental education participants that sense of having the ability to employ positive conservation and environmental behaviors. One method that has been used to help in this endeavor is employing expressive writing as part of the environmental education curriculum. In one study, a group of college pre-service teaching undergraduates selected one conservation issue that was relevant to them personally, such as driving a car or using disposable coffee cups, and researched the environmental impacts of their chosen issue they were then asked to write creatively on the issue. Findings of the study indicated that the expressive writing assignment had increased their sense of ownership and empowerment on their chosen issues (Meyer & Munson, 2005). On the Hawaiian island of Molokai, elementary teachers use an environmental education curriculum throughout the school year that begins with student input in selecting a local conservation issue to study, continues with students conducting research activities throughout the school year, and culminates in a student-planned and student led community symposium. Findings showed participating students reported having taken environmental action at much higher rates than non-participating students of the same grade level. Volk & Cheak (2003) believe this indicates a motivational difference.

Another method employed the use of what is often termed “charismatic megafauna”. Animals such as giant pandas that are highly valued by many persons and thus are often the focus of conservation programs are selected for study. Barney et al.
(2005) reported that participants in a program focused on the bottlenose dolphin gained a greater knowledge of the natural history of the species and engaged in less potentially harmful behaviors towards the dolphins than non-participants in the program. However, a study exploring the link between zoo visitor knowledge of and attitudes towards gorillas and chimpanzees prior to and after the zoo experience reported a higher level of cognitive knowledge of the great apes, but little change in attitude towards them. This indicates the need for some type of experiential or active participation component necessary to affect attitude change (Lukas & Ross, 2005). Additionally, Kruse & Card (2004) reported a higher level of conservation awareness with increased participation in conservation education and environmental education activities.

The research reported herein seeks to focus on the development of a technique that attempts to bridges the gap between program theory and economic methods by using tools from each and incorporating them into one process. This technique would incorporate tools from primarily program theory and evaluation methods, but will also base calculating the adjusted program valuation on some elements the various economic methods discussed in this chapter. The purpose of this study is to better understand the elements contributing to program efficacy and to support of the program by administrators or managers, with regard to the program decisions that are made.
CHAPTER 3

METHODS

Overview of the Study Methods

This study encompasses the three research questions discussed in Chapter One. The study is conducted in six phases and utilizes program evaluation, survey and focus group data gathering methods. The study phases are as follows:

1. Program evaluation utilizing the FLOW program logic model.
2. The Shorebird Sister Schools Program Educator Survey, found in Appendix A.
3. The Data Discussion Group Session, found in Appendix B.
4. The USFWS Administrator Survey, found in Appendix D
5. Determination of the dollar market value of the overlooked outcome.
6. Comparison of modified program valuation and traditional program valuation.

The methods section will be broken into subsections that discuss the study design, the participant groups, the survey instruments and data collection procedures, the data analysis procedures and the study schedule.
**Study Design**

The study utilized a program logic model, two surveys and a data discussion group, a specialized type of focus group. The first instrument used in this study was the FLOW program logic model to determine the degree to which the SSSP functioned as was designed. The data obtained from the program logic model were also used to develop the first survey of the study. Data from the first survey were used to develop the Data Discussion Group session script and data from the Data Discussion Group session were used to develop the second survey. Data from the Data Discussion Group session were also used to identify the overlooked behavioral outcome associated with the SSSP. The value of the overlooked behavioral outcome was determined by obtaining the amount of funding allocated by the USFWS for like outcomes from the 2008 USFWS budget. This amount was then added to the traditional SSSP valuation to determine the adjusted valuation of the Shorebird Sister Schools Program. Finally, data from all four instruments were used to determine the overall efficacy of the SSSP. A conceptual diagram of the methodological flow is shown in Fig. 3.1 on the following page.

The program logic model used for analyzing the SSSP is the FLOW Model, based on the Bennett hierarchy program evaluation process and developed by Joe E. Heimlich and Emmalou Norland (Heimlich, 2006) and is shown in Fig. 3.2 on page 57. To utilize this model, one actually begins by determining the desired long-term impacts, or goals and objectives, of the program (far right box) and the necessary inputs of the program (far left box). Once these are listed, arrows guide the evaluator to the box marked “Audiences”. This category explores who the program is designed to reach or be utilized by; audiences can be thought of as the desired program participants. Arrows then
FLOW Program Logic Model

Program efficacy

Data Discussion Group

Administrator/Manager Survey

Overlooked Outcomes Identified

Adjusted Program Valuation

Program User Survey

used to determine

in-depth evaluation identifies

used to calculate

used to develop

used to determine

used to develop

used to develop
lead to “Activities”, in which program activities are listed, then on to the “Outputs”, in which those materials developed for the implementation of the program activities, such as a curriculum guide, are listed. Next, reactions desired from the potential program participants (audience) are listed in the “Reactions” box. “KASA” lists the knowledge, attitudes, skills, and aspirations desired or necessary in order to allow program participants to engage in the behaviors listed under “Individual Behaviors”. These behaviors best reflect the desired long-term impacts and goals first identified and listed in the program logic model. Note that the arrows show linkage between components of the program that either have an impact on or are impacted by the other linked components.

![FLOW Program logic model](image)

Fig. 3.2: FLOW Program logic model (Heimlich, 2006)

Thus, the relationship between many program components and desired outcomes is a give and take relationship. The completed form serves as an overview of the degree to which the program is meeting its mission and was used as a part of the entire evaluation process. Additionally, data pertaining to desired outcomes of the SSSP were used in the development of some items found in the two surveys and the focus group script.

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Participant Groups

The first sample population is composed of those individuals who listed and Email address when requesting the SSSP curriculum guide and activity CD-rom from the SSSP. This population, termed the Educator Sample, contained formal and nonformal educators as well as persons not associated with a specific educational program and/or organization but who instead are interested in the information. A record of all educators requesting the SSSP CD-rom Curriculum Guide has been maintained by the SSSP, allowing for a complete sample frame for this population. Contact information for individuals in this population was obtained from the office of the SSSP National Coordinator. The sample size was dependent on the number of persons recorded in the SSSP curriculum request file who had listed a valid Email address as part of the contact information and thereby eliminated those educators who did not list an Email address when requesting the curriculum. This obstacle regarding access to educator contact information was not clarified until after the study design had been developed and the Educator Survey participant contact information was required.

The second sample population, the Data Discussion Group session participants, was composed of individuals selected based on their responses from the SSSP Educator Survey (n = . Individuals selected for this sample population indicated an interest in participating in a data discussion group that explored the various components of the SSSP in more depth than could be done in the original SSSP Educator Survey. In addition to the evaluation component of this data-gathering phase, participants in the data discussion group were asked to recommend changes to improve the SSSP as well as to share any behavioral outcomes that resulted from learner participation in SSSP activities or
programs. An attempt was made to select individuals from both the formal education and nonformal education sectors as well as from different areas of the United States. A range as to what extent the materials are used by the educators in their environmental education programming was also considered when identifying participants for this study phase.

The third population, USFWS Administrators, was composed of the US Fish and Wildlife Service managers who have some type of input or control of the SSSP budget. This very small population is key to the SSSP program as individuals from this population. A few managers of environmental education programs from other USFWS agencies that also help fund the SSSP to some extent were included. Because the number of persons in this group is extremely small, a census of USFWS administrators was used for receipt of the final survey instrument.

Data Gathering Instruments

In addition to the FLOW program logic model, two survey instruments and a data discussion group instrument were developed for this study. The two survey instruments were composed of Likert-type scaled items and other close-ended items with ordered response choices, close-ended with unordered response choices, items requiring a “yes” or “no” response, and open-ended questions with a short or extended response box following the main question. The Likert-type scale items have a continuum of choices between the numbers 1 and 7, with only the two extreme choices, “Strongly agree” and “Strongly disagree” for the SSSP Educator Survey and “Not important” and “Very
important” for the USFWS Administrator Survey, being listed above the numbers 1 and 7, respectively. The data discussion group instrument consists of open-ended answer items, with responses to some items being rated.

The first survey instrument developed, the Shorebird Sister Schools Program Educator Survey, was sent out to the Educator Sample population. One objective of this survey was to determine to what degree individuals who had requested the SSSP Explore the World with Shorebirds! CD-rom implemented these materials into their curriculum. A second objective of this survey was to examine the perceptions and opinions of these educators regarding the various components of the entire SSSP. Data from this instrument were used to explain findings for research questions one and two, dealing with the efficacy of the SSSP and the perceptions of some of the stakeholders with regard to their attitudes on issues relating to environmental education and the SSSP. This survey instrument contained questions covering both perceptions of environmental education in general as well as those on specific aspects of the SSSP curriculum guide and other program components. Additionally, the data from this survey instrument were utilized in the development of the remaining two survey instruments. A panel of experts examined the survey and determined both the face validity and construct validity for this instrument. Chronbach’s alpha coefficient calculations are used to determine the reliability of those items for each of the general categories measured in the survey.

When developing the SSSP Educator Survey, items were designed to be listed in one of nine general categories of interest. Items 5, 7, 8, and 9 pertain to preferences of educators regarding the CD-rom format style of the curriculum as compared to the traditional hardcopy workbook format. Item 4 related to the extent to which educators
implement the SSSP curriculum into their lessons. Items 11 and 12 explore two areas of current concerns for primarily formal educators. The category composed of the most numerous survey items rated the curriculum with regard to content and usage. This area of interest contained items 13, 14, 16, 17, 19, 20, 23, 26, and 27 and addressed the content themes of the curriculum and its appropriateness for different groups of learners. Items 10, 18, 21, and 29, were designed to explore the degree to which the SSSP curriculum helped learners develop critical thinking skills. The impact of the curriculum on affective, conative, and behavioral outcomes was explored in items 15, 22, 24, 25, and 28. The first category examining the SSSP website contains items 30, 31, 32, and 33 and looks at website content. The second website item category pertains to the usage of the SSSP website by learners and contains items 35, 37, and 39. The final grouping of SSSP Educator Survey items, 34 and 38, pertain to educator usage of the SSSP website. A table

<table>
<thead>
<tr>
<th>SSSP Educator Survey</th>
<th>General Categories for Items</th>
<th>Items in the General Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format of the curriculum</td>
<td>5, 7, 8, and 9</td>
<td></td>
</tr>
<tr>
<td>How SSSP materials are implemented into lessons</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Current areas of concern in formal education</td>
<td>11 and 12</td>
<td></td>
</tr>
<tr>
<td>Curriculum content and usage</td>
<td>13, 14, 16, 17, 19, 20, 23, 26 and 27</td>
<td></td>
</tr>
<tr>
<td>Critical thinking skills development</td>
<td>10, 18, 21 and 29</td>
<td></td>
</tr>
<tr>
<td>Effects on affective, conative, and behavioral outcomes</td>
<td>15, 22, 24, 25 and 28</td>
<td></td>
</tr>
<tr>
<td>Website content</td>
<td>30, 31, 32 and 33</td>
<td></td>
</tr>
<tr>
<td>Learner usage of SSSP website</td>
<td>35, 37 and 39</td>
<td></td>
</tr>
<tr>
<td>Educator usage of SSSP website</td>
<td>34 and 38</td>
<td></td>
</tr>
<tr>
<td>Reasons and when requested curriculum</td>
<td>1, 2 and 3</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.3: SSSP Educator Survey items and general categories of interest
showing the general categories of interest and the survey items listed under each category can be found in Figure 3.3 on page 64. The Shorebird Sister Schools Program Educator Survey instrument is found in Appendix A.

The data discussion group instrument was used with individuals selected from the Educator Sample population on the basis of their responses on the Shorebird Sister Schools Program Educator Survey. The objective of this data discussion group survey is to determine the extent the curriculum materials were implemented by participants and to identify the main outcomes of the implementation of the SSSP curriculum. Items contained in this instrument were designed to gather more in-depth data regarding why and how the SSSP materials were used and if/how participants may have developed extension activities to SSSP curriculum that pertained to shorebirds or their habitats in some manner and could be perceived as benefiting an aspect of the USFWS. Additionally, participants were asked to identify strengths and weaknesses of the SSSP and to recommend possible changes to improve the SSSP. In order to develop this survey instrument, data from the Shorebird Sister Schools Program Educator Survey instrument were first obtained and analyzed, meaning this survey instrument was not developed until phase two of the study was completed. The data discussion group instrument is comprised of 8 items and entailed the use of a flip chart on which responses can be written, either by the facilitator or the participants, and, when appropriate, ranked using colored self-stick dots as to participant preferences. The Data Discussion Group script is found in Appendix B.

The USFWS Administrator Survey was developed to determine the attitudes and perceptions of the USFWS Administrator sample population regarding environmental
education and the SSSP. One objective of this survey instrument was to determine the value USFWS administrators put on environmental educational programming in relation to other visitor services activities. A second objective was to obtain USFWS administrators’ perceptions as to the value of the SSSP and its outcomes. Because data from both the SSSP Educator Survey and the Data Discussion Group Session were used to develop some of the items for the Administrator survey, this survey instrument was not developed until responses to the prior two instruments were obtained and analyzed. The data obtained in the USFWS Administrator Survey were then used to help develop the overall valuation of the SSSP and in the evaluation as to the overall efficacy of the SSSP. As with the SSSP Educator Survey, general categories of interest were identified and items to examine each category were developed. There were five categories identified in this survey instrument. The first category, the overall perception of the value of environmental education within the USFWS, listed the first three items of the survey. Items 4-13 were listed in the second category, which pertained to the value placed upon major outcomes of environmental education. The third category covered USFWS administrator perceptions of the value of various learning domain outcomes of the SSSP and contained items 14-18. The fourth category contained items 19-25 and dealt with possible additions to the SSSP. The fifth and final category pertained to the funding USFWS administrators considered appropriate for the SSSP and contained the last three items. Figure 3.4, found on page 67, lists the general categories and items contained in each for the USFWS Administrator Survey. This survey is found in Appendix D.
### USFWS Administrator Survey

<table>
<thead>
<tr>
<th>General Categories for Items</th>
<th>Items in the General Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of EE for the USFWS</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Value placed upon major outcomes of environmental education</td>
<td>4, 5, 6, 7, 8, 9, 10, 11, 12, and 13</td>
</tr>
<tr>
<td>Value of various learning domain outcomes of the SSSP</td>
<td>14, 15, 16, 17 and 18</td>
</tr>
<tr>
<td>Possible additions to the SSSP</td>
<td>19, 20, 21, 22, 23, 24 and 25</td>
</tr>
<tr>
<td>Funding USFWS administrators considered appropriate for the SSSP</td>
<td>26, 27 and 28</td>
</tr>
</tbody>
</table>

Figure 3.4: USFWS Administrator Survey items and general categories of interest

The two surveys were sent via the Internet using the Zoomerang electronic survey software program. An introductory letter was e-mailed to the appropriate sample populations prior to the survey being distributed. Rationale for using the Internet for distribution of the survey is that very few, if any, educators do not have access to the Internet. Also, the time required for sending the survey to participants and receiving responses is much diminished. Lastly, the response rate for Internet surveys has been found to be comparable to that of traditionally sent surveys {Dillman, 2000}. The data discussion group was done on a face-to-face basis with a small group of selected participants. A central meeting site was selected and participants had their travel expenses, including airfare, hotel and meals, provided for by the study.

The fifth phase of this study associated a dollar market value to the newly identified overlooked conservation action outcome of the SSSP. Data collected during the Data Discussion Group were instrumental in identifying the overlooked conservation action outcome. This allows for a dollar market value to be placed on this overlooked conservation action outcome of the SSSP curriculum. This amount is then included in
the overall program outcomes and compared to program costs, resulting in a more complete valuation for the SSSP. This adjusted valuation would then be used to better justify appropriate program funding.

**Data Analysis**

The goal of the two survey instruments and the data discussion group session was to gather data that indicate trends and patterns in participant preferences regarding components of the SSSP curriculum and website. Validity for the SSSP Educator Survey was determined by a panel of experts prior to its distribution. Reliability for this instrument was determined for the Likert-like scale items by determining the Chronbach’s alpha coefficient for items grouped under each general category for the SSSP Educator Survey, seen in Figure 3.5 below. Due to the extremely small population receiving the USFWS Administrator Survey, no reliability measures were valid.

<table>
<thead>
<tr>
<th>SSSP Educator Survey</th>
<th>Items in the General Category</th>
<th>Chronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format of the curriculum</td>
<td>5, 7, 8, and 9</td>
<td>0.711</td>
</tr>
<tr>
<td>Curriculum content and usage</td>
<td>13, 14, 16, 17, 19, 20, 23, 26 and 27</td>
<td>0.815</td>
</tr>
<tr>
<td>Critical thinking skills development</td>
<td>10, 18, 21 and 29</td>
<td>0.773</td>
</tr>
<tr>
<td>Effects on affective, conative, and behavioral outcomes</td>
<td>15, 22, 24, 25 and 28</td>
<td>0.887</td>
</tr>
<tr>
<td>Website content</td>
<td>30, 31, 32 and 33</td>
<td>0.777</td>
</tr>
</tbody>
</table>

Figure 3.5: Chronbach’s alpha coefficient of reliability for SSSP Educator Survey
Central tendency quantitative descriptive analysis techniques were used for the Likert-type scale items and the close-ended unordered response choices items from the two survey instruments. Descriptive statistics used for this study are the median, which identifies the choice that represents the midpoint of the distribution for the item, and the standard deviation, a measure of the average distance of the responses given from the mean, or arithmetic average of the responses. The lower the standard deviation, the closer the responses are to one another, indicating close agreement between respondents on the item. Conversely, a greater standard deviation score means the responses are more spread out, indicating survey participants are less in agreement on the item. Thus, these central tendency statistics allow for analysis of the distribution of the range of the responses.

Frequency and percentage tables were used to analyze other close-ended with ordered responses items and yes/no items for the surveys so as to identify the most-preferred responses. Determining the most-preferred responses to these items aids in the identification of trends and patterns in participant responses.

For the Data Discussion Group, a total of eight items were discussed, with Item 6 having three questions nested within it. Responses to each item were analyzed as to common themes, which are termed general categories in this study, and frequencies were determined for each category. Additionally, participants ranked their top five response choices for two items and these individual responses are listed in tables. Furthermore, some raw data generated in the Data Discussion Group session were reported without being coded. These analysis techniques enable us to identify the common themes and
patterns occurring in participant responses and to thus determine overall participant preferences. All raw data gathered for the Data Discussion Group session are listed in Appendix C.

To determine the overall efficacy of the SSSP, data were listed under each category of the FLOW program logic model. These data were then compared to responses from participants of both surveys and the Data Discussion Group session. Additionally, data from the USFWS Administrator survey were considered during the final determination as to whether or not all goals and objectives identified as components of the program model were achieved, reflecting the efficacy of the program.

**Study Schedule**

The study schedule is as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>August – September 30, 2006</td>
<td>Development of Educator Survey</td>
</tr>
<tr>
<td>October 20, 2006</td>
<td>Proposal submission to IRB</td>
</tr>
<tr>
<td>November 6, 2006</td>
<td>First survey sent via email</td>
</tr>
<tr>
<td>November 15, 2006</td>
<td>Thank You letter/Reminder #1 sent to non-respondents</td>
</tr>
<tr>
<td>November 22, 2006</td>
<td>Reminder #2 sent to non-respondents</td>
</tr>
<tr>
<td>December 2006</td>
<td>Participants for data discussion group identified and invitations sent to selected sample. Data discussion group survey script developed.</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Mid-January – February 2007</td>
<td>Data discussion group meets. USFWS manager survey developed and pilot tested.</td>
</tr>
<tr>
<td>May 2007 (early)</td>
<td>USFWS manager survey sent. Follow up reminders sent to non-respondents.</td>
</tr>
<tr>
<td>May 2007 (mid)</td>
<td>Gather data on USFWS management costs associated with shorebirds and their habitat.</td>
</tr>
<tr>
<td>May 2007 (late)</td>
<td>Final data analysis of data and completion of writing of the study.</td>
</tr>
<tr>
<td>June 2007</td>
<td>Final report submitted to SSSP personnel.</td>
</tr>
</tbody>
</table>
CHAPTER 4

REPORT TO THE U.S. FISH AND WILDLIFE SERVICE

REGARDING THE SHOREBIRD SISTER SCHOOLS PROGRAM

This chapter is the formal report presented to the USFWS personnel associated with Shorebird Sister Schools Program on June 20, 2007. This report answers two research questions specific to the SSSP:

1. What is the efficacy of the Shorebird Sister Schools Program?

2. What are the perceptions of the program as held by different stakeholders?

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Executive Summary

The Shorebirds Sister Schools Program (SSSP) is the result of an environmental education program developed cooperatively by a middle school science teacher and the local USFWS biologist for use in the 1994 Kachemak Bay Shorebird Festival held in Homer, Alaska. The original primary goal of the shorebirds-oriented environmental education program was to make students and local residents aware of the migratory nature of the shorebirds they observed in the summer months. By linking schools along the Pacific Flyway and sharing information on the various shorebird species, it was hoped participating students and residents would gain a greater awareness of the shorebirds and their habitats, including stopover sites during migration, and thus a greater desire to protect both. (U.S. Fish and Wildlife Service National Conservation Training Center 2004). By 1996 the program had grown considerably in popularity and was transferred to the Regional Office of the USFWS in Anchorage, Alaska. In November 2000, the administration of the program was then transferred to the National Conservation Training Center of the USFWS in Shepherdstown, WV and since then has been administered by the National Coordinator on site and seven regional coordinators located in each of the USFWS regions. During this time, the Explore the World with Shorebirds! Educational Guide for grades 2-12 was developed from a previous version of the environmental education curriculum and made available free of charge to educators. As the SSSP continues to evolve, it is important to ascertain the extent to which it is attaining its mission, goals, and objectives and how those educators and USFWS administrators associated with the program perceive it use and value.
This study developed a program model of the SSSP as a means of determining whether or not the program is working as it was designed. Data from this program model were also used to help develop later data gathering instruments and implemented in the final efficacy evaluation. Additional data, gathered over the course of 8 months, explored perceptions of the SSSP by educators and a small number of USFWS administrators through the utilization of two surveys and a specialized focus group, the data discussion group. A number of questions were asked in the SSSP Educator Survey, but can be combined and listed into the following nine categories:

1. Format of the curriculum
2. How SSSP materials are implemented into lessons
3. Current areas of concern in formal education
4. Working with the curriculum
5. Critical thinking skills development
6. Effects on affective, conative, and behavioral outcomes
7. Website content
8. Learner usage of SSSP website
9. Educator usage of SSSP website

During the Data Discussion Group Session, the following questions were discussed by a small group of educators selected from the SSSP Educator Survey group:

1. Why did you request the SSSP curriculum?
2. What do you like about the SSSP curriculum?
3. Let’s now determine the pros and cons of both a workbook and a CD-rom format for a program such as SSSP.
4. What could be improved about the present SSSP curriculum?

5. What are some things not presently part of the SSSP that might get other educators to use the SSSP materials?

6. How often do you use the SSSP website? Why do you use it? Why don’t you use it?

7. Are there any recommendations you have regarding the SSSP that we have not covered?

8. If you were telling another educator about the SSSP, how would you describe the program?

9. Possible extensions to add to the SSSP curriculum

Finally, the USFWS Administrator Survey explored perceptions pertaining to the value of environmental education in general, different components of the SSSP, possible additions to the SSSP and appropriate and adequate funding of the SSSP and other EE programs supported by the USFWS. The five categories in which the numerous questions in the USFWS Administrator Survey were listed are as follows:

1. What is the value of EE to the USFWS?

2. How important are the outcomes of EE programs?

3. How important are the outcomes of the SSSP?

4. How important do you think these possible additions are to the SSSP?

5. What do you think the appropriate level of funding should be for the SSSP?
The overall evaluation of the SSSP was very positive, with the exception of the SSSP website. Educators rated the SSSP curriculum highly regarding academic content, ease of implementing activities and appeal of activities to learners. Data discussion group participants also gave input as to recommendations for improvement and extension activities beyond the scope of the planned SSSP curriculum.

The SSSP website was found to be underutilized by educators responding to the SSSP Educator Survey and in desperate need of updating by Data Discussion Group participants. Additionally, the Data Discussion Group participants recommended a number of cutting edge technological additions to be made to the website and to other aspects of the SSSP.

The data from the these three instruments and the program logic model indicate the Shorebird Sister Schools Program has been effective overall in meeting its mission, goals and objectives. Some minor adjustments to the curriculum and many major adjustments to the website were recommended, but both educators and USFWS administrators associated with the SSSP gave this EE program high marks.
**Introduction**

The Shorebird Sister Schools Program (SSSP), an environmental education program sponsored by the U. S. Fish and Wildlife Service (USFWS), is an offshoot of an environmental education program developed cooperatively by a middle school science teacher and the local USFWS biologist for use in the 1994 Kachemak Bay Shorebird Festival held in Homer, Alaska. Over the years it has grown and evolved and in 1996 was transferred to the Regional Office of the USFWS in Anchorage, Alaska. In November 2000, the administration of the program was then transferred to the National Conservation Training Center of the USFWS in Shepherdstown, WV and since then has been administered by the National Coordinator on site and seven regional coordinators located in each of the USFWS regions.

According to the SSSP website, the mission is to encourage *public participation in the conservation of shorebirds and their habitats by connecting people along flyways and increasing their awareness and knowledge of local natural resources to inspire community conservation* (Shorebird Sister Schools, 2006). The website was designed to not only impart information about the SSSP but to also be one way in which to implement the first portion of the mission which addresses linking people along flyways. *The Explore the World with Shorebirds!* curriculum was developed to aid in the second portion of the SSSP mission, that dealing with the education of the public as to the issues of shorebird conservation. The vision as stated in the curriculum, is that *the SSSP, through education and outreach, engages public participation in the conservation of shorebird species and their wetland, grassland, and shoreline ecosystems* (U.S. Fish and Wildlife Service National Conservation Training Center, 2004). As funding for
educational programming continues to be more and more difficult to obtain, it becomes increasingly important to be able to determine how effective a program is in achieving its mission and objectives. One step in determining the efficacy of a program is to develop a program evaluation that, by analyzing all inputs, outputs, and expectations, can identify gaps in effective program implementation.

The SSSP has never been formally evaluated and stakeholders have not been surveyed as to their perceptions of the program and its curriculum. Therefore, this study addressed the following four evaluation and research questions:

1. What is the overall efficacy of the SSSP?
2. What value do those individuals requesting the SSSP curriculum put on the program?
3. What reasons would explain the valuation of the SSSP as identified in Study Question 2 and what recommendations could be offered to improve the SSSP?
4. What is the value placed on the SSSP by the USFWS administrators who have funding budget control for the program?

Data were gathered over the course of 14 months from a variety of sources using three techniques: a face-to-face interview, two Internet surveys, and a Data Discussion Group Session, a modified focus group. The objective of the interview with the SSSP National Coordinator was to gather data to be implemented in the FLOW program logic model to help determine the overall efficacy of the program. The Educator Survey was sent to those persons who had listed an Email address when requesting a copy of the SSSP curriculum. The Data Discussion Group Session participants were chosen from the Educator Survey population and the USFWS Administrator Survey was sent to those
USFWS administrators having some connection with budget decisions for the SSSP. Data analysis relied primarily on central tendency statistics and coding open-ended question responses to determine trends and patterns. Each data gathering and data analysis technique will be discussed in greater detail in the Methods section of this report.

Results from the Educator Survey and Data Discussion Group Session indicated those stakeholders thought highly of the SSSP, overall. However, the Data Discussion Group Session participants discussed a number of shortcomings of the program and developed recommendations for improvement even though each participant believed the SSSP was a valuable environmental education program with much potential.

Four assumptions were made when implementing this study. First, it was assumed that individuals who request the SSSP Curriculum CD-rom did so because they intended to utilize some of the activities. A second assumption pertains to the SSSP Educator Survey. It is assumed that those who value the SSSP in any manner will respond to the request to participate in completing the survey. Thus, the survey response rate gives an indication as to the educators’ perceived value of the SSSP. Third, any outcomes beyond the scope of those identified as being part of the program as it was designed are considered overlooked outcomes because they are not listed as formal outcomes of the SSSP. Fourth, it is assumed that those USFWS manager/administrators responding to the USFWS Administrator Survey regarding the willingness to fund the SSSP, or projects within the SSSP, have the authority to make budget-funding decisions.

There are three issues that limit the scope of this study. One limitation pertains to the lack of Email addresses for many persons who had requested the Shorebird Sister Schools Program curriculum CD-rom. Thus, the number of persons sent the Educator
Survey was greatly less than initially anticipated. Secondly, although two stakeholder groups, educators and USFWS administrators, were surveyed for this study, a third major stakeholder group, learners, was not included. Because many of the learners participating in SSSP activities do so in nonformal programs, many of which do not record participant rosters, a large number of nonformal program learners could not be identified and would not be sent a survey. This would result in a learner population biased towards those learners who participated in SSSP activities in a formal classroom setting. Therefore, rather than introducing this possible bias towards formal program learners, it was decided to not survey any group of learners. The third limitation is that the various USFWS environmental education programs are decentralized, making it difficult to identify all those managers/administrators who have budget-funding authority. This prevented determining the perceived valuation of environmental education programming, in general, by targeted USFWS personnel.

**Methods**

**Overview of the Study Design**

The FLOW program logic model (Heimlich, 2006), two Internet surveys and one data discussion group session were implemented to gather data for this study. The first survey, developed in part from data collected for the FLOW model, gathered data from formal and nonformal educators who had requested the Shorebird Sister Schools Program curriculum, *Explore the World with Shorebirds!* Results of analysis of data obtained in this survey were used to develop the script for the Data Discussion Group. Participants for this session were chosen from those educators responding to the initial survey. Data
Figure 4.1: Evaluation methodological flow diagram using SSSP data
from the Educator Survey and the Data Discussion Group session were then used to develop the USFWS Administrator Survey. A conceptual diagram of the methodology process is shown in Figure 4.1 on the previous page. The overall goal for these three data gathering instruments was to identify key stakeholder perceptions with regard to the Shorebird Sister Schools Program. The USFWS Administrator Survey had the additional goal of exploring the value various USFWS administrators with some type of decision-making authority for the SSSP yearly budget attach to environmental education in general as well as the SSSP.

The Internet was chosen as the medium for the two surveys because few, if any educators, do not have access to the Internet, because the time requirement for sending the survey to participants and receiving responses was much less, and because response results of Internet surveys have been shown to be comparable to those of traditionally sent surveys (Dillman, 2000). Participants for the Data Discussion Group Session came from two areas of Oregon, Ohio, and South Carolina and met in Houston, Texas. One invited participant from South Dakota was unable to attend due to extreme weather conditions prohibiting any airline flights in or out of the local airport.

Both qualitative and quantitative statistical techniques were used in analyzing data from the two survey instruments. Most raw data gathered during the Data Discussion Group session were summarized and reported as descriptive statements, although some raw data was reported when deemed appropriate. More discussion on data analysis is provided in the Data Analysis section of this report.
**FLOW Program Logic Model**

The initial phase of this study pertained to analyzing the efficacy of the Shorebird Sister Schools Program by using the FLOW program logic model, shown below in Figure 4.2. To utilize this model, one begins by determining the desired long term impacts, or goals, (far right). Once these are listed, arrows guide the evaluator to “Audiences”, exploring whom the program is designed to reach or be utilized by. Arrows then lead to “Activities”, in which activities necessary to the program are listed, then on to the “Inputs”, which are the costs associated with the program. “Outputs” covers information on program implementation, including items such as numbers of program participants and materials produced for and used in the program. Finally, the various desired program outcomes, listed in the Reactions, KASA, and Individual Behaviors boxes, are identified. These outcomes should reflect the goals and objectives of the program listed in Long Term Impacts.

![FLOW program logic model](image)

Figure 4.2: FLOW program logic model (Heimlich, 2006)
Using the FLOW program logic mode, the degree to which the SSSP is effectively meeting its mission can be determined. Additionally, data gathered for the FLOW model can be used to develop the surveys and data discussion group script, used in phases 3-5 of the study.

**SSSP Educator Survey**

The population of persons receiving this survey instrument (N = 131) was composed of those individuals recording an Email address when requesting the SSSP curriculum guide and activity CD-rom from the SSSP. This survey instrument was composed of Likert-type scale items and other close-ended items with ordered choices, close-ended with unordered response choices, items requiring a “yes” or “no” response, and open-ended questions with a short or extended response box following the main question. The Likert-type scale items have a continuum of choices between the numbers 1 and 7, with only the two extreme choices, “Strongly agree” and “Strongly disagree”, listed above the numbers 1 and 7, respectively. The Educator Survey items were divided into two major groupings: (1) items covering the SSSP curriculum and (2) items covering the SSSP website. The SSSP curriculum items were then divided into five subgroups: (1a) educator convenience and use, (1b) items covering current areas of concern among formal educators regarding curriculums in general, (1c) items that pertain to general aspects of curriculum content (1d) the critical thinking/decision-making aspects of the SSSP curriculum, and (1e) the effects of the SSSP curriculum on the affective and conative domains. Under the (1a.) category were placed four items that covered the ease
of using of the CD-rom format for the SSSP curriculum and the flexibility and appropriateness of the materials for educator usage. The (1b) category contained two items covering integration of the curriculum across disciplines and correlating the curriculum to state standards and the (1c) category contained nine items covering curriculum content. The (1d) category contained four items that were designed to determine to what extent the SSSP curriculum materials encouraged learners to develop skills allowing them to make good environmental decisions. Finally, the (1e) category included five items that explored how the SSSP curriculum influenced participants’ interests in environmental issues. The remaining four curriculum survey items explored how those requesting the curriculum heard about the Shorebird Sister Schools Program, when they received the curriculum, and how they incorporated curriculum materials into their learning plans.

Items in the website category were grouped by (2a) value of content of the SSSP website, (2b) usage of the website by learners and (2c) usage of the website by educators. Four survey items were grouped in category (2a), three items in category (2b) and two items in category (2c).

Data Discussion Group Session

Six educators, from areas throughout the U.S., who responded to the initial SSSP Educator Survey, were selected to participant in this focus group. Items for this instrument were designed to elicit more in-depth responses concerning many of the subjects covered in the Educatory Survey, with the Data Discussion Group Session items written in more general terms. All items were designed to evoke open-ended responses,
which were coded during analysis for commonalities. Participants ranked the Item 2 responses according to their top five choices. After the Data Discussion Group session, when all the participants met for dinner, more data were gathered informally, regarding extension activities for the SSSP curriculum. The ideas on extension activities beyond the scope of the SSSP curriculum as it was originally designed were generated and explored for appropriateness and feasibility of implementation by the group. Thus, these data were also included in the Data Discussion Group Session section of this report.

**USFWS Administrator Survey**

Although the original intent was to survey USFWS administrators who manage various EE programs throughout the U.S., logistics dictated this survey population to be composed only of those USFWS administrators who had some type of decision-making authority for the SSSP budget. This resulted in a population of four administrators to whom the survey was distributed, with three being minimally connected to the SSSP through funding special projects. Five themes were explored in this survey instrument. First was the overall perception of the value of environmental education within the USFWS. This category was composed of the first three items of the survey. Ten items covered the second theme, which pertained to the value placed upon major outcomes of environmental education by administrators. The third theme covered USFWS administrator perceptions of the value of various learning domain outcomes of the SSSP. The fourth theme contained seven items that dealt with possible additions to the SSSP. The final theme pertained to administrator perceptions regarding the appropriate level of personnel support for the SSSP.
The SSSP Educator Survey instrument, the Data Discussion Group Session script and the USFWS Administrator Survey instrument are located in the Appendices section of this report. The coded raw data from the Data Discussion Group session are also reported in the Appendices.

**Data Analysis**

**FLOW Program Logic Model Data Analysis**

The FLOW program logic model, shown in Figure 4.1 earlier in this report, was implemented in order to collect data to answer the first study research question: What is the efficacy of the Shorebird Sister Schools Program? During an April 20, 2006 meeting with the SSSP National Coordinator, SSSP inputs, outputs, and expectations were identified and explored. These points were then inserted into the appropriate sections of the FLOW program logic model, giving a visual representation of the program that allowed for a more effective means of analyzing and identifying any presently existing programming gaps in the SSSP.

*Long Term Impacts*

We begin by exploring the Long Term Impacts that are objectives of the SSSP as seen in Figure 4.3 on the following page. Long Term Impacts can be thought of as the desired overall outcomes or changes that occur as the result of the program. By the end of the process developing the program model, all other data should support the attainment of the points listed in this box.
People will understand shorebird behavior and respect shorebird habitats.

Figure 4.3: Long term impact data

**Audiences**

Arrows from both the Long Term Impacts and the Inputs boxes of the FLOW program logic model lead to Audiences. This allows us to see that components of these two areas should be identified and developed for a specific audience population. In the case of the SSSP, two audience groups were identified as below in Figure 4.4. Although

- Educators – primary audience
- Learners – secondary audience

Figure 4.4: Target audiences identified for the SSSP
the activities of the SSSP were developed to appeal to students, the program was
designed for use by educators and is marketed as such.

Activities

Activities listed, seen in Figure 4.5 below, are quite broad and general and pertain
to both the SSSP curriculum and the website. Note that in the FLOW model, arrows
between the Audiences and Activities boxes indicate the flow is in two directions. Thus,
there is an interactive component to Audiences and Activities, with audiences being
affected by the types of activities and activities being limited to the targeted audiences.

- Educators use the curriculum activities for all age groups
- E-field trip utilized by educators for their students – either static or live broadcast.
- Teacher training workshops

Figure 4.5: SSSP activities

Inputs

The next step in implementing the FLOW program logic model is to determine
the SSSP inputs. Program inputs traditionally are associated with personnel and
overhead costs as well as the costs involved with developing, duplicating, and
distributing program materials. The various types of inputs for the SSSP are listed in
Figure 4.6 below. Note that the majority of inputs deal with personnel who in some way were involved with developing or overseeing the materials used for SSSP program and the various costs associated with distributing the SSSP curriculum to interested persons.

- Personnel time
- Coordinator travel time
- Curriculum guide development
- Website updating and hosting
- Teacher workshop expenses
- Translate curriculum into Spanish
- SSSP training USFWS personnel
- Correlate to state standards
- Replace and maintain the SSSP trunk
- Postage for educator materials
- Future costs

Figure 4.6: SSSP inputs

*Outputs*

Outputs, listed in Figure 4.7, are the materials developed in response to the activities developed for the targeted audiences. Outputs can be thought of as being the compilation of all the materials needed to implement the Shorebird Sister Schools Program as planned. Although it may seem logical to think of outputs as having a cost, costs associated with the outputs are considered to be part of the inputs. Note that most of
the outputs listed are materials to be utilized by educators when implementing SSSP activities developed for specific audiences. The one exception to this is the SSSP website, which has broader, more general targeted audiences as does any Internet website.

- Curriculum
- Website
- Shorebird activity trunk
- Shorebird flash cards
- Student activity guide in English and Spanish
- Guides for E-field trips

Figure 4.7: SSSP outputs

Reactions

The next box to discuss would be Reactions, listing the desired affective responses to the program directly after participation in program activities. Reactions listed here refer to how those participating in some way in SSSP activities emotionally feel about what they have just experienced after completing the activity. All reactions except the third listed in the box in Figure 4.8 on the following page could be reactions of both target audiences, educators and students alike. Only the middle reaction would be considered to be limited to educators.
• “Wow! Shorebirds are cool!”
• “Gee, I didn’t know that!”
• Educators to realize that the SSSP curriculum fits in with what they are doing in class.
• Have an enthusiasm for shorebirds
• Want to know more about shorebirds

Figure 4.8: Reactions of target audience to SSSP activities

KASA

The next FLOW box to be discussed is composed of four sub-groupings, with each sub-group analyzing the desired cognitive or conative SSSP outcomes and can be seen in Figure 4.9 on the following page. Cognitive outcomes are identified in the Knowledge sub-group. This list includes facts on shorebirds, their habitat requirements, the life histories of the different species of shorebirds, and threats facing shorebirds. The remaining boxes, Attitudes, Skills, and Aspirations refer more to the desire to take actions on behalf of shorebird conservation. Attitudes can change as knowledge increases. Developing specific skills key to understanding different aspects of shorebirds can lead to attitude changes, or attitude changes can motivate one to learn the desired skills.
There is a wide variety of shorebirds
Shorebirds are migratory, bringing a global focus to their issues
Shorebirds have specific physical adaptations requiring them to live in a specific type of habitat
Characteristics of shorebirds
Human behaviors are impacting shorebird populations in many ways
Shorebirds in the same area can eat different things
Many shorebirds live in wetlands, which are important to animals and people

“I care about shorebirds.”
“I can make a difference.”
“I want to make a difference.”
“I want to protect shorebirds and their habitats.”
It is valuable to keep shorebird habitat

Identify some species of shorebirds
Be able to distinguish shorebirds from other types of birds
Ability to do activities listed in the curriculum guide
Ability to participate in shorebird habitat clean up activities

I will learn more about shorebirds, their habitats, their migrations, etc., to get a clear picture of their life history

Figure 4.9: Desired cognitive, affective and conative outcomes of the SSSP
Aspirations can develop due to changes in attitudes or development of specialized skills associated with learning about shorebirds. Thus, the sub-groups are interactive can be two-way processes.

*Individual Behaviors*

The final FLOW box to be discussed in the one titled Individual Behaviors. These individual behaviors of the target audience populations, listed below in Figure 4.10, pertain to behaviors that would result from participating in SSSP activities. Note that some behaviors listed are appropriate in only a formal educational setting, such as

- Every school that participates in the SSSP links up with the pen pal program, often via a Listserve on the website.
- Choose to participate in continuous learning about shorebirds
- People participate in the protection of all components of shorebird habitats
- Students become proactive by organizing shorebird festivals, doing shorebird habitat cleanups, etc.
- Educators give feedback on the program by relating any modifications they have done, what is particularly successful for them, etc.
- Educators take their students on field trips to learn first hand about shorebirds and their habitats.

Figure 4.10: Desired behavioral outcomes resulting from participation in SSSP activities
schools linking up via the pen pal program, while others could be appropriate outcomes of both formal and nonformal educational programming. In all cases, individual behaviors listed here should reflect the objectives listed in the Long Term Impacts box.

**Survey and Data Discussion Group Data Analysis**

The primary goal of the survey items analysis process was to identify trends and patterns in survey participant responses to help answer research question 2: What are the perceptions of the program as held by different stakeholders? A number of statistical data analysis techniques were used for both the Educator Survey and the USFWS Administrator Survey. Central tendency quantitative descriptive analysis techniques were used for the Likert-like scaled items and the close-ended unordered response choices items from the two survey instruments. Descriptive statistics used for this study were the median, which identifies the choice that represents the mid point of the distribution for the item, and the standard deviation, a measure of the average distance of the responses given from the mean, or arithmetic average of the responses. The lower the standard deviation, the closer the responses were to one another, indicating closer agreement between respondents on the item. On the other hand, a greater standard deviation score means the responses are more spread out, indicating survey participants were less in agreement on the item. Thus, these central tendency statistics allow for analysis of the distribution of the range of the responses.
Frequency and percentage tables were used to analyze other close-ended with ordered responses items and yes/no items for the surveys so as to identify the most-preferred responses. Identifying the most preferred responses to these items aids in the identification of trends and patterns in participant responses.

Data analysis of the open-ended question responses from the Data Discussion Group Session participants began with identifying commonalities in responses for each item. Common responses were then grouped into categories and listed according to numbers of responses per category. Additionally, participants ranked Item 2 and Item 4 responses as to their top 5 choices for each. These categories were then used to identify the common themes and patterns occurring in participant responses and to thus determine overall participant preferences and recommendations.

**SSSP Educator Survey Results**

The survey invitation and contact link was emailed on November 29, 2006 to 117 persons, educators who had submitted an email address when requesting the SSSP curriculum; the survey was closed on January 31, 2007. During the time the survey was open for response, two Email reminders were sent to those persons who had not responded. At the time of the survey closure, the survey had been distributed to only 113 individuals, due to invalid Email addresses, and a total of 31 persons had responded to the survey. Eight of those who responded, however, did not fill out the survey because they had requested the curriculum for use as a reference material and had not yet examined it. Thus, the overall response rate for the SSSP Educator Survey was n = 23, or 27.4%. Although the ultimate goal of any survey is to get a 100% response rate, a more
realistic goal is to get a response rate of between 75%-90%. Survey technique, however, plays a large part in survey response rate. Generally speaking, any face-to-face survey technique, such as personal or telephone interviewing, results in a greater response rate. Internet surveys have been shown to typically result in a lower response rate as do other surveys of this kind, such as mail surveys (Dillman, 2000). A response rate of 27.4% is very low, even though all guidelines were followed for Internet surveys. Possible explanations for this low response rate will be discussed in a later section of this report.

Both quantitative and qualitative statistical analysis techniques were used for items in the SSSP Educator Survey. Descriptive statistics were used to analyze the Likert-type scale items by calculating central tendency values for the median and standard deviation. Frequencies were calculated for all other items except those with extended responses. For item analysis, items were grouped into those items covering a specific area of interest, or general category, concerning the SSSP curriculum and website. Groups of Likert-type scale items were then analyzed as to the median and standard deviation of responses for each item. This data and the frequencies from the other survey items were then used to determine the trend of the responses for the specific area of interest of the SSSP curriculum. Finally, trends for each area of interest were compared to determine the overall perceptions of survey respondents regarding the SSSP curriculum.

**Format of the Curriculum**

Items 5, 7, 8, and 9 are Likert-like scaled items, with responses from 1, indicating strongly disagree, to 7, indicating strongly agree. Response analysis to these items, each pertaining to the CD-rom format style of the curriculum, is shown on the following page in Figure 4.11. Results indicate that although the CD-rom was easy to install and the
materials well organized, some respondents found it difficult to easily access materials. Additionally, although respondents indicated the CD-rom format of the curriculum was more convenient to use than a hardcopy workbook format, the standard deviation of 2.0 on most items in this group indicates respondents were not in close agreement on formatting preferences.

<table>
<thead>
<tr>
<th>Item</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. CD-rom was easy to install</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>7. CD-rom more convenient than hardcopy workbook</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>8. Curriculum materials were well organized</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>9. Curriculum materials easy to access</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 4.11: Format of curriculum

**How SSSP materials are implemented into lessons**

Item 4 asked educators to determine the extent to which they implemented SSSP activities into their lesson plans. As indicated in Figure 4.12 below, most educators used the SSSP materials minimally or not at all. Only three educators used the SSSP materials to a large extent.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>6</td>
<td>26.1</td>
</tr>
<tr>
<td>Occasionally</td>
<td>14</td>
<td>60.9</td>
</tr>
<tr>
<td>As an entire program or unit</td>
<td>2</td>
<td>8.7</td>
</tr>
<tr>
<td>Integrate into multiple units</td>
<td>1</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 4.12: How SSSP materials are implemented into lessons
Current areas of concern in formal education

Items 11 and 12 looked at two issues of current importance to formal educators regarding curricula in general. More emphasis has recently been put on standardized testing, resulting in more educators being concerned with curricula being correlated with national and state benchmarks and standards. Also, there is a push to show relevance in curricula across basic disciplines. These items were also are Likert-like scale items, with responses from 1, indicating strongly disagree, to 7, indicating strongly agree. Analysis of responses, shown in Figure 4.13, indicated survey respondents were moderately concerned with correlating the SSSP curriculum to national standards while they were slightly more interested in being able to implement the curriculum across the curriculum. However, it must be noted that both formal and nonformal educators implemented the SSSP curriculum and nonformal educators tend to value these two areas of interest less than formal educators.

<table>
<thead>
<tr>
<th>Item</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Curriculum correlation to national standards important</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>12. Curriculum use across disciplines important</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 4.13: Current areas of concern in formal education

Curriculum Content and Usage

The grouping composed of the most numerous survey items rated the curriculum with regard to content and usage and contained nine Likert-like scale items, with responses from 1, indicating strongly disagree, to 7, indicating strongly agree. This area of interest contained items 13, 14, 16, 17, 19, 20, 23, 26, and 27 and addressed the
content themes of the curriculum and its appropriateness for different groups of learners.

Data analysis results, seen in Figure 4.14 shown on the following page, were very positive and similar in scale for all items pertaining to curriculum content and how well curriculum activities are utilized and modified for learners of various ages and physical abilities. The standard deviation of 1.0 also supported the results showing close positive agreement among participants regarding all items in this section. Thus, the curriculum content was highly valued by educators responding to this survey.

<table>
<thead>
<tr>
<th>Item</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Directions for SSSP activities were adequate</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>14. Shorebird information is accurate and up to date</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>16. Field guides tips were helpful</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>17. Materials were easily modified for different age groups</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>19. Social perspectives were explored in some activities</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>20. Activities were appropriate for all levels of physical abilities</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>21. Activities were age appropriate for my learners</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>23. Sustainable development behaviors were explored</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>27. Some activities explored economic perspectives</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 4.14: Curriculum content and usage

**Critical Thinking Skills Development**

Four items in the SSSP Educator Survey, items 10, 18, 21, and 29, were designed to explore the degree to which the SSSP curriculum helped learners develop critical thinking skills. As can be seen on the following page in Figure 4.15, the standard deviation shows respondents are in close agreement on all four items. With medians of 5 and 6 and a standard deviation of 1.0 for each item in this group, analysis of the results...
indicates the SSSP curriculum is effective in helping learners develop critical thinking skills, a prime goal of environmental educational programming.

<table>
<thead>
<tr>
<th>Item</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Help learners formulate original solutions to problems</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>18. Help learners develop their critical thinking skills</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>21. Learners begin to evaluate their place in environmental issues</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>29. Help learners evaluate choices to make regarding environmental</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>issues</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.15: Critical thinking skills development

*Effects on affective, conative, and behavioral outcomes*

The final group of items in the Educator Survey covering the SSSP curriculum pertains to the impact of the curriculum on affective, conative, and behavioral outcomes. Analysis of data from items in this group, 15, 22, 24, 25, and 28, is listed in Figure 4.16 on the following page. When item 15 is graphed, it exhibited a bimodal distribution, with almost equal medians at 4 and 6. This bimodality indicated an even split in respondent opinions regarding this item, with 50% believing that learners participate freely in SSSP activities and 50% being neutral regarding the statement. The item of most disagreement in this grouping was item 24. With a median of 5, results indicates a moderate increase in interest in conservation issues as a result of using SSSP materials, but the standard deviation of 2.0 also indicated less agreement on participant responses for this item.
Survey items covering the SSSP website were either Likert-like scale items or yes or no responses. The first website grouping, website content, contains items 30, 31, 32, and 33 and were the Likert-like scale items. Analysis of participant responses to these items is found in Figure 4.17 on the following page. For items 31 and 32, respondents appeared to be in agreement on the positive value of shorebird video clips and the web links to other sites with shorebird information. However, although the median of 5 for Item 30 indicated a slightly positive attitude towards the value of the website information on developing community involvement, further analysis calculated the mode of this item to be 4, indicating a significant number of low scores. There are three modes for item 33, with equal number of responses being given in the 4, 6 and 7 categories. When graphed, bimodality was illustrated in participant responses to this item, indicating a split in the perceptions as to the usefulness of the career profiles page for those interested in working with shorebirds in some capacity.

<table>
<thead>
<tr>
<th>Items</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Learners freely participate in SSSP activities.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>22. Some learners indicated an increased interest in conservation issues after their involvement with SSSP activities.</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>24. My interest in conservation issues has increased after using SSSP materials.</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>25. SSSP materials help learners develop courses of action for environmental issues.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>28. SSSP materials encouraged learner involvement in conservation activities outside the program/classroom</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 4.16 Effects on affective, conative, and behavioral outcomes

*Website Content*

Survey items covering the SSSP website were either Likert-like scale items or yes or no responses. The first website grouping, website content, contains items 30, 31, 32, and 33 and were the Likert-like scale items. Analysis of participant responses to these items is found in Figure 4.17 on the following page. For items 31 and 32, respondents appeared to be in agreement on the positive value of shorebird video clips and the web links to other sites with shorebird information. However, although the median of 5 for Item 30 indicated a slightly positive attitude towards the value of the website information on developing community involvement, further analysis calculated the mode of this item to be 4, indicating a significant number of low scores. There are three modes for item 33, with equal number of responses being given in the 4, 6 and 7 categories. When graphed, bimodality was illustrated in participant responses to this item, indicating a split in the perceptions as to the usefulness of the career profiles page for those interested in working with shorebirds in some capacity.

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Learner Usage of SSSP Website

The second website item grouping pertained to the usage of the SSSP website by learners and was the first of the yes or no response items. Participant responses to items 35, 37, and 39, shown below in Figure 4.18, were analyzed for frequency and percentages. In all cases, there was little usage of the SSSP website by learners. However, it should be noted that data for these items rely on the responses of the educators rather than directly from learners. For the purposes of this study, we will accept the educator responses as relevant data for this group of survey items.

<table>
<thead>
<tr>
<th>Items</th>
<th>Std Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>30. Information on developing community involvement was useful</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>31. Learners liked the shorebird video clips</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>32. Web Links were useful for further shorebird research</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>33. Career profiles page contained useful information for those interested in working with shorebirds.</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 4.17: Website content

<table>
<thead>
<tr>
<th>Items</th>
<th>yes %</th>
<th>no %</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. Learners have taken the Identify the Mystery Shorebird Quiz</td>
<td>13.3%</td>
<td>86.7%</td>
</tr>
<tr>
<td>37. Learners have accessed the “Ask a Biologist” web page</td>
<td>6.7%</td>
<td>93.3%</td>
</tr>
<tr>
<td>39. Learners have posted original works on Student Gallery web page</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Figure 4.18: Learner usage of SSSP website
**Educator Usage of SSSP Website**

The final grouping of Educator Survey items, 34 and 38, pertained to educator usage of the SSSP website. As can be seen in Figure 4.19 below, almost half the educators surveyed accessed the SSSP website at least 5 times. However, data also show educators did not take advantage of registering their group or class for SSSP membership.

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>34. Educator has accessed the website 5 or more times.</td>
<td>46.7%</td>
<td>53.3%</td>
</tr>
<tr>
<td>38. Educator has registered group/class for SSSP membership</td>
<td>20.0%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

Figure 4.19: Educator usage of SSSP website

**Data Discussion Group Results**

The Data Discussion Group participants, numbering five formal and nonformal educators, met from 2:00 pm to 6:00 pm on March 3, 2007. A total of eight items were discussed, with Item 6 having three questions nested within it. Responses to each item were analyzed as to common themes, which are termed general categories in this report, and frequencies were determined for each category. Additionally, participants ranked their top five response choices for two items and these individual responses are listed in tables. Raw data for each item will not be reported in the body of this report. Instead, the common themes that were determined and their frequencies will be listed in tables as well as ranked responses. However, the initial analysis of the raw data of all responses is made available in the appendix as individual responses to these items are of interest to SSSP personnel.
**Item 1: Why did you request the SSSP curriculum?** As can be seen below in Figure 4.20, the most common response to this item was prior knowledge of the program, closely followed by obtaining the curriculum to be used as reference materials. Interestingly, as many participants requested the curriculum because of a personal interest or curiosity about the SSSP as they did to actually implement curriculum materials in either a formal or nonformal learning situation.

<table>
<thead>
<tr>
<th>Participant Response Category</th>
<th>Response Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior knowledge of the SSSP</td>
<td>4</td>
</tr>
<tr>
<td>Obtained curriculum for reference material</td>
<td>3</td>
</tr>
<tr>
<td>For use in learning situations</td>
<td>2</td>
</tr>
<tr>
<td>Personal interest/curiosity about the SSSP</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 4.20: Item 1 responses

**Item 2: What do you like about the SSSP curriculum?** General categories for this item are Extensive Information, Variety of Activities, Ease of Use, and Correlated to National Standards. After participant responses to item 2 were listed on the flip chart, participants were asked to rank their top 5 choices. For this item, only the top five ranked choices were reported and these are shown in Figure 4.21. Although the Ease of Use of Curriculum materials category contained more responses, the Extensive Information Given in the Curriculum category had the greatest number of ranked responses. When grouping the top five ranked responses shown in Figure 4.21 into one of the five major themes identified in overall responses to this item, two of the top ranked choices fall into
the Extensive Information category, with the Variety of Activities category, the Ease of Use category, and the Correlated to National Standards category each receiving one of the top five rated responses. The majority of the lower ranked responses or those that were not ranked at all fell primarily into the Ease of Use and Extensive Information categories. Only one participant indicated the importance of an international component to the SSSP, but this response received enough rankings from other participants to tie for the sixth place rank position.

<table>
<thead>
<tr>
<th>Participant Responses</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>It provides extensive background information on shorebirds</td>
<td>1</td>
</tr>
<tr>
<td>It has a variety of activities</td>
<td>2</td>
</tr>
<tr>
<td>The topics on shorebirds are very important environmental topics</td>
<td>3</td>
</tr>
<tr>
<td>It is tied (correlated) to national science standards</td>
<td>4</td>
</tr>
<tr>
<td>Lesson plans are structured as formal lesson plans and include extension ideas</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 4.21: Item 2 responses

**Item 3: Let’s now determine the pros and cons of both a workbook and a CD-rom format for a program such as SSSP.** For this item, data was presented for both the workbook format and the CD-rom format. Response results for the workbook format, seen in Figure 4.22, indicated the most positive aspect of the workbook format, according to the participants, was the ease of use. However, participants also agreed that the bulk of the workbook made it more difficult to transport than the smaller CD-rom version. Results also indicated that the workbook format was costly to produce and mail and required a large amount of paper, contributing to the low participant rating for
conservation considerations. The one rating in favor of technological considerations for the workbook format was due to participants rating the workbook more user-friendly for persons with less technological knowledge. The rating showing dissatisfaction with the technological considerations is due to the lack of ability to access Clip Art and other such features when creating Power Point presentations or other computer-based presentations.

<table>
<thead>
<tr>
<th>Participant Response Theme</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of use</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Cost considerations</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Conservation considerations</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Technological considerations</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4.22: Pros and cons of a workbook format

The most frequent responses regarding pros for the CD-rom format, shown in Figure 4.23, indicated technological considerations are the main improvement over the workbook format. However, participants were unanimous in rating the CD-rom curriculum format as being difficult to use, especially for those who are less technologically savvy. One nonformal educator participant, who had implemented SSSP activities in public schools for a number of years, stated many teachers prefer the hard copy workbook format and are very reluctant to use the CD-rom curriculum guide. Conservation considerations were not addressed as being either a pro or con by participants. One response, however, indicated the CD-rom format was cheap and easy to mail, and was relevant to the small, lightweight packaging of the CD-rom format.
Table 4.23: Pros and cons of a CD-rom format

<table>
<thead>
<tr>
<th>Participant Response Category</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of use</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Cost considerations</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Conservation considerations</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Technological considerations</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 4.23: Pros and cons of a CD-rom format

**Item 4: What could be improved about the present SSSP curriculum?** As with the responses from Item 2, after participant responses were listed on the flip chart, participants were asked to rank their top 5 choices. General categories for this item were Administrative Considerations, Communication/Response, Update SSSP Materials, Marketing Considerations, and Better Support of SSSP. In this instrument, Marketing Considerations referred to any action helping to publicize the SSSP in any manner. As is seen in Figure 4.24, the highest-ranking concern of participants pertained to the need for more personnel hours for the national coordinator position, which was placed under the Administrative Considerations category. Interestingly, the top ranked concern was the only one of the 28 participant responses to this item to be listed under the Administrative Considerations category. All of the remaining ranked responses, except for the response ranked fourth, fall under the Update SSSP Materials category. This category contained the majority of the participant responses, with 20 of the total of 28 responses being listed here, followed by 4 responses listed under the Marketing Considerations category, then the Better Support of SSSP category.
The National Coordinator position should be a full-time position for one person in order to adequately administer the SSSP. Main reasons listed pertained to the need to update SSSP component and the need to increase collaboration and communication between SSSP participants.

The USFWS needs to determine ultimate shorebird conservation outcomes and how to achieve them; would improve the conservation aspect of the SSSP.

Format the CD-rom so it is easier to use; e.g. send out written information on how to load it, where to find things in the curriculum, etc.

Actively communicate its availability/market the curriculum, especially to schools and organizations in coastal areas where shorebird conservation needs are greatest.

Link to websites that have information on how to take action regarding shorebird conservation activities.

Include more information on service learning activities.

<table>
<thead>
<tr>
<th>Participant Responses</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>The National Coordinator position should be a full-time position for one person in</td>
<td>1</td>
</tr>
<tr>
<td>order to adequately administer the SSSP. Main reasons listed pertained to the need to</td>
<td></td>
</tr>
<tr>
<td>update SSSP component and the need to increase collaboration and communication between</td>
<td></td>
</tr>
<tr>
<td>SSSP participants.</td>
<td></td>
</tr>
<tr>
<td>The USFWS needs to determine ultimate shorebird conservation outcomes and how to</td>
<td>2</td>
</tr>
<tr>
<td>achieve them; would improve the conservation aspect of the SSSP.</td>
<td></td>
</tr>
<tr>
<td>Format the CD-rom so it is easier to use; e.g. send out written information on how to</td>
<td>3</td>
</tr>
<tr>
<td>load it, where to find things in the curriculum, etc.</td>
<td></td>
</tr>
<tr>
<td>Actively communicate its availability/market the curriculum, especially to schools</td>
<td>4</td>
</tr>
<tr>
<td>and organizations in coastal areas where shorebird conservation needs are greatest.</td>
<td></td>
</tr>
<tr>
<td>Link to websites that have information on how to take action regarding shorebird</td>
<td>5</td>
</tr>
<tr>
<td>conservation activities.</td>
<td></td>
</tr>
<tr>
<td>Include more information on service learning activities.</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 4.24: Item 4 responses

Item 5: What are some things not presently part of the SSSP that might get other educators to use the SSSP materials? This question generated a number of ideas and suggestions from participants. The majority of responses pertained to improving the program by revising and developing additional materials as a means of encouraging more educator use of the SSSP curriculum. However, the need to develop and implement more technological components to the program had the second highest frequency in responses, with only one response less than the highest frequency category. Results for this item are shown in Figure 4.25.
### Participant Response Category

<table>
<thead>
<tr>
<th>Participant Response Category</th>
<th>Response Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revise/add to program to encourage more use of SSSP</td>
<td>10</td>
</tr>
<tr>
<td>Develop and implement more technological components.</td>
<td>9</td>
</tr>
<tr>
<td>Develop and provide more resources and materials for classroom use.</td>
<td>4</td>
</tr>
<tr>
<td>Update content utilizing scientific research from many sources.</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 4.25: Item 5 responses

**Item 6A: How often do you use the SSSP website?** The responses to this question were brief, with each participant giving one response. Data for this are shown in Figure 4.26 below.

<table>
<thead>
<tr>
<th>Participant Response</th>
<th>Response Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
</tr>
<tr>
<td>More than 20 times to look up information</td>
<td>1</td>
</tr>
<tr>
<td>Five times</td>
<td>1</td>
</tr>
<tr>
<td>Prior to 2002 or 2003, a lot</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 4.26: Frequency of website usage

**Item 6B: Why do you use it? Why don’t you use it?** General categories for these two questions were determined to be Information Provided, Connection with Other Educators, Updating Needs, and Technology Considerations. As is seen in the results, listed in Figure 4.27 on the following page, the primary reasons for using the website are
grouped in the Information Provided and Connection with Other Educators categories.

Responses concerning why the website is not used represent all the general categories except the Information Provided category.

<table>
<thead>
<tr>
<th>Why do you use the website?</th>
<th>Why don’t you use the website?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species profile/information.</td>
<td>It is old, outdated.</td>
</tr>
<tr>
<td>ListServe, when it was active.</td>
<td>Not a good website address;</td>
</tr>
<tr>
<td>See what other schools did.</td>
<td>difficult to remember it or even to try to give to someone else</td>
</tr>
<tr>
<td>Used the range maps, although they could easily be</td>
<td>if you have it written down.</td>
</tr>
<tr>
<td>updated/improved.</td>
<td>Some things are slow in coming up.</td>
</tr>
<tr>
<td></td>
<td>May be due to high resolution of pictures? If so, use low resolutions</td>
</tr>
<tr>
<td></td>
<td>pics instead and/or provide links to the high resolution pics.</td>
</tr>
<tr>
<td></td>
<td>No response from others</td>
</tr>
</tbody>
</table>

Figure 4.27: Reasons participants use and do not use the website

**Item 7: Are there any recommendations you have regarding the SSSP that we have not covered?** As seen in Figure 4.28 on the following page, the general category with the greatest frequency of participant responses pertained to training and support for Educators regarding the SSSP curriculum. Participants also thought it was important to appoint a group to assess the strengths and weaknesses of the SSSP and to develop an improvement plan based on their assessment.
<table>
<thead>
<tr>
<th>Participant Response Category</th>
<th>Response Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training support for educators.</td>
<td>5</td>
</tr>
<tr>
<td>Planning group to develop plan for improving the SSSP.</td>
<td>3</td>
</tr>
<tr>
<td>Develop assessment component for educator use.</td>
<td>2</td>
</tr>
<tr>
<td>Develop stronger ties to other bird conservation organizations.</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4.28: Item 7 responses

**Item 8: If you were telling another educator about the SSSP, how would you describe the program?** Participant responses to this were relatively short overall and

<table>
<thead>
<tr>
<th>Positive Response</th>
<th>Negative Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive</td>
<td>Inaccessible.</td>
</tr>
<tr>
<td>Informative</td>
<td>Under-utilized.</td>
</tr>
<tr>
<td>Using shorebirds to teach broader conservation issues.</td>
<td>Has potential to be really good.</td>
</tr>
<tr>
<td>Comprehensive resource.</td>
<td>Dysfunctional.</td>
</tr>
<tr>
<td>Model curriculum for bird education.</td>
<td>Mission is conservation-weak.</td>
</tr>
<tr>
<td>Using shorebirds to teach broader biological concepts.</td>
<td>Not many “sisters”.</td>
</tr>
<tr>
<td>Provides resources to incorporate to what they do.</td>
<td>Could address current, relevant conservation issues.</td>
</tr>
<tr>
<td>Has potential to be really good.</td>
<td>International program (could be).</td>
</tr>
<tr>
<td>Field component connects kids with nature.</td>
<td></td>
</tr>
<tr>
<td>Could address current, relevant conservation issues.</td>
<td></td>
</tr>
<tr>
<td>Energizes kids and changes their attitudes regarding shorebirds IF educator uses it.</td>
<td></td>
</tr>
<tr>
<td>Shorebird curriculum.</td>
<td></td>
</tr>
<tr>
<td>International program (could be).</td>
<td></td>
</tr>
<tr>
<td>Technological.</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.29: Describing SSSP to other educators
were listed under the general categories of “Positive Response” and “Negative Response”. Note that 3 responses were listed under both categories, as they could be interpreted either way. Results, shown in Figure 4.29 on the previous page, indicated the overall perception of the SSSP was very positive. The frequency of positive responses was 11, while that of negative responses was only 6.

Possible Extensions to Add to the SSSP Curriculum

Oregon Coast National Wildlife Refuge Complex Program

During the Data Discussion Group session, participants brainstormed as to activities and programs that could be created as extensions of the SSSP. Two of these ideas were already being implemented by USFWS personnel, in a program led by Dawn Grafe, Supervisory Park Ranger at the Oregon Coast National Wildlife Refuge Complex. Grafe and an AmeriCorps volunteer who was the Education and Outreach Specialist at Oregon Coast, developed and piloted the SSSP classroom learning unit program. This program, consisting of four 90-minute classroom sessions and culminating in a field trip to a local estuary, was provided to local 4th and 5th grade classroom teachers and was free of charge to the school. One activity of the final field trip session was an estuary clean up activity, with students competing for honors such as the most trash collected or the most unusual piece of trash picked up. Some years the trash had been turned into sculptures of sandpipers and displayed, alongside poems on shorebirds written by the students, at the Oregon Coast Aquarium. Five classroom teachers signed up for the program in 2003, the first year it was implemented in schools, and by 2007 a total of twenty-two classrooms, in
schools from Astoria to Bandon, were involved, with a total of over 700 students participating in SSSP activities. In addition to activities focusing on cognition, students were shown how to use bird field guides and binoculars in order to identify the birds they would see on the field trip, as well as developing other appropriate EE skills (Grafe, 2007). By hiring AmeriCorp personnel as instructors, new EE facilitators are trained while at the same time personnel costs are lowered. This program has proven to be very successful in providing local classroom teachers and students with excellent environmental educational materials. Additionally, volunteers that help with the field trips, from local bird watching groups to parent chaperones, are also made aware of shorebird issues of concern and behaviors that can lessen or mitigate the effects of negative environmental behaviors, thus benefiting the local populations of shorebird species. This program serves as an excellent model for other USFWS refuge environmental education personnel to implement in appropriate areas throughout the U.S.

**Other Extension Activities/Programs**

The following was a list of possible extensions to the SSSP that the Data Discussion Group participants developed. Although participants acknowledged some of these activities may already be implemented in some manner, those activities already in place as well those that are not yet implemented in any fashion should be developed with the SSSP as the focus. These extension ideas are listed in the order they were given in the meeting rather than in any type of rating by participants.

- Project Pals: This program was implemented at a vocational school in Ohio. Older wildlife management students mentor younger ones in the program. This is beneficial to both age groups.
• Get teams of kids and adults, or just adults, to volunteer as beach patrollers at USFWS sites during nesting season. Would be similar to a docent program and they could explain why you don’t let your dogs run the area off-leash, why you shouldn’t fly kites during this time, etc.

• Volunteers help with plant removal efforts to benefit shorebird nesting sites in order to lessen possibility of nest predation.

• Link school kids with professional USFWS (or other) biologists. Would allow them to participate in activities such as mist netting and banding birds and other bird survey activities. Would let them see what it really is like to be a scientist.

• Get kids and adults to help at festivals or refuges, again to act as docents or interpreters, but not just during nesting season.

• Volunteers of all ages clean up multiple important bird area sites along coastal areas.

• Adopt an Estuary Program
  o Start students doing various activities for this in middle school
  o As they get to high school, they become mentors for the middle school students – similar to Ohio’s Project Pals program.

• Develop a service-learning program to be implemented with college undergraduates. Might be able to develop the curriculum for an undergraduate class that could be used as written or easily modified. Smaller colleges may be more open to this concept.

• Develop a retiree program – now done to some extent in Oregon and is very successful.
○ Rent an RV and put on site for the summer at a shorebird refuge.

○ Retirees live in the RV free of charge and volunteer as interpreters for the site.

○ Can advertise for retiree volunteers on volunteer.gov or other sites.

**USFWS Administrator Survey Results**

The goal of this survey was to ascertain the perceptions of USFWS administrators regarding 1) the value of environmental education and various outcomes and 2) the value of and appropriate funding for the SSSP. As was mentioned in the Methods section of this report, the USFWS Administrator Survey population was extremely small, thus results cannot be generalized to the larger population of all USFWS administrators. Of the four administrators sent the survey, only one responded, with others citing their agencies funded occasional special projects for the SSSP, but otherwise had no association with it. Although having only one administrator respond to this survey was not planned on when developing this study, responses to this survey were not critical to the outcome of the study but were included to help determine the perceived valuation of the SSSP by the USFWS administrators. Thus, responses from one administrator were adequate for the objective of this survey.

*The value of EE to the USFWS*

The first general category of items required the administrator to rank the importance of the six visitor services areas of concern according to the USFWS and to divide $100, first between the visitor services areas and then between an assortment of
EE programs sponsored by the USFWS. Environmental education was ranked first in importance, followed by interpretation, wildlife observation, wildlife photography, fishing, and finally, hunting. When asked to divide $100 in funding between these visitor services, the administrator funded $25 to both environmental education and interpretation and $20 to wildlife observation. This would appear to indicate that the 1 and 2 rankings in the first item were due more to not being able to rank both a “1” rather than a true preference to EE over interpretation. The remaining $40 was evenly divided into the remaining four visitor services. When the $100 had to be divided into a number of different EE programs within the USFWS, the administrator allocated $20 to the Schoolyard Habitat program and the SSSP and $15 to the Federal Junior Duck Stamp program. Remaining EE programs were funded at either $10 or $5, indicating all EE program should be funded but not necessarily at the same amounts.

**Importance of EE program outcomes**

The second group of items covered the perceptions of the administrator regarding the major outcomes of EE programs. This section was devised to determine the administrators’ understanding of good EE program components as set forth in the NAAEE Guidelines for Excellence publication (North American Association for Environmental Education, 2004). In all cases, the administrator’s perception of the importance of the listed EE outcomes correlated with best EE practices.
Importance of SSSP program outcomes

This general category was followed by administrator perceptions of SSSP cognitive and behavioral outcomes. The administrator’s overall response to this section indicated an emphasis on behavioral outcomes being more important than cognitive ones.

Importance of possible outcomes to the SSSP

The fourth section of items pertained to the possible extension activities that were suggested from the Data Discussion Group session. For all but one suggestion, the administrator rated the possible extensions as having the potential to be very important added components to the present SSSP curriculum.

Appropriate funding level for the SSSP national coordinator position

The final category requested, among other things, the administrator to explain his or her understanding of why the USFWS supports the SSSP. The first comment listed was the strong connection of the SSSP to the mission of the USFWS. Other responses were the excellent curriculum, including the field component, and the web presence. Other points listed were the partnership and international aspects of the program and the interconnections to the shorebird biology program.

Also included in the final category was requesting the administrator to choose the appropriate level of personnel resources for the SSSP national coordinator position. Choices were less than 25%, 25%, 50%, 75%, or 100%. The administrator chose the 50% level, indicating the need to expand the national coordinator position considerably. To date, the national coordinator position is one of many job responsibilities of one of the
persons working at the National Conservation Training Center. However, the administrator also determined there would be no need for any type of support personnel if the national administrator position were to be expanded.

**Discussion of Results**

The discussion of the results of this study begin with attempting to explain the causes of the low response rate to the SSSP Educator Survey. For the next phase, responses pertaining to the SSSP curriculum from the SSSP Educator Survey were merged with relevant responses from the Data Discussion Group and the USFWS Administrator Survey. The same process occurred with those responses covering the SSSP website. Both sets of responses were then compared with data identified in the FLOW program logic model to determine the extent to which the Shorebird Sister Schools Program appears to have met its goals and objectives, thereby developing a sense of the efficacy of the program from the view of two stakeholder groups.

**SSSP Educator Survey Response Rate**

As was stated at the beginning of the Results section of this report, a survey response rate of 27.4% was extremely low. This is interpreted to reflect the value, or lack thereof, placed on the *Explore the World with Shorebirds!* curriculum by the majority of educators who received the SSSP Educator Survey. As will be seen later, however, those educators who did respond to the survey generally rated the curriculum quite highly. This discrepancy in the high rating of the curriculum by educators and the low survey response rate is likely explained by the responses of the eight individuals who did not fill out the
survey but Emailed their reasons for not doing so. These persons had requested the curriculum primarily as reference material for various reasons. Some responses were “I did receive the curriculum guide from Sandy but I'm not a teacher. I was gathering information to write a children's magazine story and Sandy kindly sent the guide. I would be concerned that if I answered your survey my answers might throw off your analysis otherwise I'd be happy to help.” and “I would love to support your research efforts but to be totally honest with you, I really haven't used the CD or curriculum yet. It really does look like a wonderful resource and I have told other educators about it but just haven't the time to fully explore it. Consequently, I don't feel that I can adequately assist you with the study. “ And finally “ I learned of the SSSP materials from a forwarded e-mail from another environmental educator. I gave it to a colleague here at The Outdoor Campus whose specialty is birds. Should I forward the survey to her?” Only one of the eight persons who declined to complete the survey indicated the time commitment was a factor in his/her decision. Thus, if we interpret these responses to be indicative of the opinions of the non-responders regarding the SSSP curriculum, it appears that much of the low response rate can be explained by the non-use of the curriculum by non-responders who had requested it.

Another possible explanation of the low response rate might be linked to the timing of the survey. Due to difficulty in obtaining contact information on individuals who had requested the curriculum, the survey was launched on November 29, 2006 rather than the projected date of late October 2006 – early November 2006. This coincided with the Christmas and Hanukkah holiday seasons and school breaks. Although the survey was left open until January 31, 2007 and Email reminders were sent out, that two-month
period was a busy one for many persons. Additionally, the semester change for many school systems occur during mid-January, requiring more administrative work on the part of teachers. Thus, some non-responders may have felt they were too busy to take the 15-30 minutes required to respond to the survey.

SSSP Curriculum

Participants were divided on the workbook format issue. Although there were benefits to having it as a CD-rom, such as links to Internet websites, the ease of transport, and the ability to easily insert clip art pictures into documents, it was noted that many teachers in formal classrooms preferred the traditional hardcopy workbook format. Reasons cited were that it is easier to find specific activities or information by browsing through a hardcopy workbook. Also, the organization of materials on the CD-rom was confusing, especially to those with less developed technological skills. However, Data Discussion Group participants unanimously cited the large volume of paper needed for the hardcopy workbook format to be a very negative aspect, especially considering this is an environmental education program workbook. Additionally, for those educators with moderate to advanced computer skills, the awkwardness of navigating within the CD-rom format was negligible. Thus, for a conservation-minded program such as the SSSP, the CD-rom version was preferred although Data Discussion Group participants suggested having hardcopy workbooks available to those who favored this format for a fee to cover printing and mailing costs.

Curriculum content was highly rated by SSSP Educator Survey and Data Discussion Group Participants. Responses from both groups gave positive ratings to the
concepts presented in the activities and the enjoyment factor exhibited by learners who participated in the activities. Data Discussion Group participants listed the depth of information on shorebirds, an often-ignored family of birds, as being the top-ranked aspect of the curriculum. Even the nonformal educator Data Discussion Group participants appreciate the Field Trip Guidelines, the formal lesson plans with extension activities, and the correlation of the curriculum to national science standards as these make it easier to market the program to formal educators for use in the classroom setting. Additionally, having all the visual materials needed for the activities on the CD-rom and tips on modifying the activities to different age groups were listed as assets of the curriculum.

**SSSP Website**

Responses from both the SSSP Educator Survey and Data Discussion Group participants regarding the SSSP website were not as positive. Although each group gave a high rating to the information on shorebirds found on the website and links to other Internet websites dealing with shorebird issues, SSSP Educator Survey participants indicated they implemented few, if any, of the interactive web pages. For example, only 13.3% of these educators had their learners take the Mystery Shorebird Quiz and only 6.7% had used the Ask a Biologist web page. Of those educators responding to the survey, 0% had posted original student artwork on the Student Gallery web page. Data Discussion Group participants were most critical of the need to update various
components of the website. One participant was very insistent that the name of the program should be changed since there is no “sister schools” component to the program at present.

Recommendations for Improvement

The question on what could be improved about the SSSP curriculum was asked only of the Data Discussion Group participants and elicited a 28 responses dealing with both the curriculum and the website. While this group was very positive about the curriculum in general, they were even more positive about the potential of the SSSP and would like to see the program expanded and used by more educators. According to this group, the greatest areas of concern and recommendations for improvement are as follows:

- Updating the curriculum
  - Reorganize CD-rom so it is easier to find specific activities, etc.
  - Add more in-depth information on shorebirds, conservation issues pertaining to them and reasons they are important to learn about.
  - Add to list of field trip materials.
  - Increase emphasis on service learning and community outreach.
  - Develop better bird identification skill builder kits
    - How to use field marks to identify birds.
    - Classroom set of shorebird flashcards (laminated) or small shorebird field guides.
    - Classroom posters of shorebirds
- Power Point presentations to use with activities

- Updating website
  - Make home page more welcoming/inviting in appearance.
  - Need to either get all web pages on website working as planned or remove them.
  - Have web page devoted to current avian concerns, such as the West Nile virus and the bird flu.
  - Have web page that allows communication between SSSP participants.
  - Use additional technology, such as podcasts, distance learning and videoconferencing between SSSP participants.
  - Popularize birds by doing a My Space or blogs for them.

- Could be on website or in curriculum
  - Information on bird watching, such as equipment, where to go to see specific types of birds, etc.
  - Add more visual, copyright-free resources for educator use.
  - Correlate activities to state benchmark standards or have link to website for each state’s benchmark standards site.
  - If SSSP is updated, it would be a good time to change the name since a lot of elementary school boys don’t like the “sisters” connection.

- Marketing. This pertains to “getting the word out” on the quality of the SSSP.
  - This should be done after the curriculum and website have been updated.
    - Market the program to all nonformal educators in each state, maybe via a clearinghouse.
- Have the SSSP endorsed by environmental education organizations such as the North American Association for Environmental Education.
- Create a grant fund to allow educators (formal and nonformal) to apply for funding in order to implement SSSP.
- Contact persons in Central and South American countries to try to get the SSSP implemented by them.

**Educators and the SSSP**
- Require an educator training session in order for educators to obtain the curriculum. Certification occurs at the end of the training, much like many of the well-known EE programs do.
- For educators new to the EE field, offer follow-up training sessions to help retain them.
- Monitor USFWS educators to determine if they are doing significant programming implementing the SSSP (this also helps “get the word out” to the public participating in SSSP activities).
- Have nonformal educators take SSSP to the schools in their area. Could hire AmeriCorps personnel for this. Need to set up multiple sessions as a unit for each classroom each year.

**Administrative concerns**
- Need to have a more expanded role for the national coordinator position in order to have updating, marketing and training recommendations occur.
- Regional coordinators need to be more prompt in dealing with requests concerning the SSSP. Also be more proactive in marketing it.
o Upper USFWS management needs to be more supportive of the SSSP, especially in funding it.

The final recommendation from this group was to use the basic design of an updated SSSP as a template for other EE programs within the USFWS. Again, the concept of changing the name of the program came up during this discussion as some participants felt the ultimate time to change the name of the SSSP would be after the program components have been updated.

**USFWS Administrator Survey**

Overall perceptions of this administrator are the SSSP curriculum follows best EE practices as written, but the extensions suggested by the Data Discussion Groups session participants would be valuable additions to the program. Also, it appears someone on at least a 50% basis should administer the program. Because the national coordinator position is such a small percentage of the NCTC person’s job duties, the salary for this person is not included in the SSSP budget. However, if the position would be extended to a halftime position, the salary would probably be more likely to be included into the SSSP budget. Therefore, in order to rationalize expanding the national coordinator position to 50%, it would be fortuitous to have the highest possible valuation of the program on which to base budget-funding requests.

**Conclusions**

Comparing the outcomes identified by the survey and Data Discussion Group participants with relevant points elicited from the FLOW program logic model helps to
develop an evaluation as to the efficacy of the SSSP. Each FLOW box will be evaluated separately, ending with a summative evaluation of the program as a whole. For this process, FLOW program logic model boxes will be discussed in a sequence starting with Inputs and ending with Long Term Impacts.

Most inputs pertained to the operating costs of the program, including further developing and updating the curriculum and website materials and training USFWS personnel. A major concern addressed in the recommendations section above concerns the SSSP website. In this area, the SSSP is not meeting goals pertaining to the website.

Audiences identified were educators as the primary audience and learners as the secondary audience. The SSSP curriculum was given very high ratings for appropriate materials by educators in both the SSSP Educator Survey and in the Data Discussion Group session. Curriculum content, extension guidelines, and the ease of modifying activities for different ages and types of groups indicate the curriculum is working as it was developed to work.

In the Activities category, the main concern in the SSSP meeting its goals again centers round the lack of the website to work as it was envisioned to do. The last point listed, pertaining to SSSP participants engaging in activities beyond the planned scope of the program, has been observed in some regions. It is the contention of this study that overlooked behavioral outcomes, such as the one identified in this study, should be included in the total valuation of the SSSP in order to better justify requests for increased funding of the program.
There was agreement from the study educator participants that outputs as listed in the FLOW box, other than the SSSP website, are very satisfactory. Thus, the SSSP outputs are appropriate as developed by the program and as implemented by educators.

Of the five points listed in the Reactions category, only one was examined as to whether or not any SSSP participants had experienced that reaction to the program. The reaction pertained to educators realizing that the SSSP curriculum fits in with their mandated curriculum. This reaction was evaluated indirectly by the reaction of the educators to the SSSP curriculum and to what extent they implemented it into their lesson plans. As was seen in the analysis of data on this point from the SSSP Educator Survey, 26% of those educators responding did not use the SSSP materials at all and only 13% used them more than just occasionally. Therefore, it appeared some effort needed to be put into encouraging more frequent educator use of the SSSP materials. This could possibly be accomplished with required educator training sessions, as is the case with many other environmental education programs.

In the KASA box four groups of outcomes were examined. Successfully meeting the goals set in the attitudes and aspirations areas can be measured by pre-participation and post-participation assessment of participants, which was not a part of this study. However, indications on how well the SSSP materials meet the knowledge and skills sections can be gathered from educators’ responses to the SSSP Educator Survey. In this, they gave the curriculum a very good rating, indicating satisfaction with the cognition and skills aspects of the program.

The Individual Behaviors area of the model appeared to be the one most difficult to assess as to efficacy. Many of the points in this area depended upon use of the SSSP
website, which is the weak link of this program. The pen pal program web page, designed to link students in different schools from different areas, both national and international in scope, of the various flyways had been deactivated due to unresolved privacy issues. There also did not seem to be a provision for encouraging educator feedback concerning how they implemented the activities. Finally, behaviors outside the learning situation needed to be studied in some way to determine if there are continuing affective and behavioral outcomes after participation in SSSP activities.

The final program logic model box to examine is the one titled Long Term Impacts. One desired world impact was for SSSP participants to understand shorebird behavior. The high ratings for the SSSP curriculum by educators indicated that it is effective in imparting knowledge pertaining to the understanding of shorebirds. The second desired world impact was for participants to respect shorebird habitats. This is a behavioral outcome that would most likely be observed in situations outside the initial learning environment and would thus need to be studied further to determine the degree to which participants engaged in these conservation behaviors. However, when analyzing the other components of the program, it was concluded that, with the exception of the SSSP website, the Shorebird Sister Schools Program was functioning well as designed.

The overall evaluation of the Shorebird Sisters Schools Program was the curriculum had shown to be very effective in attaining the mission and goals of the program. Although Data Discussion Group participants recommended updating of a few of the components, they and the larger population of educators responding to the SSSP
Educator survey rated the SSSP curriculum very highly. The USFWS administrator also noted the agency supported the SSSP because of its strong connection to the mission of the USFWS.

There were concerns with both the website and with some administrative aspects of the program being less than effective. Educator Survey and Data Discussion Group data pointed out overall low usage of the website and a great need of updating many of its components. Along the same lines, many Data Discussion Group participants recommended the technology to be updated to become more “cutting edge”. These same persons concluded that more personnel hours needed to be dedicated to the SSSP if it were to realize the great potential of the program.

It can be seen from this study that educators who had actually implemented SSSP activities in their learning situations thought highly of the program. However, many educators who requested the SSSP Explore the World with Shorebirds! curriculum, for whatever reason, did not value the curriculum enough to respond to the survey. Thus, if only those educators who chose to respond to the survey are considered in determining how educators value the SSSP, the program would be given a high rating. Additionally, the USFWS administrator who responded to the survey highly rated the SSSP curriculum and indicated the need for an expansion of the national coordinator position.

The program evaluation segment of this study indicated the Shorebird Sister Schools Program, with the exception of the website, was effective in meeting the goals and objectives identified for the program. Additionally, educators responding to the survey, Data Discussion Group participants and USFWS administrators who recommend budget funding for the SSSP agreed that, overall, the SSSP was an excellent environmental
education program. However, the Data Discussion Group participants also were concerned that while the SSSP curriculum is an excellent EE program with great potential for widespread use, both formal and nonformal educators underutilize it. Also, with the present level of support from the USFWS, the SSSP will have little opportunity for growth. As is often the case in these situations, program funding, especially regarding expanding the scope of the national coordinator position, could prove a barrier to greater success of the Shorebird Sister Schools Program.
CHAPTER 5

DETERMINING A MORE COMPLETE PROGRAM VALUATION:
INTEGRATING TOOLS FROM PROGRAM THEORY AND
ECONOMICS TO BETTER INFORM PROGRAM DECISIONS

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This article answers the three research questions of the dissertation study:

1. How does program theory relate to determining program efficacy?
2. What would be the process for conducting a more complete program evaluation?
3. Is it possible to structure a technique for incorporating a more holistic view of a program by including overlooked collective conservation actions?

*Abstract*

A technique (Gap Technique) was developed in this study with the intention to better understand and implement program aspects that contribute to and influence
decisions made by administrators. The Gap Technique brings together elements of program theory, program evaluation, elements of various economic budget theories, and the determination of program efficacy. Thus, the Gap Technique bridges the gap between program theory and economic methods by using tools from each and incorporating them into one process. The Shorebirds Sister Schools Program was chosen as the case environmental education program for use in this study.

**Introduction**

According to the North American Association for Environmental Education (2004), the primary goal of environmental education (EE) is to promote an environmentally literate populace that will choose to take positive actions with regard to conserving and protecting species and their habitats as well as with other environmental issues. This is further expanded on by Vaughan et al. (2003:12) by their description of EE as a “continuous learning process where individuals become aware of their environment and acquire knowledge, values, skills, and experiences to solve environmental problems for present and future generations.” These descriptions stress the importance of the action aspect of environmental education.

Although these descriptions of EE pertain to individuals taking action, it can be inferred that they are equally appropriate when examining the effect of collective conservation actions. Behavioral outcomes of a program are implied to refer to behaviors engaged in by individuals, but collective conservation outcomes refer to behaviors engaged in by formal organizations, agencies and other such entities such as governments. When these individual behaviors are engaged in collectively, they become
conservation actions, resulting in a more synergistic effect. Collective conservation actions can result in a larger benefit to the mission of an organization or agency. An example of this would be an organization listing, as a program objective, program participants engaging in conserving electricity use as a means of reducing carbon dioxide emissions from coal-burning power plants. The impact of this individual behavior on the environment would be minimal even though the behavior itself would reflect the program being effective in reaching that objective. If, on the other hand, program participants successfully lobbied for strict emission control standards for the power plant to be set by the state, a collective conservation action, the impact on the environment would be greatly magnified. Again, the program objective would be achieved, but the impact would be of much greater value to the organization than the individual behavior.

Program theory has become increasingly important when designing programs. Program theory refers to the desired outcomes of a program and the way in which the program should be implemented in order to generate the desired outcomes (<http://Itclass.Heinz, 2000>). A program theory explains the planned outcomes of the program and how those outcomes will be accomplished. It describes the program, explains the conditions necessary for the program to work, predicts the outcomes of the program and specifies the activities necessary to realize the predicted outcomes (Sidani & Sechrest 1999). Weiss (2002) defines program theory as focusing on the mechanisms occurring between the implementation of the program components and the response of participants to the program components “The mechanism of change is not the program activities per se but the response that the activities generate” (Weiss, 1997:73).
Whether an organization or agency is funded by public or private sources, there is a need for each to validate the efficacy of its program components in order to justify the existence of the program (Gutman, 2002). Program efficacy can be determined by one or more program evaluation methods such as a program model, that identifies all program components and how they interact to assure the program is functioning as it was designed (Heimlich, 2006). The first step in most program evaluation processes is to determine what the goals and objectives of the program are, followed by analyzing a variety of outcomes components of the program, including perceived required student knowledge, skills, values, and attitudes that would show progress towards meeting the program goals and objectives (Healy, 2000). Additionally, some program evaluation processes include economic inputs and outputs as well as outcomes geared toward meeting program goals and objectives (Bennett, 1995). This illustrates the importance of having all program outcomes identified during the evaluation process. Otherwise, the efficacy determination of the program will likely be inaccurate and less complete and could be interpreted to imply improper program design. When this evaluation process is compared to program theory, the strong linkage between the two is obvious: a program can be designed utilizing elements of program theory and evaluated utilizing the same elements. Since program efficacy is computed in part by data gained from an evaluation, a direct connection between program theory and program efficacy can be discerned.

Administrative support for a program could be thought to be driven, at least in part, by the efficacy of the program. The purpose of this study is to better understand the elements contributing to program efficacy and to support of the program by
administrators or managers, with regard to the program decisions that are made. Furthermore, in order to most accurately determine program efficacy, all program outcomes should be identified, including any that program administrators may not be cognizant of but are outcomes of modifications or extensions of the set program activities.

The Shorebird Sister Schools Program (SSSP), a small EE program supported by the U. S. Fish and Wildlife Service (USFWS), was chosen as the environmental education program used as the case for assessing the Gap Technique developed in this study. Because this is an in-depth case, results cannot be generalized beyond the populations involved in the study.

The SSSP developed the *Explore the World with Shorebirds! Education Guide* for grades 2-12, made available to educators at no charge, and an Internet website. Both the mission and the vision of the SSSP reflect the importance of active participation in conservation issues and the significance of mission-driven behavioral outcomes in environmental education programs (U.S. Fish and Wildlife Service National Conservation Training Center, 2004).

**Elements Contributing to Program Decisions**

In scrutinizing the elements that contribute to program decisions during the course of this study, it appears there are three domains that seem to contribute to program decisions. The Venn diagram of the relationship between these factors, seen in Figure 5.1 on the following page, was developed to determine the methodological process for the in-depth SSSP evaluation.
One domain identified is “costs of the program”. Determining program costs is one function of program evaluation. Care should be taken to identify not only the easily recognizable direct costs of a program, such as personnel hours involved in administrative tasks or mailing costs, but also the indirect costs. The total program costs are a major component of determining program efficacy.

Figure 5.1: Factors contributing to program decisions (Gap Technique)

A second domain identified during this study is “stakeholder perceptions”. The stakeholder group normally involved in making program decisions is composed of organization or agency personnel who are associated with the program. Another
The stakeholder group is those persons participating in or implementing the program in some manner.

The third domain that was identified as contributing to program decisions is “program efficacy”. This category, as in the previous two, can be determined during the course of a program evaluation. Program efficacy determination begins by performing a program evaluation, a source of measuring program performance in order to show accountability and program value and to explore ways to improve a program (McLaughlin & Jordan, 1999). The final efficacy of a program is established by comparing identified program outcomes with program goals and objectives.

**Study Methods**

To examine research question one, “How does program theory relate to determining program efficacy?”, literature pertaining to program theory, program evaluation, and economic methods were explored because all three contribute in some manner to program efficacy. In analyzing the information, it became apparent that in order to obtain more a complete, holistic program evaluation and determination of program efficacy, tools from both program theory and economic methods were required. Since no one method or process incorporated these tools a gap was identified that the subsequent evaluation methods developed for this study attempt to better address.

The second research question, “What would be the process for conducting a more complete program evaluation?” was the basis for the development of the methods design that emerged for addressing the gap that was identified in the first research question. The design, seen in Figure 5.2 on the following page, is an in-depth evaluation process.
Figure 5.2: Evaluation methodological flow diagram
utilizing six phases, three styles of evaluation instruments and associating a dollar market value with overlooked conservation action outcomes. All instruments except for the FLOW program logic model (Heimlich, 2006) were developed specifically for this study.

To answer research question three, “Is it possible to structure a technique for incorporating a more holistic view of a program by including overlooked collective conservation actions?”, the methodology was tried using a case, the Shorebird Sister Schools Program (SSSP). Therefore, as the study methods are explained in answer to research question two, information on their implementation in the SSSP case is also given to demonstrate how the case addresses research question three.

The initial phase requires the development of a program model in order to determine the degree to which the program is functioning as designed. The FLOW program logic model, modified from the Bennett hierarchy model by Joe E. Heimlich and Emmalou Norland (Heimlich, 2006), was chosen for use in this study. As can be seen below in Figure 5.3, the FLOW program logic model reveals the nonlinear

![Figure 5.3: FLOW program logic model (Heimlich, 2006)](image-url)
interconnectedness of the various components of the program in addition to identifying those components. To utilize this model, one begins by determining the desired long-term impacts, or goals, (far right). Once these are listed, arrows guide the evaluator to “Audiences”, exploring whom the program is designed to reach or be utilized by. Arrows then lead to “Activities”, in which activities necessary to the program are listed, then on to the “Inputs”, which are the costs associated with the program. “Outputs” covers information on program implementation, including items such as numbers of program participants and materials produced for and used in the program. Finally, the various desired outcomes, listed in Reactions, KASA (knowledge, attitudes, skills, and aspirations) and Individual Behaviors, are identified. These outcomes, especially the individual behaviors, should reflect the goals and objectives of the program originally identified in Long Term Impacts.

The next phase of the process requires a survey of program users, those individuals utilizing program activities in some manner, to determine their perceptions regarding the program. Data collected from the program logic model are used to develop this survey.

For the case, this survey consists of 39 survey items listed under ten general categories covering aspects of the SSSP curriculum and website and was sent via the Internet with two reminders sent via Email to nonrespondents. The validity of this survey instrument was determined by a panel of experts. Reliability for the Likert-type items was determined by Chronbach’s alpha coefficient calculations. In the Gap Technique, data from this survey are also used to develop the items for the Data Discussion Group script, utilized in the next phase of the study.
During the third study phase, the Data Discussion Group session, individuals selected on the basis of their responses to the Program User Survey are invited to participate in a more in-depth discussion of the program. The purpose of the Data Discussion Group, a type of focus group, is to gather further data relating to the utilization of program materials and if or how the materials motivate further involvement in other conservation activities related to the program. The script for the Data Discussion Group instrument is developed from data gathered in the initial survey and consists of an introduction and eight items. It is during this session any overlooked conservation action outcomes to the program are likely to be identified since participants are asked specifically how they use program materials, including any ways in which they modify or expand on the original activities. This is an important step in the evaluation process due to the amplified value of the collective conservation action compared to an individual behavioral outcome.

The fourth phase pertains to associating a dollar market value amount with the newly identified overlooked conservation action outcome. When dealing with a large organization or agency with multiple programs, this can be accomplished directly by examining the organization or agency budget and discovering the monetary amount appropriated for the same outcome, but listed in a different program. The amount can also be identified indirectly by using a proxy measure from another organization or agency or by contacting other organizations, businesses, or individuals who are involved with like outcomes.

The fifth phase requires development of the Administrator/Manager Survey. The objective of this survey is to determine administrator program valuation and support. For
the case, this survey contained 29 questions covering EE in general, present elements of
the program and potential elements to add to the program. Because of the decentralized
nature of the EE component of the USFWS, only one administrator has overall decision-
making authority for the program, this limited the sample to one individual and thus
negated the need to determine reliability of the instrument. The instrument was
determined valid by a panel of experts.

The goal of the final phase of the study is to determine the overall efficacy of the
program by comparing the data regarding goals and objectives from the program logic
model with the data from the surveys and Data Discussion Group

**Findings.**

The literature explored in this study illustrates the causal linkage between
program theory, program evaluation, and program efficacy. Program theory is the
causative basis for program outcomes. A program evaluation is the means by which the
internal causal outcomes are measured. Furthermore, program evaluation can lead to the
identification of additional outcomes, adding to the extent of program efficacy.

One important aspect of program efficacy is that it is one component that drives
administrative decisions on future support of programs. Thus, administrative decisions
that effect future program support is also linked to program theory through the
determination of program efficacy by program evaluation methods. A diagram of the
relationships between the aspects of a program as applicable to this study can be seen in
Figure 5.4.
This diagram indicates the cyclical nature of how decisions are made for programs. The program, having been designed utilizing program theory, is evaluated, with the results determining the program efficacy. Administrative decisions regarding the future support of the program are based on the program efficacy. Thus, the program efficacy drives the decisions made on the various aspects of the program, including whether or not to continue supporting the program if the program efficacy is found to be minimal. Once administrative decisions are made as to the support of the program, the cycle continues.

The process shown in Figure 5.4 above illustrates the importance of program evaluation in determining the efficacy of the program. One important aspect of program evaluation is to identify the outcomes of a program. In conservation education organizations, outcomes listed are often individual behaviors that are designed to further the organization’s mission. When individual behaviors are collective and result in conservation actions, the impact on the program efficacy is greater. Thus, it is important to conduct a complete program evaluation in order to identify all program outcomes. The complex, expanded methods process, shown in Figure 5.2 on page 142, emerged in this study as a means of conducting a more complete, holistic program evaluation.
To examine the potential for using this more complete evaluation an evaluation using the methods process developed in this study was conducted for the Shorebird Sister Schools Program as a means of testing the applicability of the evaluation process. During the Data Discussion Group Session phase of the evaluation process, an overlooked conservation action outcome was identified. This outcome was one that would logically be considered an intended outcome of the SSSP, but was not formally listed as such. It would be assumed that if a dollar market value could be associated with this newly identified conservation action, an adjusted valuation of the program could be obtained. This, in turn, would lead to a more complete determination as to the efficacy of the program.

At the conclusion of the evaluation process, it was evident that there was a need to figuratively step back and reconsider how we view program evaluation, efficacy and administrative support regarding program decisions and how the overlooked collective conservation actions fit into the mix of program components. The remainder of this study resulted in the development of a technique (Gap Technique) to address this issue.

**Gap Technique**

The domains identified that contribute to program decision-making, as seen in Figure 5.1 on page 140, drove the development of the methodological flow and data gathering instruments utilized in the process. Furthermore, it allowed the associated stakeholder groups to be identified. This led to the development of the diagram illustrating the traditional process influencing program decisions seen in Figure 5.4, on page 147.
However, this process does not take into account the identification of unexpected overlooked conservation action outcomes. Since the administrators would base their assessment as to program efficacy in part on the program outcomes, omitting the overlooked conservation outcomes would result in an incomplete valuation of the program. Therefore, the modified diagram of the holistic process, seen in Figure 5.5 below, was developed to incorporate these into the decision-making process.

In this case, the overlooked conservation actions, identified in the program evaluation process, could result in a more complete valuation of the program. This, in turn, would contribute to the determination of the overall program efficacy, which, as was already discussed, can influence administrator decisions regarding future support of the program. Therefore, a more complete valuation of the program could better aid the administrator making decisions regarding the program.

![Figure 5.5: Gap Technique explaining influences on program decisions](image)

### Significance of the Gap Technique

The Gap Technique brings together elements of program theory, program evaluation, elements of various economic budget theories, and the determination of
program efficacy. The program, program evaluation and some aspects of program
efficacy determination are based in program theory. The program cost aspect of program
efficacy and some aspects of the support of the program by administrators are based on
economic
determinations. Thus, the Gap Technique developed in this study attempts to bridges the
gap between program theory and economic methods by using tools from each and
incorporating them into one process.

Additional research involving the Gap Technique could involve programs other
than EE programs and programs from organizations or agencies of varying magnitude.
Also, the significance of the Gap Technique is not limited to EE programs only in the
U.S. At the 4th World Environmental Education Congress, meeting in July 2007 in
Durban, South Africa, papers on the Blue Nile Project were presented. The Blue Nile
Project is composed of multiple environmental projects focusing on topics such as
sustainable fish farming, alternate agricultural programs and water conservation activities
(Kisake, 2007) (Kidundo, Maushe, 2007). The emphasis of each project centered on the
cognitive progress made by participants, but resulted in important positive environmental
behaviors as well. However, these are not individual behaviors but are collective
conservation actions performed by formal groups within the extensive project. Thus, each
project resulted in overlooked conservation actions that could be considered large
additional assets to the overall Blue Nile Project and could have be instrumental in aiding
administrators in making program decisions.

The Gap Technique can be an important tool in evaluating conservation education
programs because of the importance of the behavioral outcome component of such
programs. The behavioral outcomes are often found to be behaviors engaged in by individuals. However, when these individual behaviors are engaged in collective actions, they become larger conservation actions, resulting in a more synergistic effect. Collective conservation actions can result in a greater benefit relevant to the mission of an organization. A key aspect of the Gap Technique is to help reveal potential conservation action outcomes of the program, making this technique a significant tool for conservation education program evaluation.

However, the Gap Technique may not be appropriate for use in all types of programs. The uniqueness of this technique centers on the identification of overlooked conservation action outcomes that result from the program. Therefore, the Gap Technique is only appropriate for utilization by organizations with a conservation component as a part of their mission. Furthermore, the conservation mission component should be one that has a conservation action outcome associated with it. Finally, the organization also should have an educational component associated with its goals and objectives. If these criteria are not met, the Gap Technique is not considered an appropriate technique for utilization by that particular organization.

In conclusion, the Gap Technique was developed with the intention to better understand and implement program aspects that contribute to and influence decisions made by administrators. This technique stresses the importance of identifying and including all program outcomes as a means of obtaining a more complete program valuation in order to aid the administrator in making decisions on future support for the program.
CHAPTER 6

IMPLEMENTING THE STUDY METHODS

Introduction

Administrative support for a program can be thought to be driven, at least in part, by the efficacy of the program. The purpose of the methods process developed for utilization in this study is to better understand the elements contributing to program efficacy and to support of the program by administrators or managers, with regard to the program decisions that are made. Furthermore, in order to most accurately determine program efficacy, it is important that all program outcomes should be identified, including any that program administrators may not be cognizant of but are outcomes of modifications or extensions of the set program activities.

The significance of the technique (Gap Technique), shown in Figure 6.1 on the following page, is that it brings together elements of program theory, program evaluation, elements of various economic budget theories, and the determination of program efficacy. The program, program evaluation and some aspects of program efficacy determination are based in program theory. The program cost aspect of program efficacy and some aspects of the support of the program by administrators are based on economic determinations. Thus, the Gap Technique developed in this study attempts to bridges the
gap between program theory and economic methods by using tools from each and incorporating them into one process.

Figure 6.1: Gap Technique explaining influences on program decisions

This chapter is designed to function as an instructional manual explaining usage of the instruments utilized in the development of the technique (GapTechnique). Discussion will center on developing and implementing the various instruments listed in the methodological flow diagram, shown in Figure 6.2 on the following page. Step by step instructions are given on how to develop and utilize the program logic model, surveys, and data discussion group session, all components of the methods process. While some of the examples given in each section will be general in nature, others will refer directly to the data gathered when analyzing the Shorebird Sister Schools Program (SSSP) case and reported in Chapter Four of this dissertation. It should be noted, however, that the goal of the study of the SSSP case reported in Chapter Four was not to prove any type of economic value. Instead, it was to demonstrate program efficacy of the SSSP through a more complete valuation of the program.
Figure 6.2: Evaluation methodological flow diagram
**Step 1 – FLOW Program Logic Model**

The FLOW program logic model is the first instrument used in the program evaluation process. As seen on page below in Figure 6.3, the FLOW model, developed by Joe E. Heimlich and Emmalou Norland requires organization personnel to analyze program components in-depth (Heimlich, 2006). In this model, the various boxes represent categories of program elements to be analyzed and the arrows show linkage between various categories. Note that while the analysis process is primarily linear in design, the two-way arrows between many categories indicate a more cyclical pattern. Therefore, you may find it beneficial to revisit one category while analyzing a second one.

![FLOW program logic model](image)

Figure 6.3: FLOW program logic model (Heimlich, 2006)

**Long-Term Impacts**

To utilize this model, one actually begins by determining the desired long-term impacts, or goals and objectives, as seen in the far right hand box of the model. This category lists the overall outcomes the program is designed to produce. It can be thought...
of as how participation in the program will result in collective behavioral change. As can be seen by the arrow running from the Long-Term Impacts box to the Audiences, the long-term impacts listed should have relevance to the audiences that will be later identified.

**Audiences**

The Audiences category explores whom the program is designed to reach or be utilized by. Although it is tempting to think of audiences as the desired program participants, in the case of some programs, such as those seen in environmental education, one needs to better analyze whom the program is designed to appeal to. In the case of any type of educational program, participants are often children. However, it should be noted that it is the educators who will decide whether or not to utilize a program. Therefore, “educators” would be listed as the primary audience while “learners” would be listed as the secondary audience. So while program activities should be appropriate for secondary audience participation, they must also have a strong appeal for the primary audience. Note also the central nature of the Audience category. Arrows indicate a direct linkage between Audiences and all other categories except Outputs, which is linked indirectly through the Activities category. Thus, it is critical to correctly identify the Audiences for which the program is designed.

**Activities**

Arrows then lead from Audiences to Activities. We often identify and describe a program in terms of the activities that make it up. Examples of environmental educational activities that could be listed here are field trips, curriculum used in a formal classroom or nonformal learning setting and workshops in which educators learn to implement
program materials. Be aware, however, that the activities listed here are to be more
general in definition than specific activities in which learners may participate.

*Inputs*

Next we go to the far left box and list the necessary inputs of the program. These
would include any direct or indirect program costs. Examples of these costs are personnel
salaries, office overhead costs that range from rent and utilities to copier toner and
mailing costs, and costs associated with producing the materials needed to implement the
program. Again, note the arrow running from Activities to Inputs indicate a close linkage
of the two categories

*Outputs*

Once the activities are identified, the outputs, the materials developed for the
implementation of the program activities, are listed. It can be tempting to think of outputs
as inputs, or costs associated with the program. And while outputs often have costs
associated with them, either directly or indirectly, we do not focus on them here. Note,
however, that as you are filling in data for this category, you might need to revisit the
inputs category if the costs associated with the outputs were not listed in the inputs box.
Examples of outputs for an environmental education program would be the curriculum
guide, certificates of completion for educator workshop participants, a trunk of materials
the program lends to educators, and binoculars for use by participants on field trips.

*Reactions*

Next, reactions desired from the potential program participants are listed. These
reactions are those that participants experience directly after having experienced the
program activity. Reactions may be general, such as an educator realizing the usefulness
of a particular program activity for his/her learners, or may be more personal, such as when a participant on a nature walk gets excited about seeing a painted lady butterfly. Note the strong linkage of reactions to audiences, and indirectly to activities when analyzing this category.

**KASA**

KASA lists the knowledge, attitudes, skills, and aspirations desired as outcomes to program participation. Knowledge refers to the cognitive gains the program is designed to effect. Attitudes are the affective elements, such as “caring” about a particular animal species, that result from participation in program activities. Skills, such as becoming adept at using binoculars when birding or mastering measuring tree trunk circumference, are elements that allow participants to successfully perform actions associated with program activities. Finally, aspirations refer to participants deciding to engage in specific behaviors, such as joining the Audubon Society. Items listed under each of the subcategories in this box should contribute to the final category to be analyzed, the Individual Behaviors category. Additionally, note the strong linkage to Reactions. This indicates the importance items listed in the KASA subcategories be closely associated in some way with the reactions to the program.

**Individual Behaviors**

Individual behaviors refer to behaviors participants will engage in after program activities have been completed. Do not get behaviors confused with reactions. Behaviors are action-oriented. Examples of behaviors resulting from an environmental education program would be to actually join the Audubon Society, start sorting solid wastes for recycling and cutting down on unnecessary trips by automobile. Again, there is a strong
linkage between Individual Behaviors, KASA and reactions. This indicates that items in all three categories should be complementary and in agreement. The items listed in these categories should also reflect those listed as the desired long-term impacts and goals first identified in this program logic model.

This completes the FLOW program logic model process. The next phase of the methodological flow process is developing the program participant survey.

**Step 2 – Program User Survey Development**

The goal of the Program User Survey is to identify the perceptions of those individuals who utilize the program in some manner. Although surveys are specific for the programs they are designed to measure, the basic method of design is similar. According to Salant and Dillman (2004), great care must be taken when designing a survey in order to collect relevant information and to prevent bias in both population sampling and in item design.

The first step is to determine general categories for the types of information the evaluator wishes to gather. For example, categories utilized in this study for the SSSP Educator Survey were format of the curriculum, how SSSP materials are implemented into lessons, current areas of concern in formal education, curriculum content and usage, critical thinking skills development, effects on affective, conative, and behavioral outcomes, website content, learner usage of SSSP website, educator usage of SSSP website, and reasons curriculum was requested and when it was requested.

Once the categories are identified, the next step is to develop the questions, or items, for the survey. Questions should be interesting and relevant to those individuals
being surveyed and should be analyzed as to the importance of the information being
gathered. There are a number of different forms item questions can take, such as those
with a “yes or no” response, open-ended items, close-ended with ordered choices, close-
ended with unordered response choices, partially close-ended, and scaled items. Good
survey instruments implement a variety of item types listed in a particular sequence to
obtain the best data for answering the research question (Salant & Dillman, 1994).

Writing item questions that are well-worded and have a clear meaning helps decrease the
possibility of one type of survey error, measurement error (Dillman, 2000).

Data analysis depends on the types of item questions. The main goal, however, is
to identify trends and patterns in program user perceptions. For any Likert-type items,
measures of central tendency, specifically either the mean or the median and the standard
deviation, would be sufficient. For other types of item questions, frequency, and possibly
percentage, calculations would be appropriate.

Distribution of this survey and the one that will be developed for the program
administrators or managers can be accomplished in one of three ways, depending on the
resources of the organization. The highest response rate for surveys is usually found in
either face-to-face or telephone interviews. However, when the sample size is large this
would take a great deal of time and therefore may not be an effective method. The
response rate for self-administered written surveys sent via both the US Postal Service
and Email is similar, so in this case the choice in which to utilize would be dependent on
other factors, primarily recipient access to the Internet (Dillman, 2000). For the SSSP
case, Email was chosen as the distribution technique since most educators have access to
the Internet and the cost of distributing the survey is greatly decreased by utilizing this
method. Consequently, a number of aspects need to be examined when determining which distribution method to utilize. First, determine the project time requirement and the personnel available to collect data when deciding on whether to employ interviews or self-administered written surveys. If the choice is written surveys, decide on either the US Postal Service or the Internet. When calculating the costs associated with the US Postal Service distribution method, remember to include the costs of printing and copying the survey, the mailing envelopes, and including a self-addressed stamped mailer envelope with the survey in addition to the actual mailing costs. Additionally, it will most likely be necessary to send out one or two reminders to nonrespondents, with the original survey included in the second reminder, which will further increase the costs. While Internet surveys can be sent as simple Emailed instruments, a number of web software companies can be found that allow the evaluator to custom design surveys, for a fee, that are more appealing visually, with interactive components that allow for a greater range of responses. The software also provides for sending out reminders to nonrespondents.

**Step 3 – Data Discussion Group Session**

The Data Discussion Group is a type of focus group. The goal of a data discussion group is to “brainstorm” in order to elicit new ideas on the item under discussion (Heimlich, 2007). This type of session results in more in-depth information being gathered on how they use the program, including any modifications or extensions they may have developed. A formal script is followed for this session, just as it would for any type of focus group. In both instances, the script includes an introduction by the moderator, one or more round-robin opening questions, introductory questions, transition
questions, key questions and finally ending questions. Data gathered are then analyzed qualitatively, to identify patterns and trends in responses (Krueger, 1994).

To gather data, the moderator has a choice of methods to utilize. It is common for focus group moderators to electronically record participant responses while they record on paper the non-verbal responses, such as nods of agreement. Also, in addition to the moderator, one or more assistants may be positioned around the room so as to better observe and record all non-verbal responses. During the debriefing session after the focus group meets, the moderator and assistants compare and combine their data to be used in the final report. A second method to be utilized involves the moderator recording participant responses on a flip chart. Prior to the session, the script item questions are recorded at the top of pages on the flip chart. For variety and to easily distinguish responses to the different items, a different color of marker can be used when recording the responses. For two of the item questions discussed during the SSSP Data Discussion Group session, participants were given self-adhesive dots of 5 different colors, with each color representing a ranking of 1 (first choice) to 5 (last choice). They were then asked to rank their top five choices of the responses given for the question by placing the dots by the chosen response.

The goal of data analysis for the data discussion group is to identify trends and patterns. Qualitative data analysis for the non-rated item questions involves first determining general categories in which the responses can be listed and developing a code for each. General categories are identified by examining responses to each item question for common patterns. Responses are then coded and frequencies determined and reported for each general category. For the rated item questions, determining which
responses were given the greatest number of dots for each rating level results in the top five response choices, although there may be cases in which two responses receive the same number of dots for the same rating level. In this case, both should be reported to tie for the same rating level position.

It is during the Data Discussion Group that any overlooked behaviors or conservation actions are likely to be identified. This can be the result of responses to one or more item questions worded to examine if and how participants modify or expand program activities in any manner. Encourage maximum input for participants in this section in order to identify as many overlooked behaviors and conservation actions as possible.

**Step 4 – Administrator/Manager Survey Development**

Developing this survey is similar to developing the User Survey. The goal of this survey is to determine the extent to which the administrators or managers support the program. During the preliminary phase, determine the general categories in which the desired information will be listed. For example, in the case of the SSSP general categories were determined to be the value of EE for the USFWS, the value placed upon major outcomes of EE, the value of various learning domains of the SSSP, the usefulness of possible additions to the SSSP, and the level of funding considered appropriate for the SSSP. Once the general categories are determined, develop specific item questions for each category. Data analysis and distribution methods discussed in Step 2 – User Survey Development also apply to this survey.
Step 5 – Adjusting the Program Valuation

There are two major steps to this process. The first is to associate a dollar market amount with the newly identified overlooked behavior or conservation action. The second is to use the dollar market amount to adjust the present valuation of the program.

After an overlooked behavior or conservation action is identified, a dollar market value amount can be associated with it. There are three methods identified in this study that would be appropriate to use for this task and are listed in order of preference according to the requirements of this study.

The method that would logically appear to be most accurate would be to locate an amount specified within the budget for that organization or agency that is earmarked for comparable work presently being done. However, large organizations and agencies may have very complex budgets in place, making it difficult to pinpoint the exact outcome that was identified. If this is the case, an alternate method should be explored.

A second method that might be useful would be to use a proxy measure. Discover and contact any businesses, firms, or individuals to whom the organization or agency might hire out the work to be done for the outcome in question. This would provide a monetary amount the organization or agency is willing to pay to get the work completed. This amount could then be used to determine the value of the outcome to the organization or agency.

If, however, there is no accurate dollar amount available for reference, it might be necessary to determine it by examining the monetary amount for a similar outcome to the one in question. For example, if, as in the SSSP case utilized in this study, estuary cleanup is the conservation action identified, there is no specific amount for this task listed in
the USFWS annual fiscal budget report. However, estuary restoration is listed, but there is much more to estuary restoration that basic trash collection. Other tasks included in restoration can be removal of invasive species, planting of native species, and clearing away of unnecessary underbrush in shorebird breeding areas. In order to use the amount set aside for estuary restoration in determining the value of estuary clean up to the USFWS, calculate what percent of the entire restoration process that the clean up would account for. Then use that percentage to calculate how much of the overall estuary restoration funds would be applicable for the clean up component of the work. If this information cannot be found in the organization or agency budget, a second option would be to determine the funding amount for the outcome by referencing an outside expert source.

In this study, the adjusted valuation of the program was calculated by adding the dollar market amount of the overlooked behavior or conservation action to the present budget of the program. In this study, it was assumed the monies appropriated for the program budget reflect the overall valuation of the program as determined by the organization or agency. Therefore, the present budget-funding amount would equal the program valuation amount.

**Step 6 – Program Efficacy Determination**

Determination of the efficacy of the program is accomplished by examining and comparing data from the program logic model, the two surveys and the Data Discussion Group session. The data from the program logic model sets the criteria used to measure the efficacy of the program. Data from the surveys and Data Discussion Group session
identify outcomes and other elements of the program. By comparing these with the program efficacy criteria, it can be determined the extent to which the program achieves its goals and objectives.

**Conclusion**

The Gap Technique seen in Figure 6.1 on page 153 illustrates the apparent cyclical nature of how decisions regarding programs are made and how those decisions impact the program and drive further program decisions. The Gap Technique’s methods process that emerged from this study uses tools from program theory, program evaluation and economics, bridging the gap between the two theoretical bases, to conduct a more complete program evaluation. Information obtained in this process includes any overlooked conservation action outcomes not identified or valuated in traditional evaluation methods, resulting in a more holistic determination of the efficacy of the program. This more complete program efficacy determination can in turn provide better guidance for administrative decisions pertaining to future program support. This underscores the importance of gathering valid and in-depth data relating to the efficacy of the program, as that can be seen to be influential in guiding the decisions administrators may make regarding future support of the program.
APPENDIX A

Shorebird Sister Schools Program Educator Survey

1. Approximately when did you receive the Explore the World with Shorebirds! CD-rom Curriculum Guide?
   □ Less than 1 month ago
   □ Less than 6 months ago
   □ Less than 12 months ago
   □ Less than 18 months ago

2. If you also have the older Arctic Nesting Shorebirds curriculum, approximately when did you receive it?
   □ Less than 2 years ago
   □ Less than 3 years ago
   □ Less than 4 years ago
   □ Less than 5 years ago
   □ More than 5 years ago

3. How did you learn about the Shorebird Sister Schools Program?
   □ Teacher workshop
   □ Conferences, such as National Marine Educators Conference
   □ Federal or State agency
   □ SSSP website
   □ Word of mouth
   □ Other – please describe in text box below

[Text Box]

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4. Check the selection that best reflects the way you use SSSP materials in your program or unit plans.
   - I never use SSSP materials in my programs or course.
   - I occasionally use SSSP materials throughout my programs or course.
   - I use two or three SSSP activities together in my programs or course.
   - I create an entire program or unit based on SSSP activities.
   - I integrate SSSP activities into multiple programs or units.

For the following, please share your level of agreement with each statement. Check the box under 1 if you strongly disagree with the statement or check the box under 7 if you strongly agree with the statement. If you are somewhere in the middle, check one of the boxes under remaining numbers that most closely describes your position.

The following statements concern your satisfaction with the Shorebird Sister Schools Program CD-rom Curriculum Guide.

5. I received the materials I requested in a timely manner.
   - Strongly disagree
   - Strongly agree

6. Having the curriculum guide on a CD-rom is more convenient than in hardcopy workbook format.
   - Strongly disagree
   - Strongly agree

7. The CD-rom was easy to install on my computer.
   - Strongly disagree
   - Strongly agree

8. The Curriculum Guide materials were well organized.
   - Strongly disagree
   - Strongly agree

9. It was easy to access the materials from the Curriculum Guide.
   - Strongly disagree
   - Strongly agree

The following statements concern your opinion regarding the SSSP Curriculum Guide materials.

10. SSSP materials help prepare learners to formulate original solutions to problems.
    - Strongly disagree
    - Strongly agree

11. Having SSSP activities correlated to national standards is important to me.
    - Strongly disagree
    - Strongly agree

12. The SSSP activities can be used across disciplines concurrently.
    - Strongly disagree
    - Strongly agree

13. Directions for the SSSP activities were adequate.
    - Strongly disagree
    - Strongly agree

14. The information given on shorebirds in the curriculum guide is accurate and up to date.
    - Strongly disagree
    - Strongly agree
15. Learners freely participated in the SSSP activities I planned for my program/lesson.

16. I have found the field guide tips given in the curriculum guide to be helpful.

17. The SSSP materials were easily modified to use for differing ages of learners.

18. SSSP activities help learners develop their critical thinking skills.

19. Social perspectives are explored in some SSSP activities.

20. The SSSP activities were appropriate for learners of all levels of physical abilities.

21. Through SSSP activities, learners begin to evaluate their place in environmental issues.

22. Some learners indicated an increased interest in conservation issues after their involvement with SSSP activities.

23. The SSSP activities were age-appropriate for my learners.

24. My interest in conservation has increased after having used SSSP materials.

25. SSSP materials help learners develop courses of action for environmental issues.

26. Sustainable development behaviors were explored in some SSSP activities.

27. Economic perspectives are explored in some SSSP activities.

28. The SSSP curriculum materials encouraged learner involvement in conservation activities outside the program/classroom.

29. SSSP activities help learners evaluate choices they can make regarding environmental issues.

The following statements concern the usage of the SSSP website.

30. I found the information on developing community involvement in the SSSP to be useful.

31. My learners like the shorebird video clips.

32. I found the Web Links to be useful in finding more information on shorebirds.

33. The career profiles page has good information for those interested in a career working with shorebirds.
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.</td>
<td>I have accessed the SSSP website 5 or more times.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>My learners have taken the Identify the Mystery Shorebird quiz.</td>
<td></td>
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<tr>
<td>36.</td>
<td>My learners have referenced the Student Projects page.</td>
<td></td>
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<tr>
<td>37.</td>
<td>Learners have accessed the “Ask a Biologist” page to gain answers to specific questions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>I have registered my group/class for SSSP membership.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Learners have posted original works on the Student Gallery page.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

40. After working with the SSSP materials, were you or your learners motivated to do further conservation activities dealing with shorebirds or their habitats?
   - ☐ Yes
   - ☐ No

41. If you answered yes to the above question, please write a brief description in the box below as to the nature of the activity(ies). Please include mention of any agencies or organizations associated with this activity.

42. Would you be willing to participate in a data discussion group at a later time? There will be a stipend available to help compensate for your time and travel.
   - ☐ Yes
   - ☐ No

43. Would you be interested in developing a pen pal exchange with a group comparable to yours in another area of the U.S. or another country?
   - ☐ Yes – U.S.
   - ☐ Yes – another country
   - ☐ No
44. THIS IS NOT MANDATORY! However, if you would allow access to your contact
information for purposes of this study, would agree to participate in the next phase of this
study, or would like information on participating in the school pen pal program, please
complete the boxes below.
Name:
Company:
Address 1:
Address 2:
   City/Town:
   State/Province:
   Country:
Email Address:
Welcome:
Thank you for agreeing to participate in this data discussion group. As you know, my name is Elaine Horr and I am a doctoral candidate at The Ohio State University in the School of Environment and Natural Resources. The goal of this data discussion group session is to generate more in-depth information about the Shorebirds Sister Schools Program than we could get in the general educator survey in which you earlier participated. Your ideas are extremely important and I want to encourage you to share them freely. To keep from missing any valuable information, I will be recording your comments on flip chart sheets during this session. Though I will be asking you to introduce yourselves, I will not be tying any comments or ideas to any names when reporting the data we are gathering here today. If at any time you do not feel comfortable in responding to a question, please feel free to opt out of doing so. The entire session will take about 2-3 hours, so if you need to use the restrooms, please feel free to step out at any time. They are located _______. (Will also probably have some sort of refreshments, so will mention those here). Do you have any questions so far? (Pause for 5-10 seconds) OK, let’s start by going around the room and introducing yourselves by giving your name and how you are associated with and/or use the Shorebird Sister Schools Program.
Item 1:
Why did you request the SSSP curriculum?
(Have participants list up to 3 reasons on an index card – collect cards after discussion of responses)

Item 2:
What do you like about the SSSP curriculum?
(After responses are listed on flip chart sheet, have participants rank the top five choices, using different colored stickers)

Item 3:
Let’s look at the format of the SSSP curriculum and determine the pros and cons of both a workbook and a CD-rom format.
(Divide 2 flip chart sheets in half vertically, with “Pros” at top of left half and “Cons” at top of right half. Head one sheet “Workbook Format” and one sheet “CD-rom Format”)

Item 4:
What could be improved about the SSSP curriculum?
(After responses are listed on flip chart sheet, have participants rank the top five choices, using different colored stickers)

Item 5:
What are some things not presently part of the SSSP that might get other educators to use the SSSP materials?
(Use flip chart sheet to record responses)

Item 6:
How often do you use the SSSP website?
(Record numbers at top of flip chart sheet)
Why do you use it? Why don’t you use it?
(Divide remainder of flip chart sheet in half vertically, with “Use” at top of left half and “Don’t use” at top of right half and list reasons under appropriate heading)

Item 7:
Are there any recommendations you have regarding the SSSP that we have not covered?
(List responses on flip chart sheet)

Item 8:
If you were telling another educator about the SSSP, how would you describe the program?
(List responses on flip chart sheet)
APPENDIX C

Analysis of Data Discussion Group Responses

Item 1

Why did you request the SSSP curriculum?

Respondents were to list up to 3 reasons on an index card.

General categories and codes:

- Prior knowledge – code: PK
- Obtained for reference materials – code: RM
- Use in learning situations – code: LS
- Personal interest/curiosity about SSSP – code: PI

Coded responses:

PK Used curriculum in past and wanted a copy now for reference for songbird programs.

PK Had participated in reviewing curriculum when it was being designed and wanted to see how it turned out.

RM Wanted to have curriculum for the occasion when I’d get to teach about shorebirds (specific teacher request).

LS To get lessons based on shorebirds for use in upper elementary classrooms.

PK It was a US Fish and Wildlife Service endorsed curriculum.
RM  Needed it to provide to other teachers.

LS  Looked like it fit our ornithology unit.

RM  Seeking resources.

PI  Personal interest.

PI  We work with shorebird habitat management and I wanted to learn more about the potential SSSP may have regarding our conservation-education component.

PK  I was organizing a teacher workshop to promote the SSSP curriculum and I needed 40 copies of the CD. The curriculum was already being used at my workplace when I arrived.

**Item 2**

**What do you like about the SSSP curriculum?**

*After responses were listed, participants were asked to rank their top 5 choices.*

**General categories and codes:**

- Ease of use – code: EU
- Extensive information – code: EI
- Variety of activities – code: VA
- Correlated to national standards – code: NS
- International component – code: IC

**Coded, ranked results:**

**EI** 1. It provides extensive background information on shorebirds.

**VA** 2. It has a variety of activities.

**EI** 3. The topics on shorebirds are very important environmental topics.
NS 4. It is tied (correlated) to natural science standards.

EU 5. The lesson plans are structured as formal lesson plans and include extension ideas.

The following responses were ranked, but were not in the top 5 rankings. These are in order:

EI 6. Habitat it deals with is wetlands – very important
IC 6. There is an international connection/level component to it
EI 7. Website is an additional resource and has links to other additional resources.
EI 8. The information is specific to shorebirds, an often-ignored family of birds.
EI 8. Information is content-based
EU 8. Lessons are charted; the curriculum is easy to use when planning lessons

The following responses were listed but not ranked:

EU  Good appendix
VA  Activities are fun and age-appropriate
EU  Field trip preparation section is helpful
EU  Instructions on how to use field journals for different age groups.
EU  All necessary visual materials (e.g. flashcards) are found on the CD-rom.
EU  CD-rom format is convenient, especially when traveling (easy to carry).
EI  Endorsed by the USFWS.
EU  Contains information on how to adapt/modify to different groups
Item 3

Let’s now determine the pros and cons of both a workbook and a CD-rom format for a program such as SSSP.

General categories and codes:

- Ease of use – code: EU
- Cost considerations – code: CC
- Conservation factors – code: CF
- Technological considerations – code: TC

Coded responses:

Workbook format:

Pros:

EU One can see it right there in front of one.
EU Easy to make copies of the pages.
EU Teachers often prefer a hard copy of the curriculum – easier to look through it.
TC More user-friendly for non-technological persons.

Cons:

EU Very bulky, especially the updated version.
CC Expensive to print and mail.
CF Uses lots of paper – not conservation minded!
TC Can’t access things such as clipart for Power Point presentations or other computer-based presentations.
CD-rom format:

**Pros:**

**CC** Cheap and easy to copy and mail.

**TC** Contains links to other websites with current information.

**TC** Technologically well-organized.

**TC** Has the capacity to add more things such as more clipart, Power Point presentations that can just be accessed and used.

**TC** Links to website if you are online.

**EU** Easy to take with you when traveling.

**Cons:**

**EU** Difficult to find what you need: software difficult to use if you aren’t familiar with how it works.

**EU** Teachers (on the whole) would rather have a hard copy; used to other e.e. sources that are hard copy format.

**EU** Not clear on how to get from the link you are presently on to one you want to go to.

**EU** Program requires tech-savvy.

**EU** Overwhelming; difficult to find things unless you know where to look.

**EU** Arranged by topic rather than grade level; more difficult when trying to plan lessons for particular grade level/age.
**Item 4**

**What could be improved about the present SSSP curriculum?**

After responses were listed, participants were asked to rank their top 5 choices.

**General categories and codes:**

- Administrative considerations – code: AC
- Communication/response – code: CR
- Update SSSP components/materials – code: UC
- Marketing considerations – code: MC
- Better support of SSSP – code: SS

**Results:**

**AC**

1. The national coordinator position should be a full-time position for one person in order to adequately administer the SSSP. Reasons:

**CR**

Need to increase communication and collaboration between all those actively participating in the SSSP; will help in sharing ideas, getting technological feedback, etc.

**UC**

Website needs to be frequently updated.

**UC**

Curriculum will also need to be updated; should be cutting-edge information.

**UC**

2. The USFWS needs to determine ultimate shorebird conservation outcomes and how to achieve them; would improve the conservation component of the SSSP.

**UC**

3. Format the CD-rom so it is easier to use; e.g. send out written information on how to load it, where things are in the curriculum, etc.
MC 4. Actively communicate its availability/market the curriculum, especially to schools and organizations in the coastal areas where the shorebird conservation needs are greatest:

- Audubon
- Partners in Flight
- American Bird Conservancy
- American Birding Assoc.
- Other USFWS agencies; most important group to market to!

UC 5. Link to websites that have information on how to take action regarding shorebird conservation activities.

UC 5. Include more information on service learning activities.

The following responses were ranked, but were not in the top 5 rankings. These are in order:

UC Need to have different lessons from the program presented by the same facilitator (refers to the non-formal educators) multiple times to the same group.

UC ListServe, if working, could link participants from different states.

UC Change the name: “Sister Schools” component doesn’t work and name is sexist (upper elementary boys don’t like it!).

SS If the USFWS doesn’t want to support the SSSP so that it can be adequately managed, they should let someone else, such as Audubon, take it over.

The following responses were listed but not ranked:

UC Pen pals component is difficult to set up; drop it if it can’t be used

UC Migration report/watch”
• Few people are participating in this.

• Doesn’t adequately prepare people to identify the birds they might see.

**MC** Need to get the word out on SSSP.

**UC** Because the website has not been updated, it doesn’t adequately reflect the quality of the program.

**UC** Website home page is not inviting.

**UC** Need more of an emphasis on current conservation issues.

**UC** List of materials needed for a field trip needs to be improved.

**UC** Show the relevance of SSSP; why should we conserve shorebirds?

**MC** Other older, more well-known programs (PLT/WILD/WET) are endorsed by CEE; need some sort of e.e. endorsement.

**SS** USFWS needs to “buy into” the program and provide adequate funding for it.

**UC** Improve the tie-in to the community.

**UC** Create a new logo – looks like bird’s wing is falling off

**UC** Need a better explanation at the very beginning of the curriculum materials regarding “What is a Shorebird?”

**UC** Strengthen the information about why it is important to teach about shorebirds.

**CR** Regional resources and contacts need to be more approachable and to communicate more with those interested in or associated with the SSSP.

**Item 5**

What are some things not presently part of the SSSP that might get other educators to use the SSSP materials?
General categories and codes:

- Develop and provide more resources and materials for classroom use – code: RM
- Develop and implement more technological components – code: TC
- Update content utilizing scientific research from many sources – code: SR
- Revise/add to program to encourage more use of SSSP – code: RA

Coded responses:

TC  Use state birding ListServes; update and link by flyway.

RM  Develop better bird ID skill-builder materials:
  - Explanation of how to use field marks when ID’ing birds.
  - Flashcards of shorebirds
  - Classroom posters of shorebirds
  - Power Point presentations on shorebirds.
  - Develop laminated shorebird ID cards for classrooms to use OR provide classroom sets of small shorebird field guides (SSSP could create them).

RM  Information on bird watching, e.g. equipment needs and where/how to obtain them.

TC  Create a distance-learning component: facilitate getting groups together via the internet/videoconferencing for activities.

TC  Set up a shorebird event with a camera crew doing a live broadcast to schools and have 2-way communication so students can ask questions (like Estuary Live).

TC  Create Power Point presentations to go along with the activities on various topics.

TC  Have a software program that allows students to do their own Power Point like presentations.
RM  Show videos of shorebird behaviors on the CD-rom, as in “Life of Birds”.

RA  Create a grant funding source for wildlife refuges, schools, organizations, etc., to apply for as a way of encouraging the implementation of SSSP throughout the US.

RA  Bring the program to teachers by sending in organization/agency personnel to run the program rather than just sending the curriculum to the teachers.

RA  On the website, have a database available that gives information on who is doing what and where it is being done.

TC  On the website, could have a place for podcasts (video and audio from iPods).

TC  Popularize birds by using something like My Space or blogs; get a My Space for each bird species, e.g.

RA  Develop a cultural connection to the lower (48) North American, Central American, and South American seabords, both the eastern and western.

RA  Give guidance on how to implement the controversial aspect of a conservation program.

TC  Better technology.

TC  Get the ListServe going again and add other countries; get someone to monitor it abroad as well as here.

SR  Add a section on conservation outcomes that are agreed on by other scientific organizations as well as USFWS.

RM  Add more visual, copyright-free resources for educators to use.

RA  Get the word out about the SSSP to more countries in Central & South America.

RA  Correlate to state benchmark standards OR at least provide a link to the website for each state’s standards.
RA Market the program to all non-formal educators in each state; maybe via clearinghouse.

SR Look at current avian-based health issues (W. Nile virus, avian flu) and give information as to how they are being monitored by the scientific community.

RA Link with birder organizations to provide members to help with school field trips (may already be in the Field Trip Tips section?)

RA Once the program is updated:

- Portray it as a model for programs for other bird families (waders, songbirds, etc.). Could be part of the refuge system and could be the model for programs covering other animals and even plants.
- Get NAAEE to review it.
- Get it endorsed by other e.e. and conservation organizations
- Develop a good marketing plan for SSSP.

Item 6

How often do you use the SSSP website?

Responses:

- Never
- More than 20 times to look up information
- Five times
- Prior to 2002 or 2003, a lot (2 persons responded in this manner)

General categories and codes:

- Information provided – code: IP
• Connection with other educators – code: EC
• Updating needs – code UN
• Technology considerations – code: TC

Why do you use it?

IP  Species profile/information.
EC  ListServe, when it was active
EC  See what other schools did
IP  Used the range maps, although they could easily be updated/improved

Why don’t you use it?

UN  It is old, outdated
TC  Not a good website address; difficult to remember it or even to try to give to someone else if you have it written down.
TC  Some things are slow in coming up. May be due to high resolution pictures? If so, use low resolution pics instead and/or provide links to the high resolution pics.
EC  Contacted people from other schools appearing on the website, and never got one response back.

Although this question was not asked, responses were given on improvements:

TC  Look at the stats for website page hits and see which ones are accessed more, then be sure they are accurate. Also, analyze what makes them appealing and see if you can improve other website pages.
UN  Get help with updating the website, such as from USGS for maps.
**Item 7**

Are there any recommendations you have regarding the SSSP that we have not covered?

**General categories and codes:**

- Develop assessment component for educator use – code: AC
- Training support for educators – code: TS
- Group to plan improving SSSP – code: GP
- Develop stronger ties to other bird conservation organizations – code: ST
- * indicates this was discussed, but not a recommendation

**Coded responses:**

**AC**  Develop any type of evaluation assessment that can be used on how the SSSP impacted the students or met the conservation goals of the program, etc.

**AC**  Give guidance on effective evaluations (I think this is so the educator can develop his own assessments).

*  Those here today would like to know the results of this data discussion group session.

**TS**  Have SSSP added to criteria for certification; like PLT is

*  Emphasize that there was a significant group of participants at this meeting; people who have experience in education and e.e.

**GP**  Get feedback as to what needs to be taken to upper USFWS management to enlist their expanded support for SSSP
GP Gather a group to develop an improvement plan and financially support their participation (e.g. cover travel expenses). Have people involved in this group from all different levels.

GP Get regional leaders to put out RFP’s for SSSP.

TS Can’t assume someone with USFWS will become an educator just because they are told they must; need to follow up and be sure they are doing significant educational programming.

ST SSSP needs to have a voice/get involved with bird conservation through education; person should be actively using SSSP.

TS Need educator training sessions.

TS New educators should be supported financially and professionally in order to take SSSP to other educators.

TS Get new e.e. educators to stay in e.e. by the training session and follow up training.

Item 8

If you were telling another educator about the SSSP, how would you describe the program?

General categories and codes:

- Positive response – code: P
- Negative response – code: N

Coded responses:

P Interactive
Using shorebirds to teach broader conservation issues.
Using shorebirds to teach broader biological concepts.
Comprehensive resource
Model curriculum for bird education

Inaccessible
Under-utilized
Under-funded

Provides resources to incorporate to what they do.

Has potential to be really good
Dysfunctional
Mission is conservation-weak
Not many “sisters”!

Field component connects kids with nature
Could address current, relevant conservation issues

Energizes kids and changes their attitudes regarding shorebirds IF educator uses it
Shorebird curriculum
International program (could be)

Technological
APPENDIX D

USFWS Administrator Survey

The purpose of this survey is to identify the perceptions and preferences of USFWS administrators who are responsible for program funding decisions. Please note that no names will be linked to any of the responses and you may opt out of responding to an item if you choose. Although you may not have direct contact with one or more of the programs in this survey, your opinions on each would still be of great value to this study and thus your responses to items covering those programs would be much appreciated.

The following statements and questions ask you to share with us your opinions on some of the components of the USFWS visitor services.

1. Below are listed six visitor services areas associated with the USFWS. Please rank them in order of importance, with “1” being most important and “6” being least important (choices are listed alphabetically):

   _____ environmental education
   _____ fishing
   _____ hunting
   _____ interpretation
   _____ wildlife observation
   _____ wildlife photography

   $100
2. Assume you have $100 for funding the six visitor services areas. Please allot a specific amount from the $100 for each of the initiatives.

- environmental education
- fishing
- hunting
- interpretation
- wildlife observation
- wildlife photography

3. Assume you have $100 for funding the six areas of interest. Please allot a specific amount from the $100 for each of the environmental education programs

- Piping Plover Atlantic Coast Population
- Federal Junior Duck Stamp Conservation and Design Program
- Outreach programs to schools
- Outreach programs to community groups
- International Migratory Bird Day
- Kids’ Corner
- On-site programming
- Shorebird Sister Schools Program
- Species fact sheets and other outreach publications
- The Nature of Learning
- Prairie Wetlands Learning Center

The remainder of this survey will be exploring your perceptions of different aspects of environmental education.

For the following, please share your perceptions regarding the statements below. Check the box under 1 if you think the statement is not important or check the box under 7 if you think the statement is very important. If you are somewhere in the middle, check one of the boxes under remaining numbers that most closely describes your position.
How important do you think the following are to the USFWS?

4. Environmental education prepares learners to formulate original solutions to problems or courses of action.  
5. Social and economic perspectives are a part of EE.  
6. Environmental education teaches that environmental issues are shaped by individuals’ feelings, attitudes, and experiences.  
7. Environmental education helps learners evaluate their place in environmental issues and the choices they can make regarding those environmental issues.  
8. An objective of environmental education is to help learners develop their critical thinking skills.  
9. Whenever possible environmental education activities should occur in environments outside a formal classroom  
10. An objective of environmental education is to help learners develop their creative skills.  
11. Environmental education leads to empowerment of learners in their ability to work towards solving environmental concerns and issues.  
12. Environmental education focuses on issues of interest to the learners in order to allow them to construct knowledge.  
13. Environmental education is an important way of getting the USFWS mission across to the public.

The Shorebird Sister Schools Program (SSSP) currently has an environmental education curriculum and website covering issues associated with shorebirds and their habitats. The curriculum is provided free of charge to educators who request it. How important do you think the following SSSP components are to the USFWS?

14. Participants learn facts about shorebird species.  
15. Participants explore shorebird conservation concepts.  
16. The SSSP curriculum materials encourage learner involvement in conservation activities outside the program/classroom.  
17. The SSSP curriculum is experienced by a large number of school children when utilized by public and private school teachers.  
18. SSSP activities help learners evaluate choices they can make regarding environmental issues.
The following would be new components to the SSSP. Indicate how important you perceive these to be as additions to the SSSP.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Not Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Encourage volunteers to clean up/restore important shorebird nesting sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Enlist volunteers of all ages to act as docents/interpreters for USFWS shorebird sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Develop a service-learning program for college undergraduates that would benefit USFWS shorebird sites.</td>
<td></td>
<td></td>
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<tr>
<td>22</td>
<td>Develop a multi-grade level program in which upper level students who have participated in the SSSP in lower grades act as mentors for younger students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Train informal educators through the Americorps program.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Partner secondary school students with USFWS biologists to participate in conservation projects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Develop projects in which a school or community group would “adopt” an estuary or other site-specific habitat.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. Why do you think the USFWS administers and supports the Shorebird Sister Schools Program (SSSP)?

27. Check the level of personnel resources you think would be appropriate for a SSSP national administrator.

   ___ less than 25%
   ___ 25% part time
   ___ 50% part time
   ___ 75% part time
   ___ 100% fulltime
28. Do you think any type of support personnel, in addition to the national administrator, should be budgeted for the SSSP?

☐ Yes
☐ No

29. If yes, please explain in the box below (1) the type of position (job duties), (2) whether part time or fulltime, and (3) whether new hire or use present USFWS personnel.
LIST OF REFERENCES


Heimlich, J. E., Ph.D. (2006/heimlich.1@osu.edu, 18 April). (Discussed upcoming trip to SSSP coordinator and using FLOW model). The Ohio State University: School of Environment and Natural Resources.

Heimlich, J. E., Ph.D. (2006/heimlich.1@osu.edu, 16 April). Discussion on FLOW program logic model. The Ohio State University: School of Environment and Natural Resources.

Heimlich, J. E., Ph.D. (2007/heimlich.1@osu.edu, 19 March). Personal meeting to discuss focus groups. The Ohio State University: School of Environment and Natural Resources.


Keeler, A., Ph.D. (Keeler.29@osu.edu). (2007, 12 March). Personal meeting to discuss CVM. The Ohio State University: John Glenn School of Public Affairs.


Marvel, M., Ph.D. (2007/marvel.1@osu.edu, 09 April). Discuss use of OBB and CVM. Telephone conversation.


