

**VALUES, PRIORITIES AND PERFORMANCE IN THE MANAGEMENT OF
VIRGINIA'S FISH AND WILDLIFE RESOURCES: A COMPARATIVE STUDY
BETWEEN INTERNAL AND EXTERNAL CONSTITUENTS OF THE VIRGINIA
DEPARTMENT OF GAME AND INLAND FISHERIES**

by

JAMES R. WATKINS

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

MASTERS OF SCIENCE

in

Fisheries and Wildlife Sciences

April, 2000

Blacksburg, Virginia

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(ABSTRACT)

House Bill 38 will allocate up to \$13 million per year in state sales tax revenue to the Virginia Department of Game and Inland Fisheries (VDGIF) beginning in Fiscal Year 2001. To plan for this major budget enhancement, the VDGIF asked us (in cooperation with Responsive Management and Dr. Brett Wright) to identify the agency programs and functions that VDGIF employees gave high priority to for the allocation of additional resources, and to compare these priorities with those of the agency's external constituents. We also evaluated how internal and external stakeholders rated agency performance in its programs.

Of all VDGIF functions, employees felt most strongly that more resources should be allocated to enhancing public awareness of VDGIF and to providing general wildlife-related education and information to Virginia citizens. Among constituent groups, employees placed higher priority for additional resources on educating and informing children and youth than they did on allocating additional resources to educate urban/suburban constituents, women and minorities.

Employees assigned high priority for additional resources to capital improvement needs and to land acquisition-related issues. Activities that improved the agency's ability to provide hunting opportunities such as enforcing laws that protect habitat, encouraging private landowners to open their lands for hunting and managing game animals also received high priority for additional resources.

Although employees felt that nearly all agency programs needed additional resources, their assessment of agency performance varied widely. Programs in which agency performance was relatively poor, such as acquisition of additional land and water for wildlife conservation, educating and informing citizens, and providing education and outreach to schools, have greater need for additional resources than programs in which agency performance was quite good (e.g., hunter education and enforcement programs).

Virginia citizens felt law enforcement and providing safety education for boating and hunting were VDGIF's most important functions. Both citizens and employees placed greater importance on the existence value of wildlife than they did on its recreational value. Virginia citizens placed significantly less importance on providing hunting opportunities than did VDGIF employees and substantially more on providing wildlife viewing opportunities than did agency personnel. This study also revealed substantial latent interest in fish and wildlife-oriented recreation among Virginians who currently do not participate and that all forms of wildlife-related recreation in Virginia have substantial growth potential.

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Introduction: Review of the Literature

Demand on the country's fish and wildlife resources has never been greater as millions of Americans flock to the nation's forests and waters to hunt, fish or observe wildlife (Scott 1999). At the same time, many state fish and wildlife agencies face budget cuts and funding shortages - threatening their ability to properly manage the fish and wildlife resource and serve an ever-increasing and ever-diversifying constituency.

As America's demographics change, so is the face of wildlife resource use changing. Although the actual numbers of traditional users – hunters, anglers and trappers - are remaining stable, the percentage of the population participating in these traditional forms of recreation is declining. For most of this century, the sale of licenses and permits to hunters and anglers and matching Federal grant-in-aid programs have been the principal source of revenue for most state fish and wildlife agencies. Today, while license sales and percentage of traditional users are declining, in many states there is an increasing demand on state wildlife agencies for more products and services. As a result, agencies are finding it necessary to search for alternative sources of revenue to fund their fish and wildlife management and conservation efforts and provide services to their constituents.

Virginia is one of only a handful of states in history that has come into a significant source of alternative funding for fish and wildlife management . Through House Bill 38, a state code amendment passed in early 1998, the Virginia Department of Game and Inland Fisheries (VDGIF) will soon begin to

receive a portion of the state's sales tax on hunting, fishing and wildlife-related equipment. In anticipation of this new funding, the VDGIF solicited the assistance of Virginia Tech, Responsive Management and Dr. Brett Wright to conduct surveys of the agency's constituents. The results of these surveys will be used in planning prior to implementation of House Bill 38. The VDGIF, like many agencies, realizes the value of the social sciences and the necessity of involving their publics and in the resource planning and management process. The study described here is designed to provide a greater understanding of the priorities internal and external constituents place on the VDGIF's major functions and programs, and to suggest areas of priority for implementation of House Bill 38 revenues.

State Fish and Wildlife Agency Funding

Although state fish and wildlife agencies vary in their organizational structure's, responsibilities, objectives and operations, the principal sources of agency revenue can be categorized as follows (Spencer et al. 1983, WCFA 1996, Scott 1999):

1. Hunting and fishing license, stamp, and permit sales (46.5% of agency revenue, on average) .
2. Federal payments under the excise tax provisions of the Federal Aid in Sportfish Restoration and Federal Aid in Wildlife Restoration programs (funded through excise taxes on hunting and fishing equipment and motorboat fuel sales, 24%).
3. General fund appropriations raised from the taxation of the general public of the state (9.6%).
4. Interest income on deposited funds (1.9%).
5. Other revenue, such as revenue from income tax check-off, lottery income, special automobile license plates, or specific tax sources (18%).

Hunting and Fishing Licenses and Permit Sales

Since the early 1900s, the majority of funding for wildlife management and habitat protection, at the Federal and state level, has come from the consumptive users of game animals (Loomis 1991, Kolus et al. 1998). Roughly 20 years ago, consumptive users paid an estimated 75% of the cost of wildlife management (Jahn and Trefethen 1978, LaPage 1981). Today, fees paid by sportsmen in conjunction with federal payments continue to make up the largest part of the

funding base for state wildlife management. During fiscal year 1995, license sales and apportionment of federal excise taxes paid by hunters and anglers accounted for 75% or more of fish and wildlife agency funding bases in 27 states (Scott 1999).

In 1986, over 53% of all state fish and wildlife funding was raised through license fees (WCFA 1987). In Wisconsin, for example, 78% of the \$16.6 million that came from Wisconsin hunters in 1986 was generated by a single species, the white-tailed deer (*Odocoileus virginianus*) (Heberlein and Beckley 1990). Over \$13 million provided by deer hunter license sales supported fisheries, law enforcement, research and other bureaus (Heberlein 1991).

In fiscal year (FY) 1995, total fees from license sales generated revenues of \$943.3 million nationwide (WCFA 1996). This represented an increase of \$152.2 million (19.2%) over FY 1991. It is important, however, to note that the total number of fishermen and hunters who purchased licenses, stamps, and other permits declined slightly in FY 1994 as compared to the number reported for FY 1991 (USDI/FWS 1997). Although hunters and anglers continue to contribute the most to state agency budgets, proportionally, license revenues in the agencies' total budgets are shrinking while the proportion of federal payments and income from other sources (excluding state general fund monies) is growing (Table 1). This proportional change between license sales and federal payments, however, may have more to do with increased federal funding resulting from the 1984 Wallop-Breaux amendment to the Dingle- Johnson Act than with decreased license sales.

Table 1. Revenue Sources (%) for State Fish and Wildlife Agencies: 1979-1995. Source: Wildlife Conservation Fund of America 1996.

	FY1979	FY1986	FY1991	FY1996
License Revenue	56.5	53.4	49.7	46.5
Federal Payments	18.2	17.1	22.8	24.1
General Fund	9.4	14.2	9.6	9.6
Interest Income	1.3	1.9	1.9	1.8
Other Revenue	14.6	13.4	16	18
Total	100	100	100	100

The U.S. Fish and Wildlife Service and Federal Payments

The U.S. Fish and Wildlife Service is responsible for administering federal grants-in-aid to state fish and wildlife agencies for use in fish and wildlife restoration and enhancement (Barton 1987). The legal authority for the federal grants-in-aid to state wildlife agencies comes from the following laws:

- the Federal Aid in Wildlife Restoration Act, also referred to as the Pittman-Robertson Act
- the Federal Aid in Sport fish Restoration Act, also known as the Dingell-Johnson Act; and
- the Fish and Wildlife Conservation Act, also called the Forsythe-Chafee Act or the Nongame Act.

Together these three federal grant programs constitute the Federal Aid Program of the U.S. Fish and Wildlife Service (Chandler 1987, Drabelle 1985).

Federal payments represent the second largest source of revenue for state fish and wildlife agencies. On average, 17.8% of state wildlife budgets in the late 1970s were financed by some form of federal assistance (Chandler

1987) totaling \$107 million (WCFA 1980). In FY 1995, federal payments to states totaled \$489.2 million and on average represented 24.1% of states' wildlife budgets.

Whitehead (1983) in his survey of 47 state wildlife agencies reported the largest source of federal aid was Pittman-Robertson funds, accounting for 33% of all federal revenue. Dingell-Johnson was second, contributing 12.5% of the total (with the establishment of the Wallop-Breaux Fund in 1984, which expanded the D-J account, the percentage of D-J contributions are significantly higher). The Heritage Conservation and Recreation Service and EPA were the other major contributors, contributing 11.2% and 8.9% respectively (Whitehead 1983). The remaining one-third came from another 38 federal sources ranging from 0.01% to 5.7% of the total.

In 1995, Pittman-Robertson and Dingell-Johnson funds totaled \$329.4 million, and represented 71.5% of total federal funds received. During FY 1991, these two sources comprised 81% of the total federal funds reported (WCFA 1996). In 1997, a total of \$165.2 million was apportioned to states under the Pittman-Robertson Act and \$273.2 million under the Dingell-Johnson Act (PAWCO 1997, USDI/FWS 1997). The large increase of Dingell-Johnson monies in 1997 was in part, a result of \$20 million held in reserve in 1996 pending legislation that did not pass, thus making the funds available in 1997.

Federal Aid in Wildlife Restoration Program/Pittman-Robertson Act

The Federal Aid in Wildlife Restoration Program, more commonly known as the Pittman-Robertson (P-R) Act after its congressional sponsors, was initiated in the midst of the Great Depression by sportsmen and conservationists concerned about the nation's rapid decline in wildlife and wildlife habitat caused in large part by the "Dust Bowl" droughts (Drabelle 1985). The program's purpose was to restore wildlife populations by generating projects at the state level.

Originally, the P-R Act apportioned among the states the annual receipts from an 11% federal excise tax on firearms and ammunition. The current act also includes a 10% tax on handguns, and an 11% tax on archery equipment (Drabelle 1985, USDI/FWS 1984b). Federal grants under the P-R Act are used by states principally to benefit game animals, although FWS officials estimate 10 to 12 percent of the P-R funds are spent to benefit nongame animals (Chandler 1987).

Pittman - Robertson federal grants require states to contribute one dollar to match every three federal dollars. States may spend grant-in-aid monies on qualifying projects within the categories of land acquisition, management, planning, surveys and inventories, research, development, and hunter education (Chandler 1987, Drabelle 1985).

The Pittman-Robertson program has been extremely successful in providing consistent funding assistance that has enabled states to establish and progressively develop fish and wildlife programs (Chandler 1987, Williamson

1987). States have substantially increased populations of game animals such as elk (*Cervus* spp.), deer (*Odocoileus* spp.) and turkey (*Meleagris* spp.); protected or improved millions of acres of wildlife habitat; and significantly improved state wildlife-management efforts through surveys, inventories, and research (Downing 1987, Lewis 1987, Thomas and Lyon 1987, Williamson 1987, USDI/FWS 1984b).

The Federal Aid in Sport Fish Restoration Act/Dingell-Johnson Act

During World War II, Congress enacted excise taxes on various items, including fishing equipment (Drabelle 1985). At the end of the war, taxes on fishing equipment stood to be repealed until two congressmen, Representative John Dingell of Michigan and Senator Edwin Johnson of Colorado, proposed to use these taxes for fisheries restoration. In 1950, their bill was enacted as the Federal Aid in Sport Fish Restoration Act, more commonly known as the Dingell-Johnson (D-J) Act.

Although the Dingell-Johnson program was closely modeled after the Pittman-Robertson program there are some differences. Theoretically, P-R monies could be used to fund projects that encompass nongame as well as game animals. D-J funds, on the other hand, are limited to projects dealing with fish that have material value in connection with sport or recreation (Drabelle 1985). As with P-R, the principal D-J requirement is for the state to prohibit the diversion of fishing-license revenues for any purpose other than administering its fish and game department (Drabelle 1985).

Dingell-Johnson grants are used to benefit 30 to 40 species of sport fish such as trout (*Salmonidae*), bass (*Centrarchidae*) and catfish (*Ictaluridae*)

Chandler 1987, Drabelle 1985). Projects eligible for funding include research, land and water acquisition, development of fishing areas, fish restoration facilities, administrative coordination, and technical assistance.

Amendments attached to the Deficit Reduction Act of 1984 changed the Dingell-Johnson program significantly. That law established an Aquatic Resources Trust Fund, known as the Wallop-Breaux Fund, consisting of two accounts: the Boating Safety Account and the Sport Fish Restoration Account (Chandler 1987). The latter replaced the old D-J account (Drabelle 1985).

The 1984 amendments also expanded the sources and amounts of revenue for the sport-fish restoration program and authorized expenditure of funds for several new activities. The D-J Act derived all its funding from an excise tax of 10% on fishing rods, reels, creels and lures. The 1984 amendment extended the tax to additional items of sport fishing tackle and dedicated duties on yachts and pleasure craft and part of the motorboat fuel tax (Chandler 1987, USDI/FWS 1984a). Total program funds jumped from \$38 million in fiscal year 1985 to \$122 million in fiscal year 1986 and \$141 million in fiscal year 1987 (Barton 1987, Chandler 1987). In 1997 the Wallop-Breaux program collected and distributed over \$250 million to state agencies (USDI/FWS 1997, PAWCO 1997).

Congress also made modifications in the ways the funds can be used. To ensure one group of fisherman or another is not unduly favored in project expenditures, coastal states were required to distribute their grant allocation equitably between marine and freshwater fish projects – based on the proportion

of freshwater and saltwater fishermen in the state (Chandler 1987, Drabelle 1985). The 1984 amendment also required the states to use a minimum of 10% to develop recreational boating facilities. The law also permits each state to use up to 10% of its apportionment to provide aquatic resource education.

According to FWS sources, in the past 60 years the two Federal Aid programs, P-R and D-J/Wallop-Breaux, have raised more than \$5 billion (PAWCO 1997) for managing fish and wildlife species that may be harvested by hunters and fishermen. Roughly 70 million sportsmen are served by these programs, as are millions of other Americans who enjoy the same species through participation in nonconsumptive activities (USDI/FWS 1984b). However, species that are hunted, trapped and fished constitute no more than 10% of America's vertebrate fauna. The remaining 90% are nongame species which receive much less management attention (Manville 1989, Cerulean and Fosburgh 1986, USDI/FWS 1984b). These nongame fauna include 350 species of mammals, 650 species of birds, 470 species of amphibians and reptiles, and 630 species of fish (Manville 1989).

Federal Aid and Nongame Management

The nongame funding issue evolved in the early 1970s as conservationists began to urge federal involvement in state nongame management. The Committee on North American Wildlife Policy reported the need to broaden the approach of traditional game management as it was becoming clear there was a continuing shift in the use of the wildlife resource from a consumptive to nonconsumptive mode (Allen 1973). At the same time,

many writers argued for adoption of an ecosystem management approach in which nongame species were essential components (Graul et al. 1976, Wright 1976, Martyr 1978). Pister (1976) provided additional reasons for nongame management, illustrating projected increased demand for wildlife-oriented recreation. He concluded that the public's increased demand for wildlife-oriented recreation could only be met by management of the total wildlife resource.

By the end of the 1970s, 49 state fish and wildlife agencies had established nongame wildlife management programs, yet they remained underfunded (Zwank et al. 1980, USDI/IAFWA 1983, Mangun et al. 1992). More than 260 conservation organizations and agencies from all 50 states identified their support for a federal nongame program (USDI/FWS 1984a) and in April 1979, the Fish and Wildlife Conservation Act of 1980, commonly known as the Nongame Act, was passed by Congress.

The Fish and Wildlife Conservation Act/Forsythe-Chafee Act or the Nongame Act

The Nongame Act authorized the annual appropriation of up to \$5 million, to be distributed as matching funds, to states developing and implementing comprehensive management plans that incorporate nongame fish and wildlife species (Cerulean and Fosburgh 1986, Mangun et al. 1992). Amendments made to the act in 1988 and 1989 required the FWS to monitor and assess migratory nongame birds and their habitat, determine the effects of environmental changes and human activities, to identify wildlife likely to be candidates for endangered species listings and to identify appropriate actions for their conservation (USDI/FWS 1999).

Although the act was reauthorized in 1986, 1988, 1990, and in 1992 (through fiscal year 1997) no funds have ever been appropriated (Vickerman 1989, USDI/FWS 1999). Section 12 of the act required the FWS to prepare a study of various ways to finance state nongame conservation projects. The report, *Potential Funding Sources to Implement the Fish and Wildlife Conservation Act of 1980* (USDI/FWS 1985) was submitted in 1985, but lacked a Reagan administration recommendation for implementing any of the funding alternatives discussed (Chandler 1987).

Alternative Funding Sources

Despite the need and growing interest in wildlife conservation, and the gradual increase in most nongame budgets, funds continue to be insufficient and derived primarily from voluntary sources such as income tax check-offs and sale of wildlife conservation license plates (Manville 1989, Vickerman 1989). Agency leaders indicate that funding needs for nongame conservation exceed current budgets (Vickerman 1989) and that more funding and stable sources of funding are required (Kolus et al. 1989).

In 1985, 45 states allocated funds for nongame and endangered wildlife programs (Cerulean and Fosburgh 1986). Five states expended \$1 million or more (California, Missouri, Florida, Colorado and New York). Twenty-three states spent \$100,000 to \$500,000 on nongame conservation; 3 states spent less than \$50,000, and Louisiana, Mississippi, New Hampshire and South Dakota spent no funds (Cerulean and Fosburgh 1986). In FY 1995, 49 states reported spending a total of \$49.9 million on nongame programs (WFCA 1996).

Since Colorado first initiated its program in 1978, many states have generated funds for nongame programs via a voluntary check-off on state income tax forms (Loomis 1991). By 1982, these check-offs had spread to 21 states (Loomis and Mangun 1987) and today, 36 states generate revenue from check-off programs (WCFA 1996). Initially, tax check-offs proved quite successful in raising voluntary funds but as time passed, they generated insufficient and unpredictable sums. Since 1987, check-off income has increased in 13 states and decreased in 17 states (Edelson 1994). In some states, less than \$100,000 in revenue has been obtained in recent years (Vickerman 1989, Loomis 1991). One of the main reasons for the decline in contributions is the addition of competing checkboxes on the tax forms. Nongame contributions decreased an average of 16.4% when another checkoff appeared on the tax form (Vickerman 1989). Eubanks and Wykoff (1989) reported that total contributions from check-offs in 1983 amounted to about \$9 million, which is, only slightly less than the \$9.1 million generated in 1995 (WCFA 1996).

Florida finances its nongame conservation program with a tax on vehicles registered in that state for the first time. With more than 5,000 people moving to Florida each week, the first year's receipts generated between \$1.5 to \$1.9 million (Cerulean 1986, Vickerman 1989). Florida also encourages its residents to donate an additional dollar when they renew their annual vehicle registrations.

Only five agencies in recent history have come into significant sources of alternative funding. Missouri and Arkansas both receive a 1/8 of 1% state sales tax to help support their agencies and conservation programs. Arizona and

Colorado receive a portion of unobligated state lottery monies to provide funding for their various wildlife and outdoor programs. And in FY 2001, Virginia will receive its first proceeds from House Bill 38 - an apportionment of reallocated state tax monies collected from the sale of hunting, fishing and wildlife-related equipment.

Missouri – Design for Conservation

What began as a proposal tagged “Design for Conservation” became a constitutional amendment approved by the voters of Missouri in 1976 (Spencer et al. 1983). It provided for a 1/8 of 1% sales tax, with all funds earmarked for Conservation Department expenditures for fish, wildlife and forestry programs. The tax yielded about \$148 million during the first five years (1977 – 1982), an average of approximately \$30 million per year. The Missouri Department of Conservation received \$78 million from this tax in 1998 and will receive an estimated \$82 million in 1999 (Luebbert 1999). These sales tax revenues constitute well over half of the total department income and have been sufficient to greatly expand department efforts (Luebbert 1999, Spencer et al. 1983).

Arkansas – Conservation Tax Campaign

Arkansas began its Conservation Tax Campaign in 1983 when the Game & Fish Commission learned of the looming funding crisis the agency faced (Klaser 1997). Through the initiative petition process, the campaign got its proposal on the 1984 Arkansas state election ballot. It narrowly failed with 47% of the vote. It failed two more times, in 1986 and 1994, before it passed with 50.6% of the vote in 1996. The tax will raise \$39 million annually; of that, the

Game and Fish Commission will receive 45% or about \$17 million per year. Monies are expected to be divided among law enforcement (17%), conservation education (14%), restoring curtailed fish and wildlife programs (30%), endangered species and habitat protection (7%), land acquisition and improvements (29%) and administration and support services (5%) (AGFC 1998).

Arizona – Arizona Heritage Fund

Enacted with strong electoral support in 1990, The Arizona Heritage Fund initiative mandated the state to spend \$20 million of lottery revenues annually for a variety of recreation, park, wildlife, environmental education, and cultural resource programs (Mutter et al. 1996). This highly successful initiative expanded Arizona's Game and Fish Department revenues by \$10 million per year, an increase of nearly 50% over previous funding levels. Administered jointly by the Arizona State Parks Board and the Arizona Game and Fish Department, the Arizona Heritage Fund provided more than \$50 million in grants or direct program expenditures to a wide variety of recreation and natural resource protection projects in Arizona between 1991 and 1994 (Mutter et al. 1991)

Colorado – Great Outdoors Colorado

In November 1992, Colorado's voters approved Amendment 8, the Great Outdoors Colorado Amendment. Under this amendment, the Legislature allocated a portion of the net Lottery revenues to the Great Outdoors Colorado Trust Fund. Revenues from this fund are used to preserve, protect and enhance the state's wildlife, parks, open spaces and rivers. The Great Outdoors

Colorado Trust Fund was projected to receive an average of \$10 to \$20 million annually through 1998. After that, pending the General Assembly reauthorization of the Lottery, the Trust Fund will receive up to \$44 million per year (GOCO 1999).

Virginia – House Bill 38

Background

A legislative audit revealed that VDGIF would be operating at a deficit by fiscal year 2000. This financial audit provided motivation for the agency and a state legislative task force studying VDGIF's funding situation to explore alternative funding sources. These efforts led to House Bill 38 (HB38), passed into law by the 1998 Virginia General Assembly. HB38 will allocate to VDGIF 2% of the state's 4.5% sales tax on hunting, fishing and wildlife viewing related equipment and auxiliary equipment (up to a maximum of \$13 million per year).

The percentage of sales tax revenue VDGIF will receive is based on estimates of constituent expenditures on wildlife based recreation in Virginia as determined by the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (National Survey), a survey conducted every 5 years by the Fish and Wildlife Service. The Virginia Department of Game and Inland Fisheries will receive its first infusion of this reallocated sales tax revenue (\$12.3 million) on October 1, 2000. Funds will be transferred in quarterly installments directly into the Game Protection Fund – removing these revenues from state general revenue funds and effectively preventing diversion by legislators for other purposes.

Support and Opposition

Both consumptive and nonconsumptive users supported House Bill 38. Civic clubs, such as church groups and Kiwanis clubs also supported the bill (Kolus et al. 1999). VDGIF mobilized support from a network of Teaming With Wildlife supporters. In addition, the agency used its board members extensively, even assigning them specific legislators with whom to discuss the bill (Kolus et al. 1999). Although consumptive users nationwide are generally supportive of state fish and wildlife agencies' efforts to secure alternative funding, some consumptive users fear competition from nonconsumptive users for agencies' attention and resources (Kolus et al. 1999).

Although minimal opposition to HB38 existed in the General Assembly, it diminished due to the overwhelming support of constituents (Kolus et al. 1999). In the end, the bill passed without a single dissenting vote in either house of the legislature.

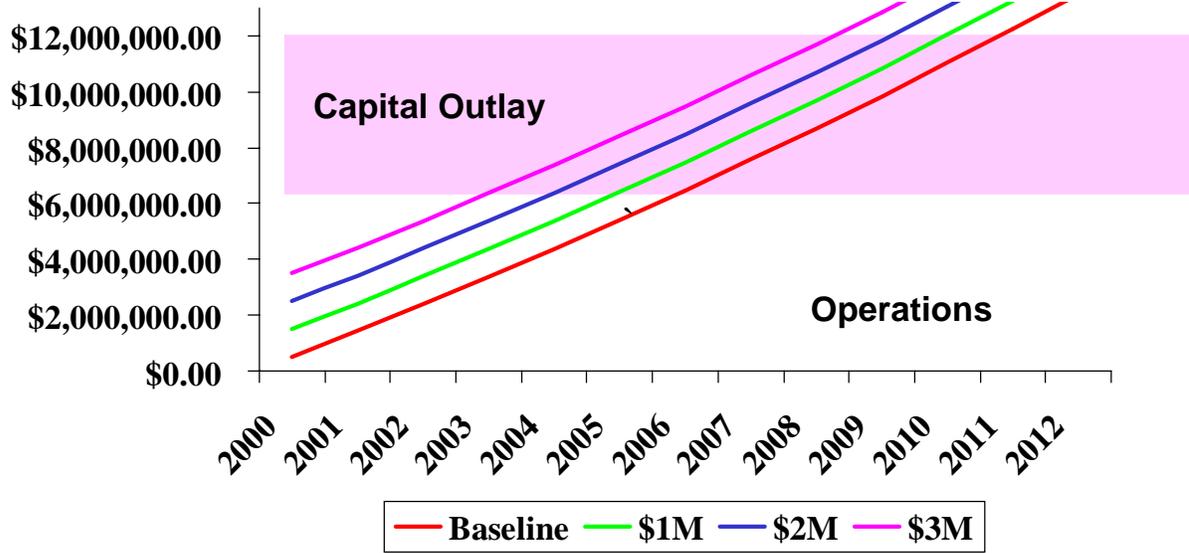
Implications of House Bill 38 for VDGIF

Increased Financial Resources

The most immediate impact of HB38 is that it keeps VDGIF solvent longer. House Bill 38 increases the agency's budget roughly 33% - from \$36 million to \$48 million. However, despite its improved financial condition, HB38 funds do not assure the security of the agency indefinitely.

Two factors will greatly influence the effect of HB 38 funds: 1) current capital improvement needs and, 2) annual inflation. Up to 50% of HB 38 revenue may be committed to capital projects such as constructing new buildings, acquiring new lands and renovating existing facilities. Based on the backlog of

capital improvement needs, it is likely that the agency will allocate the full 50% (\$6 million) to these capital needs for many years. Figure 1 illustrates the effect of inflation. If one-half of the \$12.3 million the agency receives is allocated to capital outlay as expected, approximately \$6 million will be left for other programs. If no new programs or personnel are added, inflation at 3.5% will deplete the new \$6 million by 2006. For each 1 million in new programs added, these funds will be depleted one year earlier. Thus, inflation would deplete these new funds in 2005 if \$1 million of new programs were added.



Assumes a 1999 operating budget of \$34.5 M and projected non-HB38 revenues
 Additional costs are assumed to occur in 2000 and be recurring

Figure 1. Effect of inflation fixed at 3.5% annually on four different operating cost assumptions for VDGIF budget. Source: Virginia Department of Game and Inland Fisheries 1998

Broadened Constituent Base

House Bill 38 broadens the constituent base of the Virginia Department of Game and Inland Fisheries. This will enable the agency to better fulfill its mission of managing all Virginia fish and wildlife for all the citizens of the Commonwealth (Appendix A).

Apart from having played a key political role in getting HB 38 passed, wildlife viewers (nontraditional users) will be making a substantial financial contribution to the agency. Prior to HB 38, 90% of agency revenue came from fishing and hunting licenses, Federal Aid in Fish and Wildlife Restoration or boating sources (Figure 2). With HB 38 funding, licenses and Federal Aid will still contribute nearly 60% of the budget but 26% of the budget will be derived from HB 38 revenues (Figure 3). Although a good deal of this \$12.3 million still will be generated by traditional sportsmen, for the first time, the agency will be receiving a sizeable contribution from constituents who traditionally have not paid for wildlife management.

In 1996, the National Survey showed wildlife viewers spent nearly four times as much on wildlife-associated recreation equipment (upon which HB38 revenues are calculated) as either hunters or anglers spent (Table 2). On total recreation expenses (trip related expenses and equipment), wildlife viewers spent more than hunters but less than anglers. Although there are fewer hunters than the other two groups, they spend more per person (\$1,475) recreating than do either anglers (\$1,072) or wildlife viewers (\$554).

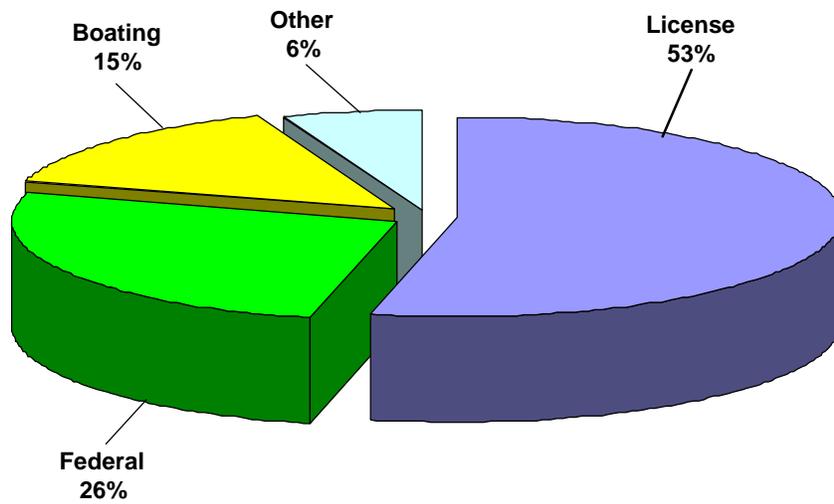


Figure 2. Distribution of Virginia Department of Game and Inland Fisheries Revenue (%), prior to receipt of HB 38 funding. Source: Virginia Department of Game and Inland Fisheries 1998

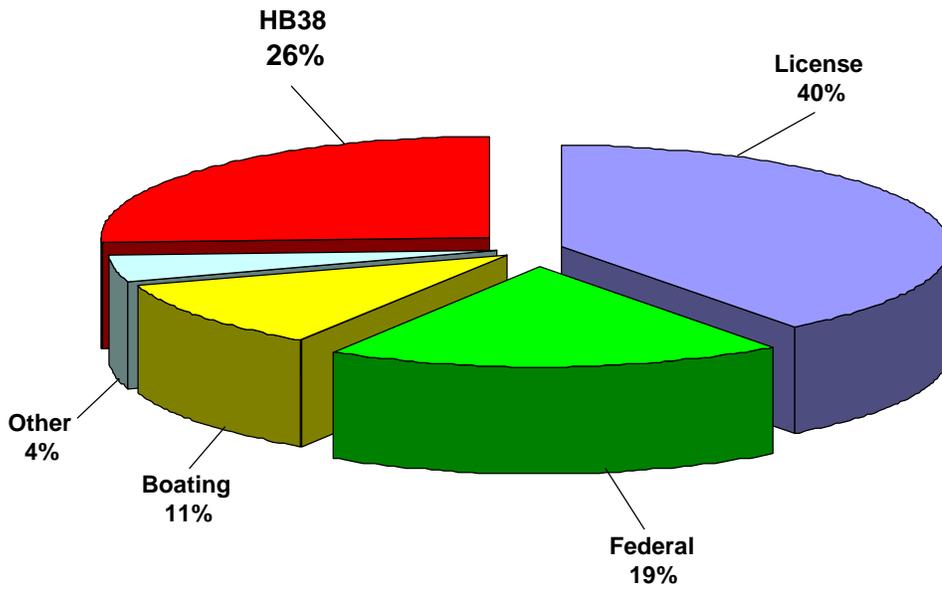


Figure 3. Distribution of Virginia Department of Game and Inland Fisheries Revenue (%) after receipt of HB 38 funding.

Table 2. Number of participants and various expenditures for wildlife-associated recreation, 1996, in millions unless otherwise noted. Source: U.S. Department of the Interior/Fish and Wildlife Service 1996.

	Wildlife Viewers	Hunters	Anglers
Number of Participants	62.9	14	35.2
Equipment Expenditures	\$19.7	\$5.5	\$5.3
Total Expenditures	\$29.2	\$20.6	\$37.8
Yearly Expenditures Per Person	\$554*	\$1,475*	\$1,072*

*in dollars

The challenge for the VDGIF will be to find ways to serve these newly empowered, contributing constituents and, at the same time, continue to serve the traditional users that have been the financial backbone of the agency since its inception. With the likely passage of the Conservation and Reinvestment Act of 1999 (CARA), which stands to provide substantial additional funding to wildlife agencies around the country, states will be watching how Virginia involves all its constituents in the management of the state's wildlife resources.

The Conservation and Reinvestment Act of 1999

The Conservation and Reinvestment Act of 1999, if passed, would dedicate a approximately \$3 billion of federal revenue derived from outer continental shelf (OCS) oil and gas leasing and production to states for coastal impact assistance, land conservation and wildlife programs (Cook 1999, IWLA 1999c). This act was originally sponsored by Reps. Don Young (R-Alaska) and John Dingle (D-Michigan). Title 1 of CARA dedicates 27% of OCS revenues to coastal protection and enhancement. Title II allocates 23%, up to \$900 million of permanent appropriation, for the Land and Water Conservation Fund and Urban

Parks and Recreation Recovery. Title III provides 10%, currently estimated at about \$459 million annually, for fish- and wildlife-based conservation, education, and recreation. This title is intended to achieve the goals of the Teaming With Wildlife initiative endorsed by over 2,100 organizations (CDNR 1997, IWLA 1999a).

After some resistance by members of the House of Representatives, CARA won the House Resources Committee approval on a bipartisan, 37-12 vote in November 1999 (Waldon 2000). This was due in large part to the compromise legislation introduced by Representatives Young and George Miller (D-California). In the Young-Miller plan, all states would benefit from CARA but coastal states would get the most funding.

The Conservation and Reinvestment Act is expected to be voted upon in the House by March 2000 after which time it will be passed on to the Senate. With support by the House leadership, an overwhelming list of cosponsors in the House, and a booming economy CARA is likely to receive congressional approval (Waldon 2000).

Teaming With Wildlife and the Land and Water Conservation Fund

Teaming With Wildlife (TWW) and the Land and Water Conservation Fund (LWCF) are two programs that are complementary in many ways but accomplish distinctly different purposes. The goals of both programs are included in CARA. The TWW initiative proposed to fund state conservation, recreation and educational activities by establishing a 0.25% to 5% sales tax on outdoor equipment (Franklin and Reis 1996). Such a tax would have been similar to the

taxes hunters and anglers pay on hunting and fishing equipment under the Dingell-Johnson and Pittman-Robertson programs (CDNR 1997, Cook 1999). But Congress was not receptive to creating a new tax, and Congressman Young stepped forward with the idea of using funds from offshore oil and gas leases for much the same purposes. TWW also lacked general support from many large and influential recreation equipment retailers.

The Land and Water Conservation Fund was created in 1965 to fund federal purchase of land and water areas for recreation and conservation and to develop recreational sources open to all Americans. It was also enacted to provide federal funds to states to assist in planning, acquiring and developing needed land and water areas and recreation facilities. The fund derives its revenues from Federal motorboat fuel tax, surplus property sales, and oil and gas leases on the outer continental shelf (Gorte 1995). Although LWCF receives \$900 million annually, much of these proceeds are routinely tapped for other uses. Since 1965, it is estimated that up to \$10 billion of LWCF has been diverted by Congress for other uses (Gorte 1995) resulting in billions of dollars of important land conservation efforts having gone unmet (IWLA 1999b). Efforts in the past few Congresses to change the LWCF to permanently appropriate the revenues, rather than make them subject to annual congressional appropriations, have not been successful. It is encouraging to note that under CARA, the funds for state fish and wildlife agencies, at least Title III conservation funds, would be permanently appropriated in the same way that the existing Pittman-Robertson (P-R) fund is established and administered.

Trends in Fish and Wildlife Resource Usage for Outdoor Recreation

Wildlife-related recreation is one of the most popular forms of recreation in the United States. In 1996, 77 million people participated in hunting, fishing and wildlife watching (including feeding and photographing wildlife)(USDI/FWS 1998). By comparison, total attendance in 1996 for all Major League Baseball and National Football League games numbered about 73.8 million (Carter and Sloan 1997). There is an increasing demand for outdoor recreation, a growing diversity of constituencies and range of benefits sought from the resource base, and at the same time a reduction in traditional fish and wildlife users.

Fish and wildlife agencies and recreation industries are concerned about potential declines in participation and reduced license revenues for management (Duda and McElveen 1991). Fish and wildlife agencies are facing a loss of organized constituent support as traditional hunting and fishing organizations decline in number, membership and political influence, while at the same time a diversity of interest groups is emerging (Wildlife Management Institute 1997). The loss of utilitarian users of the resources could cause agencies to lose historically supportive constituencies with strong conservation and environmental attitudes (Dann and Peyton 1996).

Between 1955 and 1980, the number of anglers in the U.S. doubled and the number of hunters grew 50% (Ashe 1986). Since 1980, however, numbers of anglers and number of hunters and the total days they spent fishing and hunting have declined (Cordell et al. 1995, Dann and Peyton 1996). From 1987 to 1992, the number of fishing licenses issued grew less than 1% while the population

grew 5.3% (Matthews 1993). License holders made up 12.5% of the population in 1987 and 12% in 1992. Fishing participation declined 2% for all ages each year (Matthews 1993, Sportfishing Promotion Council 1993). Although the FWS reported the number of anglers increased 20% between 1980 and 1990 (USDI/FWS 1994), most recent figures show a decrease in absolute number of anglers. In 1991 there were 35.6 million anglers compared to 35.2 million in 1996 (USDI/FWS 1997a).

Sport hunters have declined in both absolute numbers and in percentage compared to U.S. population. Total number of hunters increased from 11.8 million in 1955 to 17.1 million in 1975 (Heberlein and Thomson 1996). From this peak, hunter numbers declined to 16.5 million in 1985. The number of hunters in 1994 was roughly equal to that in 1960 (Ruh 1994). In 1991, hunters numbered 14.1 million and decreased slightly to 14.0 million in 1996 (USDI/FWS 1997a).

Hunting participation in the U.S. population declined from 10.2% in 1980 to 9.0% in 1985 while increasing to 9.4% in 1990 (Heberlein and Thomson 1996). The increase in total hunting participation from 1985 to 1990 was due to an increase in female hunting participation. In 1997, all hunters represented only 7% of the total U.S. population (Adams et al. 1997). The percentage of males who hunt has declined from 19.5% in 1980 to 17.7% in 1985 to 16.4% in 1990. Male participation continues to decline at a rate of 3.1% per decade (Heberlein and Thomson 1996). From 1980 to 1990, Virginia has undergone a decline of 18% or more in state residents who hunt (USDI/FWS 1994).

Although the diversity of constituency interests was noted at the earliest North American Wildlife and Natural Resource Conferences (Dann and Peyton 1996), this reality is becoming more and more apparent. An increasing number of recent studies have focused on nontraditional users of wildlife (Mangun et al. 1992, Gray 1993). Over 62 million people participated in some form of wildlife watching (observing, feeding or photographing wildlife) in 1996 (USDI/FWS 1998) but wildlife watching participation shows mixed trends. Since 1980, the number of wildlife watchers who took trips away from home for the purpose of viewing wildlife (nonresidential) has increased dramatically, up 63% (Schuett 1995). Wildlife feeding, which experienced a 6% increase from 1980 to 1985, showed a decrease of 5% from 1985 to 1990 (USDI/FWS 1994). Participation in wildlife watching decreased by 17%, from 76.1 million in 1991 to 62.9 million in 1996 but expenditures for trips and equipment increased by 21% (USDI/FWS 1997a). Notwithstanding the declines, Flather and Cordell (1995) reported in 1995 that the number of individuals travelling to observe, feed or photograph wildlife had increased over the last 10 years at an annual rate exceeding all other wildlife-oriented recreation.

Of all the wildlife watching activities, observing wildlife is the most popular (USDI/FWS 1997a). In 1996, birds attracted the largest percentage of people, 75% of all participants. Land mammals such as deer, bear and coyotes attracted as much attention as birds, also 75%. The percent of people who observed, fed or photographed fish was 36%, marine mammals 15% and all other animals (turtles, butterflies, etc) 49% (USDI/FWS 1997a).

Cordell et al. (1995), in data from 1994-1995 surveys, reported that one of the most popular outdoor recreation activities in the U.S. was visiting a nature center. Their data also showed that the fastest-growing outdoor recreational activities included birdwatching, hiking, backpacking and primitive camping (Table 3). Although not all of these activities are directly dependent on fish and wildlife resources, fish and wildlife often play an important role in the participants' experience of these activities. Cordell et al. (1995) also reported a decline in seven outdoor activities in the period between 1982 and 1995 – two of which were hunting and fishing (Table 4).

Table 3. Ten fastest-growing outdoor activities among persons (in millions) 16 years or older in the United States, 1982 – 1995.
Source: Cordell et al. 1995

Activity	1982-83	1994-1995	% Growth
Birdwatching	21.2	54.1	155.2
Hiking	24.7	47.7	93
Backpacking	8.8	15.2	72.7
Downhill skiing	10.6	16.8	58.5
Primitive camping	17.7	28	58.2
Walking	93.6	133.6	42.7
Motor boating	33.6	46.9	39.9
Sightseeing	81.3	113.4	39.5
Developed camping	30	41.5	38.8
Swimming in natural waters	56.5	78.1	38.2

Table 4. Activities for which numbers of participants (in millions) decreased in the United States, 1982 – 1995.
Source: Cordell et al. 1995

Activity	1982-83	1994-1995	% Growth
Tennis	30.0	21.2	-29.3
Hunting	21.2	18.8	-11.4
Horseback riding	15.9	14.2	-10.7
Sailing	10.6	9.6	-9.4
Attending outdoor concerts or plays	44.2	41.5	-6.1
Fishing	60.1	58.3	-3.0
Ice Skating	10.6	10.6	-1.9

The Effects of Demographic Changes on Wildlife-Related Recreation

Significant demographic shifts across the U.S. are affecting public perceptions about fish and wildlife management and participation in wildlife related recreation (Lapointe and Thompson 1993). These changes point toward a more urban population, more elderly residents, more single parent households and more racial and ethnic diversity (Lapointe and Thompson 1993, Matthews 1993, Dwyer 1994). These changes have important implications for wildlife resource management.

Urbanization

The demographic change with the greatest potential to affect fish and wildlife management is increasing urbanization. The percentage of the U.S. population living in urban areas rose from 35% in 1900 to 78% in 1990 (Anonymous 1991). More than three-quarters of our population lives in the nations' 837 metropolitan counties (O'Malley 1994). Urban or rural differences

are particularly great with hunting participation, somewhat less with fishing, and lowest for other wildlife-associated recreation (Dwyer 1994). Research suggests that migration to urban settings diminishes hunting opportunity and isolates individuals from social systems that support hunting (Brown et al. 1987). Kellert and Berry (1980) pointed out significant urban or rural differences in perceptions of animals and the natural environment. Kellert (1984) identified a wide range of variation in those perceptions across urban areas, with environmental and wildlife knowledge high in suburban areas compared to more heavily populated urban areas.

Aging

In 1900, the median age in the U.S. was 22.9 years and by 1990 the median age had increased to 32.9 years (Brown 1997). One-third of the U.S. population is now comprised of the baby boomers, born from 1946 to 1964. They are now middle-aged, and will begin becoming elderly (over 65) in the year 2011 (Brown 1997). By 2025, 20% of the U.S. population will be over 65. In comparison, only 11% of our population in 1990 was 65 or older (Murdock et al. 1990). Due to the fact that women currently live an average of 7 years longer than men, the older population will be numerically dominated by women. In addition, minorities are relatively young (Brown 1997). One-third of Americans under 35 belong to minority groups, whereas only one-fifth of those over 35 do. The fastest growing segments of our population are age groups 25 to 44 and 65 and over (Murdock 1995). We are becoming a population of younger minorities and older Anglos (Brown 1997).

Aging usually has a high correlation with the likelihood of participating in wildlife-related recreation activities. The general trend is a decrease in participation with increasing age. When that decrease begins depends on the type of recreational activity.

The 1996 National Survey (USDI/FWS 1997a) provides the opportunity to look at patterns in percent of the population participating in wildlife-oriented activities by age class (Table 5). For fishing only, hunting and fishing, and hunting or fishing, participation peaks between 35-44 years and declines thereafter. Murdock et al. (1992), however, found that African Americans were the only ethnic group that maintained their interests in fishing as they aged. Hunting only participation appears to remain steady at 3% of the population through age 64 when it then declines.

Wildlife watching gradually increases with age, dipping only slightly between ages 55 – 64 and remains high even at 65 and above. The overall pattern suggests that, for older age groups, there may be a tendency to shift hunting and fishing to activities such as observing, photographing and feeding animals.

Table 5. 1996 percent participation in hunting, fishing, and wildlife-associated recreation activities in the U.S Source: USDI/FWS 1996.

Activity/Age Class	16 - 17	18 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - older
Hunting	2	2	2	3	3	3	1
Fishing	13	12	15	16	14	11	7
Hunting or Fishing	22	19	23	24	22	18	10
Hunting and Fishing	7	5	6	6	5	4	2
Wildlife Watching	18	17	28	36	35	36	32

Racial and Ethnic Diversity

Although the overall rate of population growth is slowing, the ethnic diversity of our population is changing rapidly. Immigration and the offspring of immigrants will make up the largest proportion of our future growth – 55% from 1990 to 2050. (Murdock 1995, Brown 1997). In 1990, 75.6% of the U.S. population was Anglo, 11.8% was African American, 9.0% was Hispanic and 3.6% classified as other (largely Asian). But from 1980 to 1990, the Anglo population increased by only 4.2%, the African American population by 12.0%, the Hispanic population by 53.1% and the population of others by 71.7% (Brown 1997). By 2025, 81% of the population growth in the U.S. will come from nonwhite populations (Spencer 1993). Today, 89% of anglers and 93% of hunters are Anglos (Matthews 1993).

By 2025, recreational fishing is expected to grow by only 0.5% (Harrington Market Research 1991) because the growth sector in the population, African Americans, Hispanics and Asians, have generally not demonstrated a strong predilection for fishing, even though fishing is firmly rooted in each of their cultural traditions (Matthews 1993). While Anglos participate in freshwater fishing at rates from 2 to 4 times that of African Americans, Hispanic and other ethnic groups, they participate in salt-water fishing at rates lower than all other ethnic groups except younger Hispanics (Murdock et al. 1992, Brown 1997).

Nadkarni and O'Leary (1992) studied 18,450 individuals who reported participation in a wide range of recreational activities including hunting, freshwater fishing and birdwatching. They found that African Americans were

significantly less likely than the other three groups (Anglos, Hispanics and Other) to participate in many of the outdoor recreation activities studied, particularly those that take place in a wildland setting (i.e., mountain climbing, hiking, backpacking, camping and canoeing). In some athletic activities (aerobics, running and jogging), African Americans were significantly more likely than Anglos to participate.

In wildlife-based outdoor recreation - hunting, fishing and wildlife watching – the pattern of participation across racial and ethnic groups is similar to that observed for a wide range of recreational activities, with African Americans having the lowest percent participating (Table 6). African Americans were more likely than Anglos to use city and town resources than rural resources for recreational activities, as well (O’Leary and Benjamin 1982). African Americans made greater use of local parks and less use of state and national parks (Craig 1972).

Table 6. 1996 percent participation in hunting, fishing, and wildlife-associated recreation activities in the U.S. by racial and ethnic group. Source: USDI/FWS 1997

Activity	Anglo	African American	Other
Hunting	3	(z)	1
Fishing	14	8	9
Hunting or Fishing	21	10	12
Hunting and Fishing	5	1	2
Wildlife Watching	35	10	15

(z) less than 0.5%

Families and Household Composition

The changing composition of the American household portends a major change in the future of our culture and will have important implications for the management of our wildlife resources. The average size of American households declined from 3.67 in 1940 to 2.63 in 1990, largely due to lower marriage rates, higher divorce rates, lower fertility and more diverse living arrangements (Murdock 1995, Brown 1997). Nearly 25% of American children are raised in one-parent households compared to 9.1 percent of children in 1960 (Lapointe and Thompson 1993). There are fewer traditional households with married couples (Matthews 1993) and there are more female heads of households. Since most children learn traditional wildlife recreation from men, the common belief is that the increase in women head-of-household families will undoubtedly affect children's attitudes about wildlife and impact hunter and angler recruitment (Lapointe and Thompson 1993). However, in a study of factors related to hunting and fishing participation nationwide, Americans who grew up in single-parent households were as prone to participate in hunting as those who grew up in two-parent households (Responsive Management 1995, Duda et al. 1998).

Nearly one-half of the children of single-parent households headed by women live in poverty (Edmonson 1994). Income in female-headed households in 1987 was only 44% of that of married-couple households (Brown 1997). Economic stratification follows ethnic and age lines as well. In 1987, median household incomes of African Americans were 60% and Hispanics 70% of that of

Anglos. Also, median incomes of households with a head under 25 years of age or with a head over 65 were less than 50% of households with a head who was 45 to 54 years old (Murdock 1995).

Unfortunately, this shift to a more urbanized, aging, increasingly diverse ethnic population with limited economic resources and fragmented families may not bode well for those interested in natural resources (Brown 1997). All of these changing demographics will affect use and interest in our natural resources in the future. An encouraging trend seems to be an increase in the numbers of women who are participating in shooting sports (National Shooting Sports Foundation 1991) and in fishing (33% of all adult anglers are women)(Harrington Market Research 1991). Manfredo and Zinn (1996) also suggest that there is substantial latent interest in fishing and hunting among people who currently do not participate (Manfredo and Zinn 1996). For example, 30% of all respondents in a Colorado survey reported going fishing during the preceding 12 months, yet 61% were interested in taking fishing trips in the future. Similarly, 14% had hunted during the previous 12 months, but 28% showed interest in participating in future hunting trips.

Human Dimensions and Public Involvement in Wildlife Resource Management

Fish and wildlife managers must manage the resource taking into account cultural, economic, political and ecological components (Decker et al. 1992), but perhaps the most critical component agencies will need to survive in the future is understanding the needs and desires of their diverse stakeholders (Decker et al. 1992, Thorne et al. 1992). The pervasive challenge for all natural resource managers is to recognize the interests of diverse constituencies and coordinate use by them to optimize value while at the same time sustaining the resource (Decker et al. 1996).

Increasingly, diverse nontraditional users of the fish and wildlife resource have communicated to policy makers and managers their desires to have their interests addressed (Decker et al. 1996). Public expectations for agency programs vary widely (Witter 1990). Agencies, for the most part, satisfy the interests of harvest-oriented constituents. Many constituents, however, are asking for wildlife watching or aesthetic-oriented facilities and services such as nature centers, hiking trails, birding guides and special nonconsumptive events comparable to hunting seasons (Catlin 1984, Thorne et al. 1992). Some citizens oppose traditional hunting and fishing recreation and seek to eliminate it (Richards and Krannich 1991). Still others are simply uninterested. Witter's (1992) research showed that one-fifth of Missouri's citizens are generally unconcerned with wildlife.

As people pay greater attention to the management of natural resources (Johnson et al. 1993), wildlife management agencies must consider public perceptions, desires and opinions, and how the public will respond to management policies. Management decisions made without prior knowledge of public attitudes and concerns may often be strongly opposed, resented or misunderstood (Tillet 1963, Heberlein 1989). Researching and incorporating public input is essential for any wildlife agency (Thorne et al. 1992). Even if a wildlife policy seems biologically sound, it will not be successful without the support and compliance of the public it affects (Johnson et al. 1993).

Defining Human Dimensions

Human dimensions in resource management refers to the challenge of understanding and clarifying stakeholders' perspectives on wildlife management issues and programs, and incorporating this information into the process of decision making (Decker and Lipscomb 1991, Decker and Enck 1996). Dr. John Hendee formally introduced the term human dimensions to the wildlife profession at the North American Wildlife and Natural Resource Conference 25 years ago (Manfredo et al. 1998). Although public involvement and human dimensions research and application has grown substantially in the last 20 years, it has often been met with resistance. Decker et al. (1987) suggested that impediments to advancement of human dimensions center around 1) the prevalence of a biological basis among agencies and universities, 2) a communications gap between social scientists and managers, and 3) a poor image of social science among wildlife managers. The reticence to embrace human dimensions can be

more readily understood knowing that fish and wildlife resource management was established under the philosophy of scientific resource management (McMullin 1995).

Historical Perspectives of Human Dimensions and Public Involvement

Scientific resource management, made popular in the late 19th and early 20th centuries, emphasized biological factors more than social, economic and political factors (McMullin 1995). Resource managers based their management on the concept of maximum sustained yield (MSY) – obtaining the most from a resource employing scientifically based means and actions. The prevailing attitude was that resource management was too complex to involve the general public (McMullin 1995).

In the last 30 years, many factors have contributed to the shift from purely scientific-based management to management practices requiring more public involvement. In the late 1960s, the concept of optimum sustained yield (OSY) began to replace MSY (McMullin and Nielsen 1991a). Optimum sustained yield includes social, political and economic factors in management. Decker and Enck (1996) suggest that interest in human dimensions grew first from the desire to improve management for traditional purposes - to understand farmers' experiences with problem-causing wildlife, to understand the recreational needs of hunters and anglers (especially factors influencing recruitment and retention), and to understand landowners resistance to use of their land for wildlife-related recreation (Decker and Enck 1996). During the late 1960s and early 1970s, public interest in the environment increased, heightened by Earth Day and

evidenced in such legislation as the Multiple Use-Sustained Yield Act, National Environmental Policy Act, and the Endangered Species Act (Decker et al. 1996). Much of the environmental legislation mandated significant public involvement in setting goals and choosing options for natural resource management (McMullin 1995).

This time of increased interest in environmental issues saw the creation of many local, state, and national environmental groups that vigorously sought consideration in management and policy decision making (Decker et al. 1996). Naisbitt (1982) observed that Americans are shifting from a representative to a participatory democracy, whereby they become actively involved in issues believed to affect them directly. By the late 1980s, citizen participation became a common activity for some fish and wildlife agencies, and increased their credibility among key publics (Stout et al. 1992, Decker et al. 1996).

Kellert's (1980) research profoundly influenced the course of human dimensions, both in terms of theory and practical application for wildlife agencies. His findings showed a breadth of public interest in wildlife – a progression from game species to nongame to biodiversity (Llewelyn et al. 1998). His research showed fish and wildlife agencies that their external constituency was not confined to traditional wildlife users but included the entire public. Kellert (1980) reported that the majority of Americans appeared to strongly value wildlife and expressed a willingness to make substantial social and economic sacrifices to protect the resource and associated habitat. His research also showed that people have different orientations toward animals, and that certain factors such

as age, educational level, gender and region of the country influence public attitudes and knowledge of key issues (Kellert 1980, Llewelyn et al. 1998).

Professional Values and Human Dimensions

Fish and wildlife managers' ability to respond to human dimensions problems will depend on their becoming more adept at social sciences, improving communication skills and reassessing long-held and possibly antiquated values. Magill (1988) discussed the tendency of natural resource professionals to avoid public contact and harbor asocial attitudes. Although at the beginning of their training they had views about environmental issues that corresponded to those of nonresource professionals, they developed an increasingly utilitarian approach to wildlife management. These utilitarian ideals and the inclination to resent public involvement in programs becomes more entrenched as length of service increases (Magill 1988). Although there have been many comparative studies showing how fish and wildlife biologists and their agencies differ from other natural resource groups in language (Kennedy 1985), mission statement and decision-making premises (Bullis and Kennedy 1991), recent research reveals a trend toward greater unity of values (Bullis and Kennedy 1991). As more wildlife managers serve in interdisciplinary roles, professional differences are becoming less distinguishable and values are shifting more toward the consideration of resources and people in natural resource management (Bullis and Kennedy 1991).

Human Dimensions Methods and Applications

Human dimensions offers tools that improve managers' abilities to represent the public in decision-making (Manfredo et al. 1998). Manfredo et al. (1995) described two parts to the human dimensions approach to wildlife management. The first emphasizes acquiring useful information that explains stakeholders' thoughts, perceptions, and behaviors regarding wildlife, using social science methods and concepts. The second part is developing ways to apply this insight, recognizing that it is one of several components (e.g., biological, political) critical to management of the wildlife resource (Manfredo et al. 1995, Decker and Enck 1996).

Human dimensions information is particularly useful to agencies in their attempts to avoid and minimize wildlife resource allocation conflicts (McMullin and Nielsen 1991b, Manfredo et al. 1998). In a study of a fisheries allocation conflict on the Big Horn River, Montana, McMullin and Nielsen (1991b) reported that involving the affected stakeholders early in the decision-making process, keeping the public informed and involved through every phase of the process, and having reasonable goals for citizen participation were all critical in successfully reducing controversy and user conflicts. The most effective agencies maintain close contact and communication with their publics and are proactive – trying to anticipate future issues and potential social changes by following current local and national trends (McMullin 1993).

Wildlife management agencies have an array of choices available to promote public involvement and acquire information from their constituencies for

the decision-making process (Stout et al. 1996). The public meeting is the most frequently used technique of public involvement (McMullin and Nielsen 1991a). Other frequently employed techniques of public involvement include advisory groups, citizen task forces and surveys.

Surveys, of which there are three types – mail, telephone and personal - are used primarily to acquire information (McMullin and Nielsen 1991a) but the results of surveys often provide a strong basis for presenting and defending proposed policies to decision-making commissions and the public (Johnson et al. 1993). Surveys are an effective method of reaching people who would not normally participate in resource management planning (McMullin and Nielsen 1991b). Many agencies employ both surveys and public meetings in their management planning processes (Heberlein 1989, Scott 1991). Used together, public meetings and surveys can help disseminate information about wildlife management to the public, identify areas of stakeholder concern, and provide critical information to managers about the opinions and behaviors of their publics (Johnson et al. 1993).

Research Justification

The Virginia Department of Game and Inland Fisheries is one of the few state fish and wildlife agencies that has received a significant source of new funding and simultaneously experienced a broadening of its constituency base. However, little information exists suggesting how agencies can best include new constituents in resource planning or how best to implement new funding sources into agency functions and programs.

House Bill 38 increases the diversity of the VDGIF constituency. In addition to VDGIF employees, board members, hunters, anglers, boaters and landowners, wildlife viewers will now make up a significant proportion of the agency's constituent base. As the agency's constituency diversifies, the values placed on the resource and expectations for its use change and expand. This study is designed to provide better information to VDGIF about its constituencies that will help the agency address constituents' desires and expectations and allow stakeholder involvement in management of Virginia's wildlife resources. This study is a part of a larger project to understand and inventory all the agency's internal and external constituents. Although this study focuses on the internal constituents (the employees) and information obtained from employee survey research, it will compare employee information with information gathered by Responsive Management on groups of external constituents. The study is intended to provide information that will improve communication and understanding among employees and administration and the publics they both serve.

House Bill 38 expands the VDGIF constituency and substantially increases agency revenues creating a rare opportunity for the agency to reassess its priorities. This project will identify the priorities that internal and external constituents place on VDGIF programs and functions. Using the feedback from the full array of agency constituents, this study also will provide information on how well the agency is performing. By identifying constituent priorities and looking at where the agency is performing well or not performing well, information can be provided to suggest areas where to best apply the new House Bill 38 resources.

Objectives

1. To identify the priorities employees place on VDGIF's major functions and programs and the relative amount of agency resources (time and money) that should be allocated to these functions and programs.
2. To identify how employees rank the performance of the agency's major functions and programs.
3. To compare and contrast the priorities of the internal constituents vs. those of the external constituents as they relate to VDGIF functions and management of Virginia's wildlife resources.
4. To suggest areas of priority for the implementation of new funding for VDGIF over the next 5 – 6 years

Virginia Department of Game and Inland Fisheries – Employee Survey

Introduction

Virginia is one of only a few states in history that has come into a significant source of alternative fish and wildlife resource funding. Through House Bill 38, a state code amendment passed in early 1998, the Virginia Department of Game and Inland Fisheries (VDGIF) will soon begin to receive a portion of the state's sales tax on hunting, fishing and wildlife-related equipment.

In anticipation of this new funding, the VDGIF solicited the assistance of Virginia Tech, Responsive Management and Dr. Brett Wright to conduct surveys of the agency's constituents. The results of these surveys will be used in planning prior to implementation of House Bill 38. The VDGIF, like many agencies, realizes the value of social sciences and the necessity of involving their publics in resource planning and management processes. The study described here is designed to provide a greater understanding of the priorities internal constituents place on the VDGIF's major functions and programs, and to suggest areas of priority for implementation of House Bill 38 revenues.

Methods

Issue Identification

The first phase of this project focused on identification of issues in a series of scoping meetings with Department employees. We held six employee scoping meetings, one in each administrative region in Virginia (Appendix A) and one at agency headquarters in Richmond. We began these facilitated meetings with a brief introductory presentation on the background of House Bill 38, some experiences other states had with acquiring alternative sources of funding, and the implications of new HB 38 funding for the present and future direction of the VDGIF.

Following this introduction, we asked employees for their input. We structured this input using the agency's programmatic budget categories and sub-categories (Appendix A). Placards with category and sub-category descriptions were placed on the walls throughout the room. We employed a snow card method to generate ideas, i.e., we asked employees to write their ideas on pieces of adhesive note paper and place them under the appropriate category placard. Employees were asked to identify issues of concern within these category groupings. In addition, we requested that they focus their remarks on the following two questions – 1) What do you think the agency's priorities should be during the next 5 to 6 years? and, 2) What information do you need from the agency's external constituents? The information provided in these scoping meetings defined the side boards for the employee survey.

Development of Survey Instrument

Development of the internal constituent survey began with a review of existing instruments that could be used in the study. Elements of the agency's alternative funds and program study (VDGIF 1990) were insightful. Several of Responsive Management's fisheries and wildlife management studies were particularly useful in providing a basis for developing questions (Responsive Management 1998a,b)

From the information collected from the scoping meetings, we developed questions regarding VDGIF functions, programs and employee issues of concern. We constructed the survey using Dillman's (1978) Total Design Method (TDM). The TDM provides guidelines for question formulation, word choice, questionnaire length, question order, and questionnaire appearance. The TDM also facilitates obtaining desired answers in a desired form, maximizing response rate and minimizing response bias.

The project advisory team [Dr. McMullin and I, Mark Duda (Responsive Management) and Dr. Brett Wright] and VDGIF administration reviewed the draft questions for relevance and importance and submitted additional questions and recommendations of their own.

The final internal constituent questionnaire (Appendix B) consisted of 114 questions. The first 65 questions were divided into four major categories, again, closely resembling the categories found in the agency's programmatic budget (Recreation, Environmental Diversity, Education and Capital Improvements). These questions made up the priority section of the survey. Employees were

asked if they felt more, about the same, or less time and new money should be spent on activities within each of these categories. Participants could respond on a 6-point Likert scale (much more, slightly more, about the same, slightly less, much less or don't know/no opinion), where 1 equaled much more and 6 equaled don't know/no opinion. This section asked participants to rate how additional resources (time and money) should be prioritized relative to current spending levels. The next section of the survey consisted of seven questions dealing with values associated with wildlife. Respondents could answer on a 5-point scale (very important, somewhat important, neutral/don't know, somewhat unimportant, very unimportant) where 1 indicated very important and 5 indicated very unimportant. Thirty-three questions, about one-half as many as the priority questions, measured employees' perception of the current performance of the agency related to its primary functions. These questions made up the Performance section of the survey. A 5-point Likert scale – Excellent (1), Good, Fair, Poor, Don't know/no opinion (5) was utilized for this group of questions. The performance questions closely paralleled the priority questions in content. The remaining survey questions provided demographic data such as the respondent's division, organizational unit, primary job responsibilities, employee category and length of service with the agency. Two questions in the demographic section asked if educating and informing the public was a major function of the respondent's job and, if so, what percentage of his/her job involved these activities.

The instrument was pre-tested by a group of employees selected by VDGIF administration. Once the survey was approved by agency administration, the agency Director informed employees that the questionnaire was forthcoming and asked them to respond to it.

We mailed to all employees of the VDGIF a questionnaire, a postage-paid return envelope, and a cover letter that described the project and encouraged their participation. Three weeks after the initial mailing, a new cover letter, replacement questionnaire, and a postage-paid return envelope was sent to nonrespondents. Approximately seven weeks after the initial mailing, a final mailing was sent to nonrespondents. This included a modified cover letter, a replacement questionnaire and a postage-paid return envelope.

Survey Analysis

I used summary descriptive statistics (means, standard errors and percent of response) to describe differences in respondents' rating of priorities, values and rating of agency performance. Mean standard errors were adjusted by the finite population correction factor for this sample (0.2029; Ott 1977). For mean comparisons within both the priority and performance sections of the survey, the response "Don't know/no opinion" was omitted to more accurately reflect employee rating of the resource allocation priority or performance questions. One mean value was considered significant from another if there was no overlap at ± 2 standard errors from the mean (95% confidence level).

I used data from surveys conducted by Responsive Management for comparisons between employees and external constituents (Responsive

Management 1999). These included surveys of 1) the general Virginia population (n = 806); 2) hunters (n = 826); 3) anglers (n = 793); 4) wildlife viewers (n = 827) and 5) Virginia boaters (n = 849). Responsive Management weighted the general population data and boater data by regions for statewide representation (based upon 1998 Virginia population estimates from the U.S. Census Bureau). Regional data for wildlife viewers, anglers and hunters were each averaged for statewide representation.

Results

Response Rates

Eighty percent of Virginia Department of Game and Inland Fisheries employees responded to the mail survey. Because response rate was so high, nonresponse bias did not present a problem in the analysis of survey results.

The percentage of respondents from each division closely paralleled the total percentage of employees by division in the agency – with the exception of two divisions (Table 7). Almost 40% of all survey responses came from the Law Enforcement division, although they represent 34.7% of total employees.

Administration (which includes Administration, Administrative Services and Personnel) represents 10.6% of total agency personnel but only 5.5% of survey responses. Ninety-two percent of all Law Enforcement personnel responded to the survey compared to 42% of all Administrative personnel. The percent response of employees for the four remaining divisions (Boating, Fisheries, Wildlife and Wildlife Diversity) ranged from 64% to 82%.

Seventy-five percent or more of employees in each of the five state regional districts responded to the survey (Table 8, Appendix A). Survey responses were received from only 57.2% of employees from VDGIF Headquarters in Richmond. Overall, salaried employees responded more often to the survey than wage or contract employees. Nearly 85% of all salaried employees responded to the survey compared to 62.1% and 33.3% of wage and contract employees, respectively.

Table 7. Number and percent of VDGIF employees by division who responded to the HB 38 survey.

	# of Survey respondents	% of Total respondents¹	% of Division responding	% of Agency total²
Administration	27	5.5	41.5	10.6
Boating	30	6.2	66.6	7.4
Fisheries	105	21.6	84.0	20.5
Law Enforcement	194	39.8	91.5	34.7
Wildlife	94	19.3	81.0	19.0
Wildlife Diversity	37	7.6	77.1	7.9

¹ n=487

² n=611

Table 8. Number and percent of VDGIF employees by region who responded to the HB38 survey.

Region	# of employee in regional offices	# of respondents from regional offices¹	% of employees responding from each region	% each region constitutes of total survey response	% each region represents of agency total
Region I	92	79	85.9	17.2	15.1
Region II	93	75	80.6	16.3	15.2
Region III	99	79	79.8	17.2	16.2
Region IV	76	57	75.0	12.4	12.4
Region V	85	74	87.1	16.1	13.9
HQ	166	95	57.2	20.7	27.2
Total	611	459			

¹some respondents did not indicate their regional office

Major Categories - Priorities for Additional Resource Allocation

Employees felt more or at least the same amount of time and money should be allocated to almost everything they did, and there were few programs or functions on which they wanted to spend fewer resources. The mean scores of questions addressing resource allocation for VDGIF programs and functions ranged from 1.81 to 3.53 (Appendix C). VDGIF employees were inclined to allocate more resources to Capital Improvements (mean = 2.21) (Table 9) than they were to Education (mean = 2.45) and Recreation (mean = 2.53). Employees seemed willing to allocate substantially fewer resources to Environmental Diversity (mean = 2.59). This was due primarily to the fact that employees felt fewer resources should be allocated to three programs aimed at managing deer populations on private lands. The three programs – issuing out of season deer kill permits, the Damage Control Assistance Program (DCAP) and the Deer Management Assistance Program – were outliers and employees felt substantially less time and money should be allocated to these than to other items in this category. Removing these three items from consideration within this category resulted in an overall mean rating for Environmental Diversity issues of 2.41 (Figure 4). This rating more accurately reflected the priority for additional resource allocation employees assigned to a majority of environmental diversity issues.

Table 9. Mean scores¹ and corrected standard errors of employees by division rating VDGIF programs and functions. Programs and functions divided into four VDGIF programmatic budgetary categories.

Division	Recreation		Environmental Diversity		Education		Capital Improvements	
	Mean	Corr. SE	Mean	Corr. SE	Mean	Corr. SE	Mean	Corr. SE
Administration	2.65	0.03	2.39	0.06	2.30	0.04	2.37	0.06
Boating	2.44	0.03	2.56	0.04	2.43	0.04	2.32	0.05
Fisheries	2.56	0.02	2.54	0.02	2.46	0.02	2.22	0.03
Law Enforcement	2.48	0.01	2.82	0.02	2.56	0.02	2.34	0.02
Wildlife	2.52	0.02	2.44	0.02	2.36	0.03	1.95	0.03
Wildlife Diversity	2.71	0.04	1.99	0.03	2.26	0.03	1.96	0.04
Overall	2.53	0.01	2.59	0.01	2.45	0.01	2.21	0.01

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Given the minimal corrected standard error of the means, the mean differences between Capital Improvements and all other categories were particularly significant, suggesting that employees felt that more time and money should be allocated to this category than to other categories. Notwithstanding the differences, however, all four categories fell between the ratings of about the same (mean = 3.00) to slightly more (mean = 2.00) with respect to agency time and money allocation.

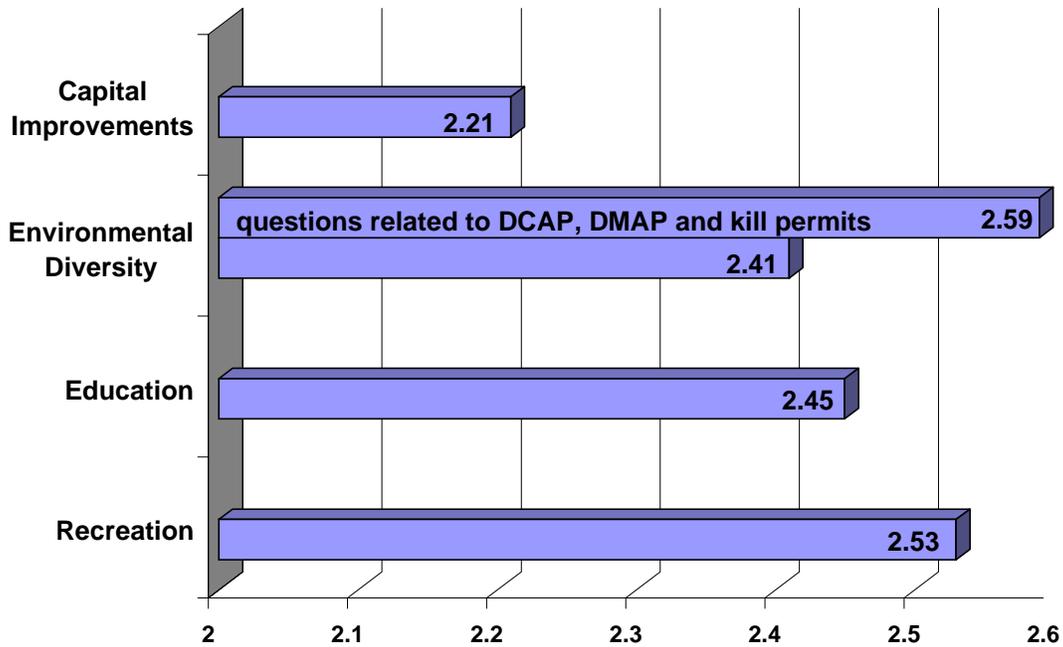


Figure 4. Mean scores of resource allocation priority questions divided in programmatic categories. Environmental Diversity mean of 2.41 reflects omission of 3 questions related to deer management on private lands.

Capital Improvements

Of all capital improvement needs, employees were inclined to allocate substantially more agency time and money to acquiring new lands (mean = 1.93) and to maintaining existing lands, buildings and facilities already owned by the department (mean = 1.98; Table 10). More employees of Wildlife (90%), Wildlife Diversity (78%) and Law Enforcement (72%) divisions felt more time and money should be spent on acquiring new lands than did employees in other divisions (Appendix E).

Table 10. Capital Improvements - Means and employee response (in percent) to questions asking whether VDGIF should allocate more, about the same or less time and money to capital improvements.

Capital Improvements	Means¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Overall	2.21	28.8	28.9	30.5	4.4	3.1	4.2
(55) acquiring new lands	1.93	44.6	27.1	17.2	3.9	4.3	2.9
(56) maintenance of Department lands, buildings and facilities	1.98	32.0	36.1	28.1	0.6	0.2	2.9
(57) building/renovating Department office buildings	2.39	22.2	28.3	36.8	5.3	4.3	3.1
(58) acquiring access to lakes and streams	2.20	23.2	37.4	31.4	3.5	1.2	3.3
(59) acquiring inholdings/adjacent lands to existing WMAs	2.15	29.8	28.2	30.7	2.9	2.3	6.2
(60) acquiring/protecting rare and endangered habitats	2.30	24.6	28.7	35.3	5.5	2.3	3.5
(61) acquiring new Wildlife Management Areas	2.09	36.4	26.1	24.5	4.9	3.5	4.5
(62) renovating existing fish hatcheries	2.22	24.8	33.3	31.4	3.1	2.7	4.7
(63) acquiring forested uplands	2.20	29.0	27.9	30.4	4.3	3.1	5.3
(64) acquiring wetlands and riparian areas	2.19	32.2	24.4	31.6	4.9	2.9	3.9
(65) acquiring areas near urban centers	2.65	18.1	20.5	38.4	9.0	7.6	6.4

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Among VDGIF regional offices, employees from Region 1 felt significantly more agency resources should be allocated to acquiring new lands (mean = 1.63) than did employees from other regions, while employees from Region 3 attached significantly less priority for additional resources to acquisition of new lands (mean = 2.38) than did employees from the other regional offices (Appendix F).

In general, employees felt the agency should spend more time and money acquiring almost all types of land. Employees felt that the agency should spend

substantially more time and money, however, acquiring new Wildlife Management Areas (WMAs) (mean = 2.09) than it should acquiring lands such as forested uplands (mean = 2.20), wetlands (mean = 2.19) or acquiring access to lakes and streams (mean = 2.20; Table 10). Among divisions, Wildlife Diversity employees seemed the most willing to allocate more resources to acquiring new WMAs. Eighty percent of Wildlife division employees felt the agency should be allocating slightly more to much more time and money on this activity (Appendix E). Among Administrative Regions, Region 1 employees favored allocating more resources to acquiring new WMAs than did employees from the other regional offices (Appendix F).

Of all items related to capital improvements, employees were inclined to allocate fewest additional resources to acquiring areas near urban centers (mean = 2.65). Administration division employees (mean = 2.24) and employees from more heavily populated regions, Region 1 (mean = 2.40) and Richmond headquarters (mean = 2.37) were more willing to allocate more resources to acquiring areas near urban centers than were employees from other divisions and regions (Appendices D and F). Region 3 (mean = 3.04) and Law Enforcement division employees (mean = 2.84) were least willing to allocate more resources to this activity.

Environmental Diversity Category

Employees felt most strongly about allocating more resources to acquiring additional land and water for wildlife conservation (mean = 1.99) than they did about allocating more resources to any other Environmental Diversity activity (Table 11). Nearly 67% of VDGIF employees felt slightly more or much more time and money should be spent on acquiring additional land and water for conservation. The Wildlife Diversity, Wildlife and Fisheries divisions felt more resources should be allocated to this activity with 87%, 82% and 67% of employees, respectively, feeling that slightly more or much more time and money should be spent on this activity. Boating employees seemed willing to allocate fewer resources to acquiring additional land and water for conservation (Appendices D and G). Although all regional offices favored allocating more resources to acquiring land and water for conservation (overall mean = 1.99), Region 1 employees felt most strongly about spending more time and money on this activity (mean = 1.78; Appendix F).

Environmental Diversity programs that were directed at preserving and protecting the quality of fish and wildlife habitat, protecting endangered species, and promoting diversity also received high priority for additional resource allocation from VDGIF employees. Employees felt more time and money should be allocated to enforcing laws that protect fish and wildlife habitat (mean = 2.18), protecting rare and endangered habitats (mean = 2.21), protecting threatened and endangered species (mean = 2.35), managing native fish and wildlife to maintain maximum diversity (mean = 2.28) and reviewing and commenting on

Table 11. Environmental Diversity Category - Means and employee response (in percent) to questions asking whether VDGIF should allocate more, about the same or less time and money to environmental diversity and conservation functions. Questions are divided into groups of related topics.

Environmental Diversity Indices	Means¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Technical Assistance							
(32) coordinating technical assistance to rural landowners on how to manage wildlife on their properties	2.34	18.9	36.0	36.0	5.3	1.6	2.1
(35) cost share programs for habitat enhancement	2.54	14.8	29.6	35.1	6.0	5.5	9.0
(22) coordinating technical assistance to urban/suburban landowners on how to manage wildlife on their properties	2.58	14.6	30.8	38.0	7.6	5.7	3.3
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	2.71	11.5	23.2	47.2	8.8	4.9	4.3
Deer Management and Damage Control							
(27) the Deer Management Assistance Program (DMAP)	3.15	4.9	16.2	47.8	7.8	16.2	7.0
(24) the Damage Control Assistance Program (DCAP)	3.35	3.3	9.1	50.4	12.3	18.1	6.8
(26) issuing out of season deer kill permits	3.53	4.3	6.8	43.9	11.5	26.5	7.0
Diversity and Conservation							
(25) acquiring additional land and water for wildlife conservation	1.99	40.5	26.5	23.6	3.5	3.1	2.9
(34) protecting rare and endangered habitats	2.21	27.7	29.2	34.9	4.1	1.8	2.3
(30) managing fish and wildlife to maintain maximum diversity of native species	2.28	22.4	30.4	39.8	2.9	1.4	3.1
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.33	20.7	29.4	37.6	4.1	2.1	6.2
(31) protecting threatened and endangered species	2.35	23.6	27.1	40.0	4.7	2.7	1.8
(28) monitoring/inventory of wildlife populations on Department owned lands	2.66	12.9	21.4	51.1	6.4	4.1	4.1
(23) conducting general biological research	2.74	14.6	20.7	42.5	12.1	6.6	3.5

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

proposed developments to minimize their effects on fish and wildlife habitat (mean = 2.33).

Within the Environmental Diversity category, three programs aimed at managing deer populations on private lands rated lowest in priority for allocation of additional resources. They were: 1) issuing out of season deer kill permits (mean = 3.53), 2) the Damage Control Assistance Program (DCAP) (mean = 3.35), and 3) the Deer Management Assistance Program (DMAP; mean = 3.15). These were the *only* VDGIF programs to receive mean ratings suggesting that the agency should be spending less time and money on them than it currently does.

Divisional Differences for Issues Related to Environmental Diversity

Law Enforcement and Wildlife Diversity personnel tended to differ from each other most often and to the greatest degree on issues related to Environmental Diversity (Appendix D, Figure 5). The difference in priority for additional resources was greatest between these two divisions for conducting general biological research (Wildlife Diversity mean = 1.81, Law Enforcement mean = 3.22) and for protecting threatened and endangered species (Wildlife Diversity mean = 1.33, Law Enforcement mean = 2.54).

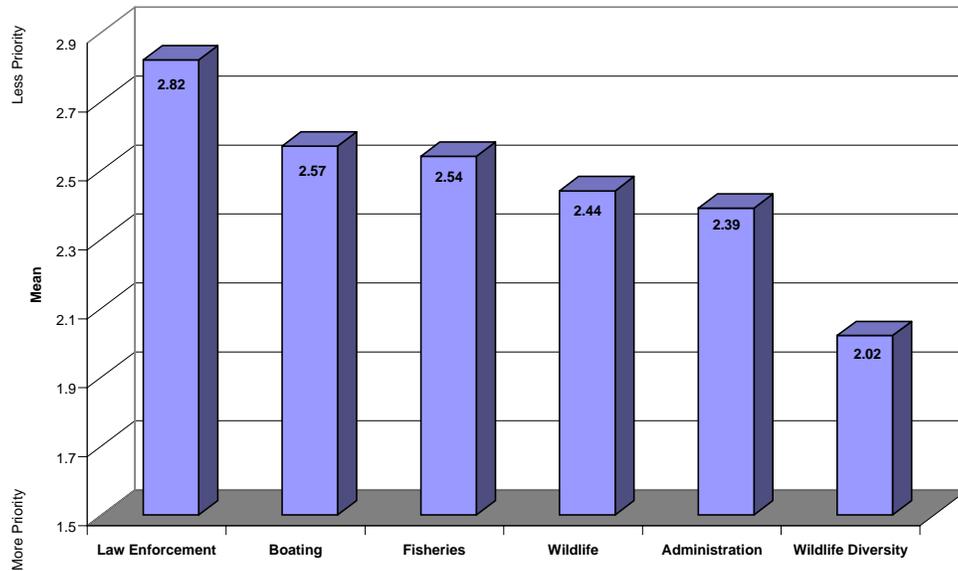


Figure 5. Mean scores by division for all questions on Environmental Diversity issues and functions. Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less.

Education Category

Broader, more universal education and information functions generally received more priority for allocation of additional resources than did existing education programs or education efforts directed to specific constituent groups. In addition, employees generally felt more resources should be allocated to *information*-related functions than to *education*-related functions. Employees felt more strongly about allocating more resources to enhancing public awareness of VDGIF and its programs, an information activity (mean = 1.81), than to all other survey items. Employees also felt much more to slightly more resources should be allocated to educating and informing citizens in general (mean = 1.92; Table 12).

Among the general education and information functions performed by the VDGIF, employees felt more resources should be allocated to providing information for fish- and wildlife-associated recreation (e.g., maps and description of facilities) (mean = 2.39) than they felt should be allocated to providing general aquatic and wildlife education (mean = 2.54) or to providing education on skills needed to pursue wildlife-related outdoor recreation (mean = 2.51).

Despite the overall trend among employees to favor allocation of only slightly more resources to information and education efforts for specific constituent groups, they favored allocating substantially more resources to education and information for children and youth and to providing education and outreach to schools (means = 2.07 and 2.18, respectively).

Table 12. Education Category - Means and employee response (in percent) to questions asking whether VDGIF should allocate more, about the same or less time and money to education programs and functions. Questions were grouped into related topics.

	Means ¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Environmental Diversity Indices							
General Education							
(37) enhancing public awareness of VDGIF and its programs	1.81	43.7	33.7	18.5	1.0	1.6	1.4
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	1.92	36.1	38.4	21.6	1.4	1.2	1.2
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.39	13.6	36.8	45.0	1.8	1.0	1.8
(41) the number of education/information personnel in field offices	2.49	18.5	27.5	39.8	7.2	3.9	3.1
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	2.51	12.9	31.0	46.6	3.7	2.9	2.9
(47) providing general aquatic and wildlife education	2.54	12.5	26.7	52.2	3.9	1.6	3.1
Education Programs							
(54) Boating safety education	2.45	14.2	33.1	44.8	4.3	1.6	2.1
(39) Hunter education	2.52	15.6	25.5	49.6	4.9	2.5	1.9
(45) providing safety training for hunters	2.55	14.8	20.9	57.3	3.3	1.4	2.3
(50) Aquatic resources education	2.75	7.4	22.8	53.8	7.0	3.5	5.5
(53) Women in the Outdoors program	2.75	9.4	23.4	49.9	6.8	6.0	4.5
(51) Project Wild education efforts	2.83	7.0	22.8	49.3	9.2	5.7	6.0
Education and Constituents							
(52) providing education and information for youth	2.07	26.1	40.5	29.2	1.4	0.4	2.5
(43) Education and outreach to schools	2.18	20.3	42.9	31.8	2.1	0.8	2.1
(48) providing education and information for urban/suburban constituents	2.52	14.6	25.5	49.3	4.7	2.1	3.9
(44) providing education and information for women	2.65	10.1	25.1	52.6	4.5	3.7	4.1
(49) providing education and information for minority constituents	2.87	7.8	16.0	55.2	5.7	6.8	8.4

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

In general, employees favored allocating only slightly more resources to providing education and information for urban/suburban constituents, women and minority constituents (Table 12). Similarly, employees favored allocation of fewer additional resources to specific education programs than they did to general education and information functions. Among the VDIGF education programs employees favored allocation of more resources to boating safety education (mean = 2.45), hunter education (mean = 2.52) and safety training for hunters (mean = 2.55) than they did to Project Wild (mean = 2.83) and Women in the Outdoors (mean = 2.75; Table 12).

Divisional Response to Education Functions

Allocation of additional resources was a relatively high priority for all divisions and divisional means for the Education category differed less than for any other category (Figure 6). The Administration and Wildlife Diversity divisions (means = 2.27) generally favored allocating more resources to education than did the other divisions. The Law Enforcement division (mean = 2.56) favored allocation of fewer resources to education than did other divisions.

The differences among division means were greater for items relating to education and constituent groups than for other indices of education items (Figure 7). Generally, employees from the Wildlife Diversity and Administration divisions placed fairly high resource allocation priority on education and constituent group items while Law Enforcement employees placed much lower resource allocation priority on constituent group education (Appendices D and H).

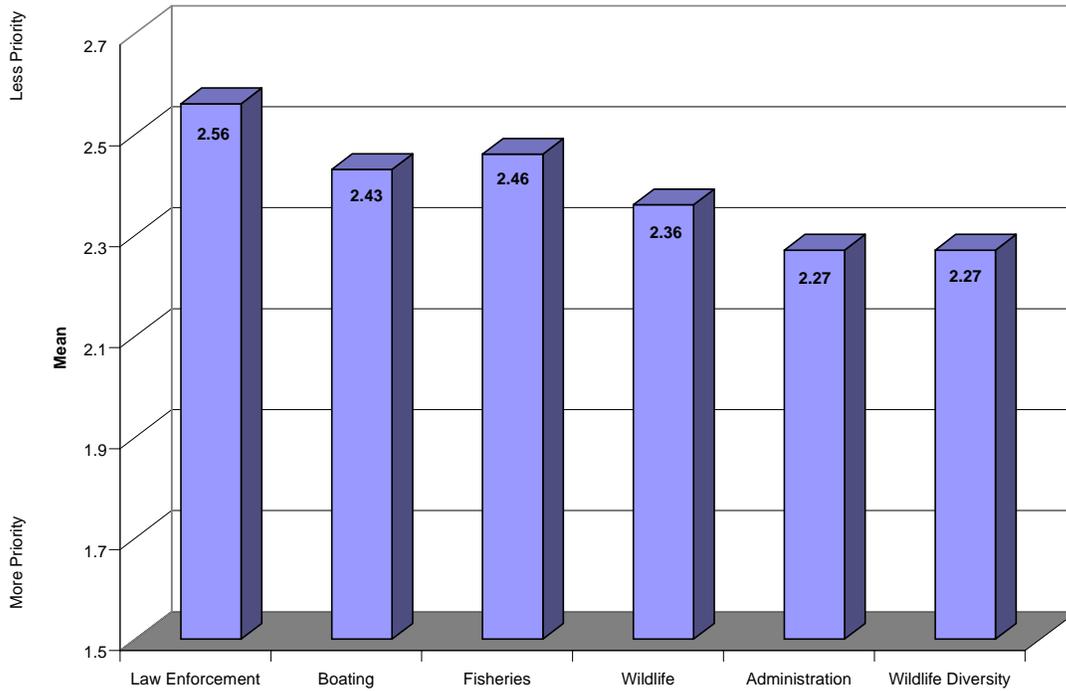


Figure 6. Mean scores by division for questions on Education programs and issues. Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the Same, 4 = Slightly Less, 5 = Much less.

This was particularly true for providing education and information to minorities. Roughly 44% of Wildlife Diversity and Administration personnel felt more time and money should be spent on providing education and information for minority constituents. In contrast, only 13.9% of Law enforcement personnel felt more time and money should be spent providing wildlife-related education and information for minorities.

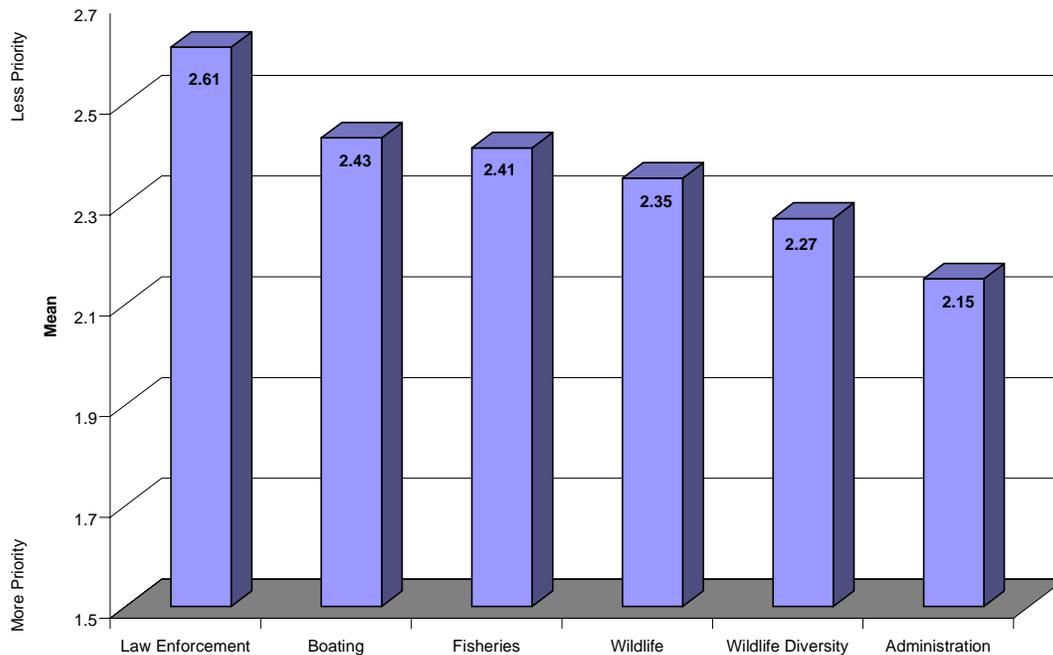


Figure 7. Mean scores by division for questions comprising Education and Constituent Groups topics. Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the Same, 4 = Slightly Less, 5 = Much less.

Informing and Educating the Public

Over 75% of VDGIF employees said information and education was a big part of their jobs (Table 13). Informing and educating the public constituted a big part of the job for 90% of Law Enforcement and Wildlife Diversity employees. Administration division employees had the lowest percentage of people (33%) who considered information and education to be a big part of their job.

Nearly 47% of all VDGIF employees said that more than 25% or more of their jobs involved informing and educating the public. Seventy percent or more of Law Enforcement, Wildlife Diversity and Boating employees reported that informing and educating constitutes 26% or more of their jobs. A considerably smaller percentage of employees from the Wildlife, Fisheries and Administration Divisions said that 26% or more of their job involved informing and educating the public (Table 13; Figure 8).

Table 13. Percent of VDGIF employees who felt that informing and educating the public is a big part of their job and the percentage of their job that involves this function.

	Overall	Admin- istration	Boating	Fisheries	Law Enforcement	Wildlife	Wildlife Diversity
(110) Do you consider Information and Education to be a big part of your job?							
Yes	77.6	33.3	83.3	73.3	90.2	62.8	89.2
No	20.1	66.7	13.3	21.9	8.8	35.1	8.1
(111) What percentage of your job involves informing and educating the public? ¹							
less than 10%	7.4	11.1	6.7	10.5	2.6	14.9	2.7
10% - 25%	23.0	7.4	3.3	31.4	25.8	21.3	16.2
26% - 50%	21.6	7.4	16.7	19.0	28.9	11.7	29.7
51% - 75%	13.6	7.4	13.3	8.6	18.6	7.4	21.6
76% - 100%	11.7	0.0	43.3	3.8	13.9	6.4	18.9

¹sum of percentages equal to percentage of respondents who answered yes to question 110

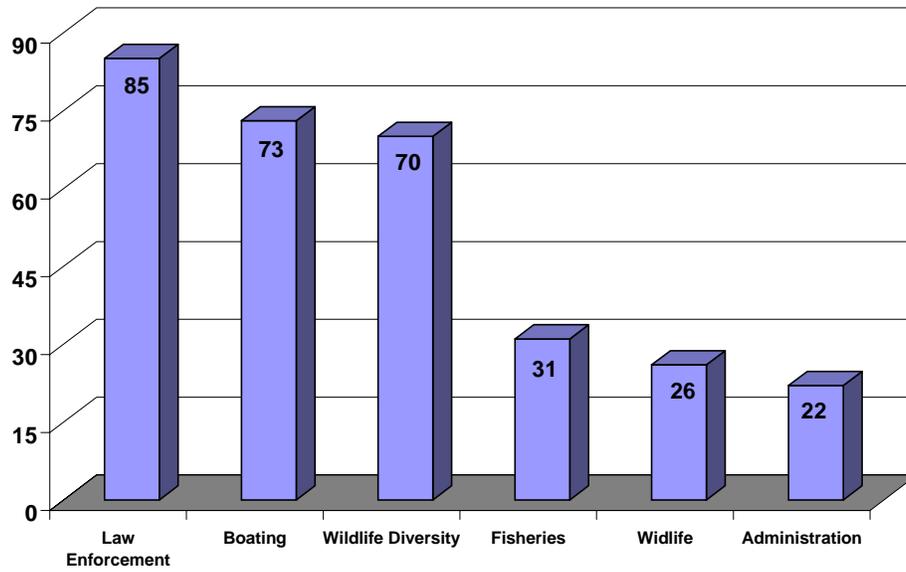


Figure 8. Percent of VDGIF employees (by division) who indicated that 26% or more of their job consisted of educating and informing the public

Recreation Category

Functions of Highest and Lowest Resource Allocation Priority

Employees felt more strongly about allocating more resources to support traditional recreational activities than they did about allocating resources to nontraditional recreational activities (e.g., wildlife viewing). Providing more fish and wildlife recreational opportunities for children and youth (mean = 1.84) and providing hunting opportunities (mean = 2.22) scored highest with respect to allocation of more time and money (i.e., the lowest mean scores) (Table 14). More than three-quarters of all VDGIF respondents felt either slightly more or much more time and money should be spent on providing recreation opportunities for children and youth. Among divisions, providing more wildlife-related recreational opportunities for children and youth received highest priority for additional resource allocation from the Wildlife and Fisheries divisions - the divisions which deal primarily with traditional uses of the fish and wildlife resource (means = 1.70 and 1.71 respectively; Appendix D). The Wildlife (mean = 1.96) and Law Enforcement (mean = 2.08) divisions most strongly supported allocation of more agency resources to providing hunting opportunities.

In the Recreation category, managing nongame fish and wildlife (mean = 2.83) and providing more fish and wildlife recreational opportunities for minorities (mean = 2.98) rated lowest in priority for allocation of additional resources. Although 35% of employees felt slightly more or much more time and money

Table 14. Mean scores and percent of respondents for recreation questions receiving the highest and lowest priority for additional resource allocation.

Highest Rating by Mean	Mean¹	Much More	Slightly More	About the same	Slightly Less	Much Less	Don't know
(12) providing more fish and wildlife recreational opportunities for children and youth	1.84	39.0	37.7	20.0	0.6	0.8	1.9
(10) providing hunting opportunities	2.22	26.9	28.9	34.5	3.3	2.3	4.1
Lowest Rating by Mean							
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	15.1	20.2	37.5	11.3	11.5	4.3
(16) providing more fish and wildlife recreational opportunities for minorities	2.98	6.8	13.6	52.6	6.2	9.5	11.3

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

should be spent on management of nongame fish and wildlife, nearly a quarter of employees felt the agency should spend slightly less to much less time and money.

Of all recreation items, employees were least willing to allocate more resources to providing fish and wildlife recreational opportunities for minorities (mean = 2.98). Administration and Wildlife Diversity personnel, however, attached significantly higher priority for additional resources for minority recreation (means = 2.57 and 2.64, respectively) than did employees from other divisions.

Hunting and Fishing

Of the four primary recreational activities managed by the VDGIF (hunting, fishing, boating and wildlife viewing), employees favored allocating more resources to providing hunting (mean = 2.22) and fishing (mean = 2.32) opportunities (Table 15). Nearly 50% or more of employees felt the agency should be spending slightly more to much more time and money on providing hunting and fishing opportunities. In addition, employees were inclined to allocate more resources to services and programs which supported the agency's ability to provide these recreational activities, such as encouraging private landowners to open access to their lands and water for hunting and fishing.

Not surprisingly, Wildlife division employees supported providing hunting opportunities most strongly while Fisheries division employees gave the most additional resource support to providing fishing opportunities (Appendix D).

Table 15. Recreation Category - Means and employee response (in percent) to questions asking whether VDGIF should allocate more, about the same or less time and money to recreation-oriented functions. Questions were grouped into related topics.

Recreation Indices	Means¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Law Enforcement							
(29) enforcing laws that protect fish and wildlife habitat	2.18	28.5	30.2	33.3	4.3	1.4	2.3
(3) enforcing safety in fish, wildlife and boating related recreation	2.33	24.5	27.0	39.4	5.2	2.5	1.4
(1) enforcing fishing and hunting regulations	2.39	26.2	22.3	38.1	7.8	3.5	2.1
(7) enforcing boating laws and regulations	2.58	19.8	19.0	44.9	9.5	4.1	2.7
(11) increasing visible presence of existing enforcement personnel to external constituents	2.60	19.8	23.3	37.3	8.7	7.6	3.3
Traditional Uses							
(10) providing hunting opportunities	2.22	26.9	28.9	34.5	3.3	2.3	4.1
(19) providing fishing opportunities	2.44	13.6	31.8	48.5	2.5	0.8	2.9
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	2.51	15.7	28.5	44.7	6.4	2.9	1.9
(13) managing game fish such as trout and bass	2.72	12.2	17.1	57.3	6.8	3.9	2.7

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Table 15. Continued

Recreation Indices	Means¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Wildlife Viewing & Nongame							
(5) providing recreation-oriented capital investments on WMAs.	2.57	17.1	31.1	32.0	7.0	8.5	4.3
(2) providing wildlife viewing opportunities	2.75	12.4	25.2	41.9	10.3	7.6	2.7
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	15.1	20.2	37.5	11.3	11.5	4.3
Boating							
(6) providing boat access to significant hunting and fishing resources	2.44	16.3	32.8	38.6	4.9	3.3	4.1
(9) providing more primitive access to river sections where outboard motors are not generally used	2.62	12.8	30.5	39.8	5.6	7.0	4.3
(14) providing boating access for recreational boating	2.77	10.1	22.9	48.9	9.3	5.8	3.1
(18) providing boating opportunities	2.82	7.6	18.8	57.9	7.6	4.3	3.7
Private Land Access							
(15) encouraging private landowners to open their lands for more hunting access	2.28	29.3	27.0	27.4	6.0	5.4	4.9
(20) encouraging private landowners to open access to their waters for more fishing use	2.36	23.5	29.9	30.5	6.4	4.9	4.7

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

The Law Enforcement and Boating divisions also felt more time and money should be spent on these two activities. Although employees from all VDGIF regions felt more resources should be allocated to providing hunting and fishing opportunities, Region 1 gave significantly more priority to allocation of additional resources to these activities than did other regional offices (Appendix F).

Boating and Wildlife Viewing

Although more employees (37%) felt the agency should spend more time and money on providing wildlife viewing opportunities than they felt should be spent on providing boating opportunities (26%), the mean scores for these two functions were relatively close (means = 2.83 and 2.75, respectively). In the case of boating, the agency has allotted significant funding to boating-related activities in recent years. The mean score for providing boating opportunities reflected employees' feelings that fewer additional resources need to be allocated to this activity. The mean score for providing wildlife viewing activities largely reflected opinions of the Law Enforcement division, which represented 40% of survey responses. Law Enforcement personnel favored allocating fewer resources to this activity (Figure 9), while all other divisions to varying degrees, felt that slightly more to much more resources should be allocated to this activity. Not surprisingly, Wildlife Diversity employees favored allocating the most additional resources to providing wildlife-viewing opportunities. Although overall, they did not strongly favor allocating more resources to providing wildlife viewing opportunities, employees did favor allocating more resources to providing facilities that would promote nontraditional recreational opportunities. Almost half

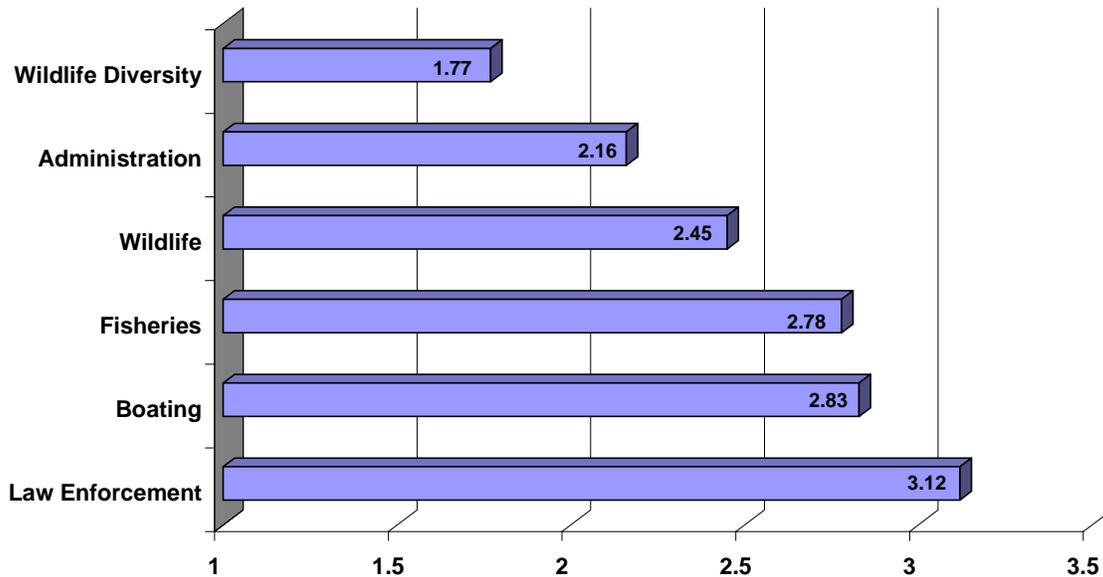


Figure 9. Mean response by VDGIF division indicating resource allocation priority for providing wildlife viewing opportunities.

of agency employees felt that more time and money (mean = 2.57) should be allocated to providing recreation-oriented capital improvements on WMAs (e.g., hiking trails, interpretive facilities, observation platforms and camping areas; Table 15). These types of capital investments would tend to be used more by wildlife viewing and nontraditional recreationists than they would by traditional users.

Game versus Nongame Management

In general, employees placed higher priority for additional resources on managing game wildlife and fish than they did on managing nongame wildlife and fish. It is interesting to note, however, that despite the fact that managing nongame fish and wildlife received a mean rating of 2.83, 35% of employees felt the agency should be spending slightly more to much more time and money on

nongame management (Table 15). In comparison, slightly fewer employees (30%) felt that the agency should be spending more resources on managing game fish (mean = 2.72). Forty-five percent of employees felt more resources should be allocated to managing game animals (i.e., hunted mammals and birds; mean = 2.51).

The lower overall priority for additional resources for nongame management was again driven by Law Enforcement personnel, and also by Boating personnel who tended to favor allocation of fewer resources for the management of nongame fish and wildlife (Figure 10). Together employees from these divisions accounted for 46% of survey responses and approximately one-quarter to one-third of employees from these divisions felt that slightly less to much less time and money should be allocated to nongame management (Table 16). Wildlife Diversity and Administration personnel were willing to allocate substantially more resources to this activity than employees of other divisions.

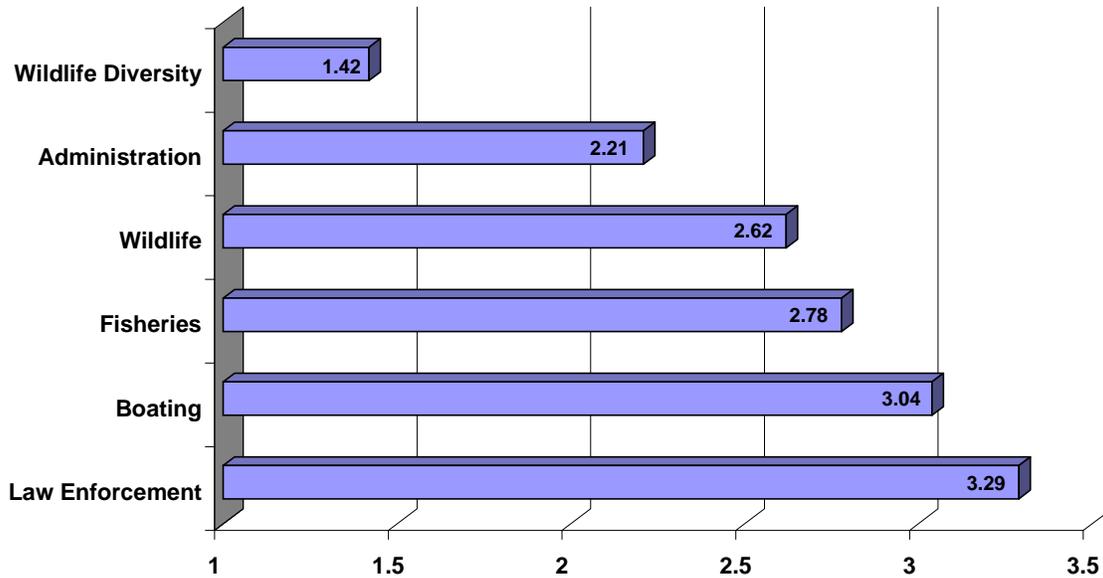


Figure 10. Mean response by VDGIF division indicating resource allocation priority for managing nongame fish and wildlife

Table 16. Response breakdown in percent to question asking employees (by division) whether they felt more, about the same or less time and money should be allocated to managing nongame fish and wildlife.

Response	Division					
	Administration	Boating	Fisheries	Law Enforcement	Wildlife	Wildlife Diversity
Much More	25.0%	14.3%	13.0%	3.2%	21.6%	69.4%
Slightly More	33.3%	17.9%	24.0%	14.9%	27.3%	25.0%
About the Same	37.5%	39.3%	41.0%	48.9%	31.8%	2.8%
Slightly Less	4.2%	7.1%	16.0%	16.0%	6.8%	0.0%
Much Less	0.0%	21.4%	6.0%	17.0%	12.5%	2.8%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Law Enforcement Activities

Mean scores for questions related to Law Enforcement ranged from 2.18 to 2.60. As might be expected, the Law Enforcement division favored spending more additional resources than did other divisions on law enforcement functions (mean = 1.91). Boating division employees also strongly supported allocating more resources to these enforcement activities (mean = 2.39; Table 17). In comparison, the Wildlife Diversity division was substantially less willing to allocate more resources to these functions (mean = 2.93).

Of all enforcement functions, more employees favored allocating more resources to enforcing laws that protect fish and wildlife habitat (mean = 2.18) than to any other enforcement activities. Fifty-nine percent of all employees felt that much more or slightly more time and money should be allocated to this activity (Appendix I). In general, of all enforcement-related activities, employees felt the least need to allocate additional resources to increasing visible presence of existing enforcement personnel to external constituents (mean = 2.60), however this activity was still a higher priority for more resources than nongame management, providing wildlife viewing opportunities, or even managing game fish.

Table 17. Mean scores¹ by division for law enforcement-related questions within the Recreation and Environmental Diversity Categories.

Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Law Enforcement	2.41	0.02	2.75	0.03	2.39	0.04	2.78	0.03	1.91	0.02	2.75	0.03	2.93	0.04
(29) enforcing laws that protect fish and wildlife habitat	2.18	0.02	2.60	0.04	2.52	0.04	2.29	0.02	1.88	0.01	2.51	0.02	2.06	0.03
(3) enforcing safety in fish, wildlife and boating related recreation	2.33	0.02	2.52	0.03	2.20	0.04	2.73	0.02	1.84	0.01	2.71	0.02	2.80	0.03
(1) enforcing fishing and hunting regulations	2.39	0.02	3.08	0.03	2.59	0.03	2.78	0.02	1.68	0.01	2.90	0.02	3.17	0.03
(7) enforcing boating laws and regulations	2.58	0.02	2.83	0.03	2.23	0.04	3.01	0.02	2.09	0.02	2.99	0.02	3.06	0.03
(11) increasing visible presence of existing enforcement personnel to external constituents	2.60	0.02	2.88	0.03	2.41	0.04	3.11	0.02	2.07	0.01	2.68	0.02	3.71	0.04

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Agency Functions of High Priority for Additional Resource Allocation

The top six questions to which employees favored allocating more resources spanned all four of the major programmatic categories (Table 18). Seventy-five percent or more of employees said slightly more or much more time and money should be spent enhancing public awareness of VDGIF and its programs (mean =1.81), providing more recreational opportunities for children and youth (mean = 1.84) and educating and informing citizens of the wildlife resource in Virginia (mean = 1.92). Employees also favored spending slightly more to much more time and money on acquiring new lands (mean =1.93), on acquiring additional land and water for wildlife conservation (mean =1.99), and on maintaining department owned lands and facilities (mean =1.98).

Agency Functions of Lower Priority for Additional Resource Allocation

The programs to which employees felt fewest additional resources should be allocated dealt with management of deer populations on private lands. Nearly 38% of all respondents said that the issuing out-of-season deer kill permits should receive slightly less to much less time and money (Table 19). More employees answered much less to this question (26.5% of respondents) than to any other survey question. The Damage Control Assistance Program (DCAP) and the Deer Management Assistance Program (DMAP) also received mean scores over 3.00, with 31% and 24% of all respondents indicating that slightly less to much less time and money should be spent on these programs, respectively.

Table 18. Mean scores and percent of respondents who indicated much more or slightly more time and money should be allocated to the highest priority VDGIF programs and functions.²

	Mean Score¹	Much More	Slightly More	Total %
Enhancing public awareness of VDGIF and its programs (Rec)	1.81	43.7	33.7	77.4
Providing more recreational opportunities for children and youth (Ed)	1.84	38.8	37.6	76.4
Educating and informing citizens (Ed)	1.92	36.1	38.4	74.5
Acquiring new lands (Cap)	1.93	44.6	27.1	71.7
Maintenance of Department lands and facilities (Cap)	1.98	32.0	36.1	68.1
Acquiring additional land and water for wildlife conservation (Div)	1.99	40.5	26.5	67.0

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

² Programmatic categories coded Rec = Recreation, Div = Environmental Diversity, Ed = Education, Cap = Capital Improvements

Table 19. Mean scores and percent of respondents who answered slightly less or much less to questions regarding VDGIF programs and functions considered of lowest priority for agency time and money allocation.

	Mean Score¹	Slightly Less	Much Less	Total %
Issuing out of season deer kill permits	3.53	11.5	26.5	38.0
The Damage Control Assistance Program (DCAP)	3.35	12.5	18.1	30.6
The Deer Management Assistance Program (DMAP)	3.15	7.8	16.2	24.0

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Regional Response to Additional Resource Allocation

Among most regions, employees were fairly consistent in their choices of the VDGIF programs and functions to which they were most willing to allocate more resources. Providing more fish and wildlife recreational opportunities for children and youth, enhancing public awareness of VDGIF and its programs, and acquiring new lands appeared among the top three items in 4 out of 6 regional offices (Table 20). Region 3 employees differed from other regions in that they felt more resources should be allocated to enforcing laws that protect fish and wildlife habitat, educating and informing citizens in general, and maintenance of Department lands, buildings and facilities.

Respondents from all regional offices felt substantially less time and money should be allocated to issuing out-of-season deer kill permits and to the Damage Control Assistance Program (DCAP). Three out of 6 regional offices (Regions 1,2 and Richmond Headquarters) felt fewer resources should be allocated to the Deer Management Assistance Program (DMAP). Providing more fish and wildlife recreational opportunities for minorities appeared among the 3 questions given lowest priority for allocation of additional resources by employees in Regions 3, 4 and 5.

Table 20. Mean scores¹ of the three questions by region given highest and lowest priority for allocation of more VDGIF time and money.

Highest Resource Allocation Priority	Region 1	Region 2	Region 3	Region 4	Region 5	Richmond HQ
(12) providing more fish and wildlife recreational opportunities for children and youth		1.72		1.79	1.77	1.87
(37) enhancing public awareness of VDGIF and its programs	1.65	1.64			1.73	1.84
(55) acquiring new lands	1.63	1.74		1.79	1.88	
(29) enforcing laws that protect fish and wildlife habitat			2.06			
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues			2.04			1.94
(56) maintenance of Department lands, buildings and facilities			1.88	1.78		
(61) acquiring new Wildlife Management Areas	1.73					
Lowest Resource Allocation Priority	Region 1	Region 2	Region 3	Region 4	Region 5	Richmond HQ
(26) issuing out of season deer kill permits	3.88	3.47	3.96	3.61	3.28	3.08
(24) the Damage Control Assistance Program (DCAP)	3.74	3.38	3.19	3.19	3.46	3.15
(27) the Deer Management Assistance Program (DMAP)	3.41	3.39				3.02
(16) providing more fish and wildlife recreational opportunities for minorities			3.13	2.98	3.06	

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Performance Ratings

Overall, employees felt that VDGIF does a good to fair job (on a scale of 1 = excellent to 4 = poor) in performing its programs and functions (Appendix J, Table 24). The Boating division (mean = 2.21) rated overall agency performance best, while the Fisheries, Wildlife and Wildlife Diversity divisions rated overall agency performance worst (mean =2.52; Figure 11). Administration and Law Enforcement ratings of agency performance were intermediate to those of the other divisions.

Three VDGIF functions had mean scores less than 2.0, indicating agency performance in the good to excellent range for these activities. These included providing hunter education (mean =1.80), enforcing the boating laws of Virginia (mean = 1.90) and managing game (hunted) animals such as deer, bear, turkey, squirrel, quail and waterfowl (mean =1.98; Table 21).

Of the traditional recreational services that VDGIF provides, employees (71%) felt the agency did the best job in providing fishing opportunities (mean = 2.17). Sixty-nine percent felt the agency did either an excellent or a good job providing boating opportunities (mean = 2.20). However, only 57% felt the agency did an excellent or a good job providing hunting opportunities (mean = 2.39) – despite the fact that 77% of employees felt the agency did an excellent or good job managing game animals.

Table 21. Mean scores and employee response (%) to questions in order from best performance to worst asking whether VDGIF was doing an excellent, good, fair or poor job performing its various programs and functions.

	Means	Excellent	Good	Fair	Poor	Don't Know
Survey Performance Questions						
(85) providing hunter education	1.80	33.54	50.52	11.80	1.24	2.90
(81) enforcing the boating laws of Virginia	1.90	28.36	49.07	12.84	2.90	6.83
(76) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	1.98	25.05	51.55	15.11	3.93	4.35
(87) providing safety training for hunters	2.03	22.57	52.59	16.98	4.14	3.73
(83) enforcing the fish and wildlife laws of Virginia	2.05	24.02	48.86	20.50	4.14	2.48
(102) enforcing safety in fish, wildlife and boating related recreation	2.09	18.63	52.80	20.08	3.73	4.76
(84) managing game fish such as trout and bass	2.13	14.49	55.07	21.33	2.48	6.63
(98) providing fishing opportunities	2.17	11.39	59.63	20.91	3.31	4.76
(103) providing boating opportunities	2.20	8.70	59.83	22.98	2.07	6.42
(73) enforcing laws that protect fish and wildlife habitat	2.22	17.39	49.90	19.88	9.52	3.31
(106) incorporating hunters' and anglers' wants and needs into the management of the state's fish and wildlife	2.30	12.63	46.58	24.84	7.66	8.28
(100) providing safety education for boaters	2.30	9.94	47.62	30.85	3.52	8.07
(90) providing education and information to women	2.36	8.07	46.58	33.13	3.93	8.28
(80) providing hunting opportunities	2.39	9.94	47.41	28.78	9.32	4.55
(95) providing boat access for hunting, fishing and recreational boating	2.40	6.21	49.07	33.33	5.18	6.21
(93) conducting general biological research	2.45	6.00	42.24	29.81	7.04	14.91

¹Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

Table 21. Continued.

	Means	Excellent	Good	Fair	Poor	Don't Know
(88) managing fish and wildlife to sustain maximum diversity of native species	2.45	10.14	42.03	27.74	12.01	8.07
(77) providing general fish and wildlife education	2.49	6.83	42.86	36.44	8.28	5.59
(96) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.50	7.66	43.06	36.44	9.73	3.11
(105) protecting threatened and endangered species	2.50	7.04	39.96	32.51	9.73	10.77
(104) coordinating technical assistance to rural landowners regarding management of wildlife on their properties	2.56	4.97	37.27	34.16	9.32	14.29
(79) managing nongame fish and wildlife (i.e., not hunted or fished)	2.60	4.14	36.85	31.68	11.18	16.15
(75) providing aquatic resource education	2.62	3.31	31.47	36.85	7.87	20.50
(94) providing education on skills needed to pursue wildlife-related outdoor recreation	2.65	3.52	34.99	39.13	10.77	11.59
(101) providing education and outreach to schools	2.65	5.38	33.13	37.89	12.84	10.77
(78) incorporating wildlife viewers' wants and needs into the management of the state's fish and wildlife	2.67	5.80	31.26	33.13	14.70	15.11
(74) coordinating technical assistance to urban/suburban residents on how to manage wildlife on their properties	2.67	3.93	31.68	38.30	11.59	14.49
(91) educating and informing citizens, in general, about fish, wildlife and boating related issues	2.71	3.93	37.47	37.06	17.60	3.93
(97) providing resource conservation training for enforcement personnel	2.73	5.80	30.85	27.95	19.67	15.73
(99) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.74	3.52	28.99	32.71	15.32	19.46

Table 21. Continued.

	Means	Excellent	Good	Fair	Poor	Don't Know
(89) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.82	3.52	30.43	32.92	21.33	11.80
(82) providing recreational shooting range opportunities	2.96	3.52	21.12	37.68	24.64	13.04
(92) acquiring additional land and water for wildlife conservation	3.19	3.11	14.29	33.95	36.85	11.80

¹Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

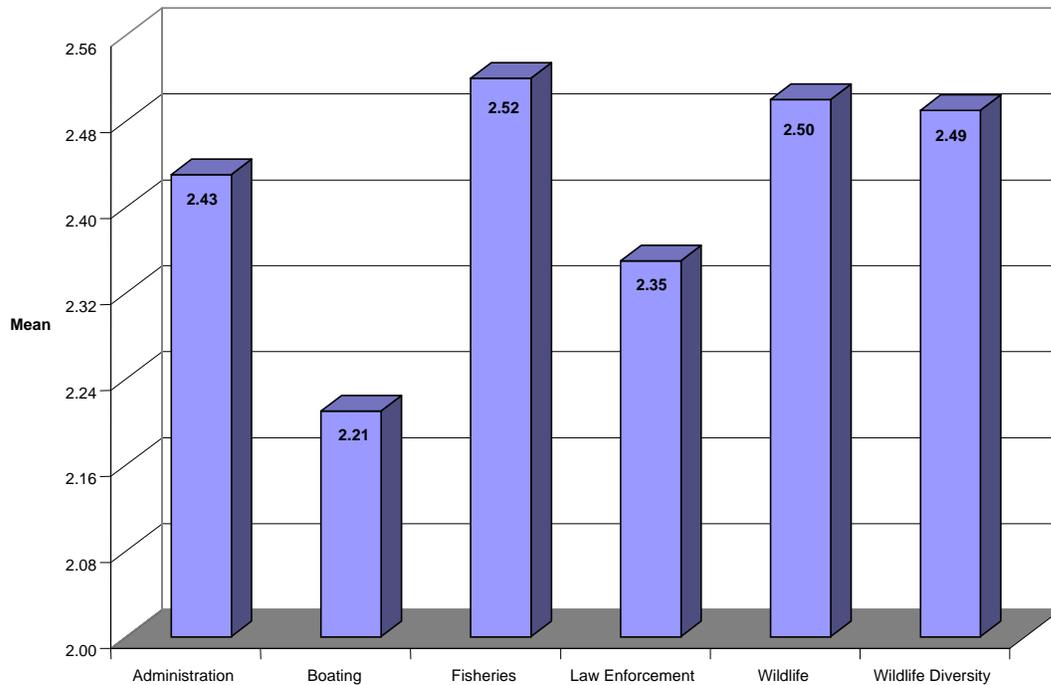


Figure 11. Overall mean scores for questions related to VDGIF performance of its programs and functions by division. Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor.

Means for items related to law enforcement ranged from 1.90 to 2.20, indicating that employees felt, overall, the agency did a good job in its enforcement functions. Nearly 70% or more of all respondents felt the VDGIF did either an excellent or a good job enforcing fishing and wildlife laws, boating laws and laws that protect fish and wildlife habitat, as well as enforcing safety in fish-, wildlife- and boating-related recreation. With the exception of enforcing fish and wildlife habitat laws, all enforcement items fell within the upper 25th percentile of all performance rankings from VDGIF employees.

Employees rated agency performance lowest on acquiring additional land and water for wildlife conservation (mean = 3.19), providing recreational shooting range opportunities (mean = 2.96) and providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails; mean = 2.82).

Approximately 25% of respondents felt the agency did a poor job on the latter two functions, while almost 37% felt the agency did a poor job of acquiring land and water for wildlife conservation.

In education- and information-related programs and functions, employees felt VDGIF did the best job in providing hunter education (mean =1.80), providing safety education for boaters (mean =2.30) and providing education and information to women (mean =2.36; Table 22). They felt the agency performed most poorly in educating and informing citizens, in general, about fish-, wildlife- and boating-related issues (mean = 2.71).

Table 22. Performance rankings (mean scores¹) of education and information-related questions.

Questions	Mean	Corrected S.E.
(85) providing hunter education	1.80	0.01
(100) providing safety education for boaters	2.30	0.02
(90) providing education and information to women	2.36	0.02
(77) providing general fish and wildlife education	2.49	0.02
(96) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.50	0.02
(75) providing aquatic resource education	2.62	0.02
(94) providing education on skills needed to pursue wildlife-related outdoor recreation	2.65	0.02
(101) providing education and outreach to schools	2.65	0.02
(91) educating and informing citizens, in general, about fish, wildlife and boating related issues	2.71	0.02

¹Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

Employees felt VDGIF did a somewhat better job of incorporating hunters' and anglers' wants and needs into the management of the states' fish and wildlife resources (mean = 2.30) than it did incorporating the wants and needs of wildlife viewers (mean = 2.67; Table 21). Administration (mean = 3.14) and Wildlife Diversity (mean = 3.27) employees gave the agency its poorest performance ranking (fair to poor) in incorporating wildlife viewers' wants and needs into wildlife management (Appendix J). The agency's performance in incorporating hunters' and anglers' wants and needs into management received its poorest ranking (mean = 2.54) from Fisheries division respondents and best ranking (mean = 1.79) from Wildlife Diversity division employees.

Comparison of Resource Allocation Priority and Performance

I compared employees' perception of the agency's current performance of 29 activities that spanned VDGIF's major programmatic categories to the priority employees placed on allocating more resources to these activities. Comparison of resource allocation priority to current performance essentially provided a means for assessing which programs and functions might benefit most from additional resources. Employees felt that additional resources should be allocated to all of the 29 VDGIF programs and functions (range of means = 1.92 to 2.83), and they felt that currently the agency was doing a good job performing over 60% these functions (range of means = 1.80 – 3.19; Figure12, Appendix K). Regardless of the performance rating, employees did not favor allocating fewer resources to any agency programs.

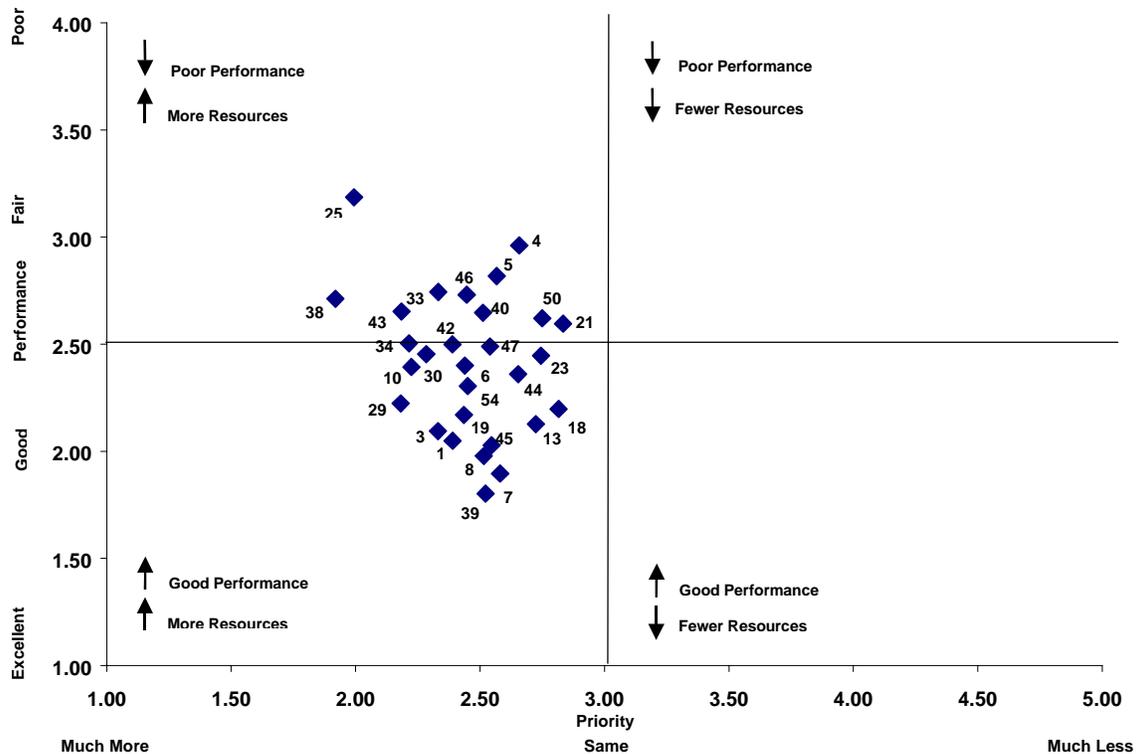


Figure 12. Scatter plot of the priority given to allocation of additional resources versus the current performance of VDGIF programs and functions. Data labels on the scatter plot correspond to agency activities listed below.

- (1) enforcing fishing and hunting regulations
- (3) enforcing safety in fish, wildlife and boating related recreation
- (4) providing recreational shooting range opportunities
- (5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)
- (6) providing boat access to significant hunting and fishing resources
- (7) enforcing boating laws and regulations
- (8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl
- (10) providing hunting opportunities
- (13) managing game fish such as trout and bass
- (18) providing boating opportunities
- (19) providing fishing opportunities
- (21) managing nongame fish and wildlife (i.e., not hunted or fished)
- (23) conducting general biological research
- (25) acquiring additional land and water for wildlife conservation
- (29) enforcing laws that protect fish and wildlife habitat
- (30) managing fish and wildlife to maintain maximum diversity of native species
- (33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat
- (34) protecting rare and endangered habitats
- (38) educating and informing citizens, in general, about fish, wildlife and boating related issues
- (39) Hunter education
- (40) providing education on skills needed to pursue wildlife-related outdoor recreation
- (42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)
- (43) Education and outreach to schools
- (44) providing education and information for women
- (45) providing safety training for hunters
- (46) Including more resource conservation training for enforcement personnel
- (47) providing general aquatic and wildlife education
- (50) Aquatic resources education
- (54) Boating safety education

Recreation

Employees felt that slightly more to about the same amount of time and money should be spent for all recreation activities (range of means 2.22 – 2.82). For the same recreation activities, employees felt that the agency's performance ranged from slightly better than good to fair (Figure 13; Appendix K). Of all recreational activities, employees placed highest priority for additional resources on providing hunting opportunities despite the fact that they felt overall performance of this function was good (item 10). Similarly, employees favored allocating additional resources to other functions that supported traditional uses such as managing game (item 8), providing boat access to significant hunting and fishing resources (item 6), and providing fishing opportunities (item 19). In these instances, as well, performance ratings were high. In contrast, employees rated performance of providing recreation-oriented capital investments on WMAs (item 5) only fair and performance of managing nongame fish and wildlife only slightly better (item 21). Despite these lower performance ratings, employees were less willing to allocate additional resources to these nontraditional-oriented recreation functions than they were to traditional recreation functions.

Law Enforcement

Employees gave Law Enforcement functions high priority for the allocation of additional resources (means = 2.18 – 2.58), even though they rated the performance of these functions as good to excellent (mean = 1.90 – 2.22; Figure 14). Of all enforcement functions, employees felt the agency performed least

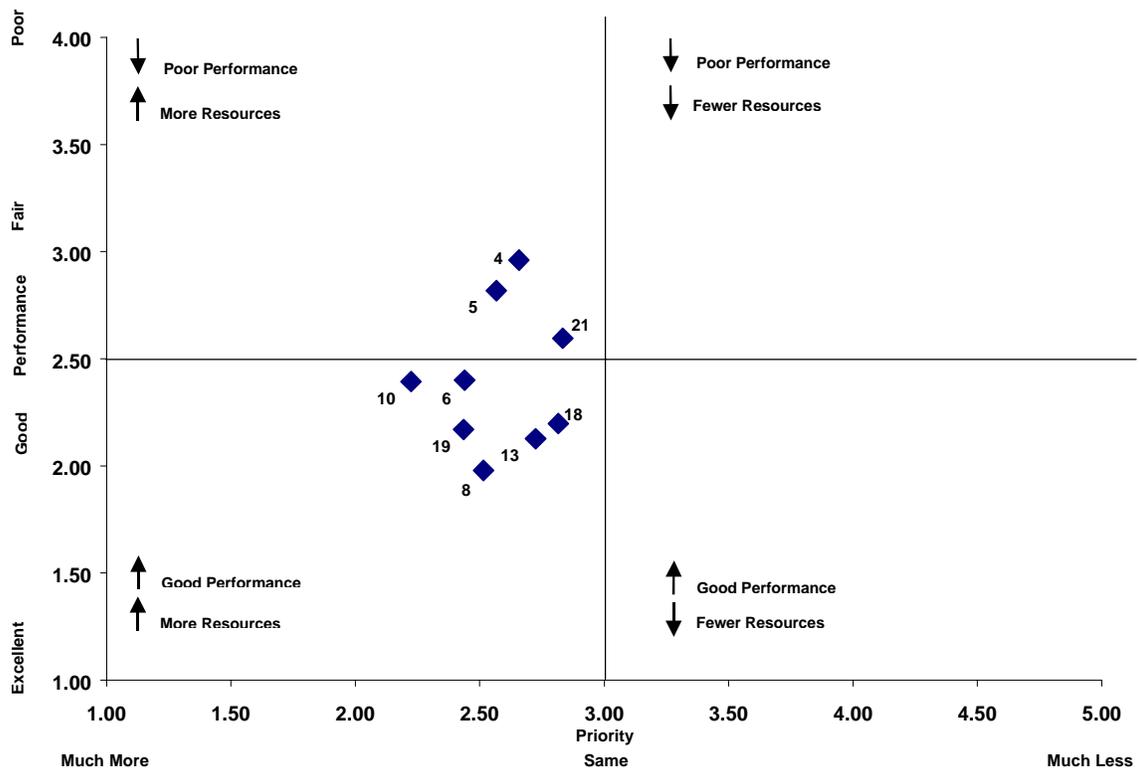


Figure 13. Comparison of the priority given to allocation of additional resources versus the current performance for VDGIF recreation functions and programs. Data labels on the scatter plot correspond to agency activities listed below.

- (4) providing recreational shooting range opportunities
- (5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)
- (6) providing boat access to significant hunting and fishing resources
- (8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl
- (10) providing hunting opportunities
- (13) managing game fish such as trout and bass
- (18) providing boating opportunities
- (19) providing fishing opportunities
- (21) managing nongame fish and wildlife (i.e., not hunted or fished)

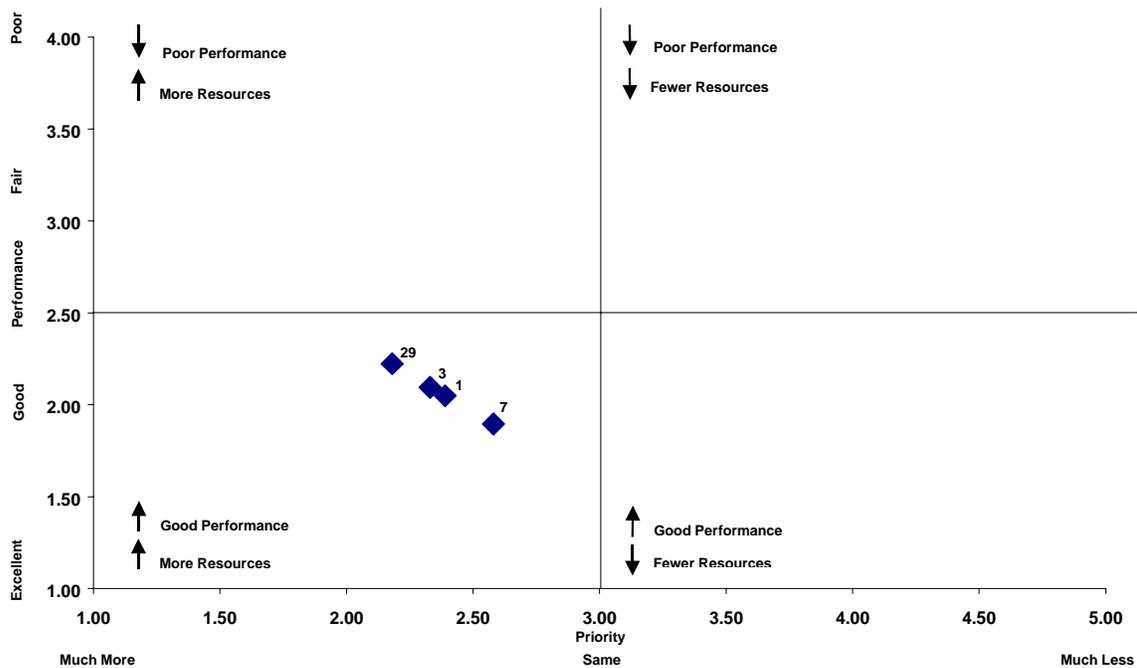


Figure 14. Comparison of the priority given to allocation of additional resources versus the current performance of enforcement-oriented VDGIF functions and programs. Data labels on the scatter plot correspond to agency activities listed below.

- (29) enforcing laws that protect fish and wildlife habitat
- (3) enforcing safety in fish, wildlife and boating related recreation
- (1) enforcing fishing and hunting regulations
- (7) enforcing boating laws and regulations

well (mean = 2.22) enforcing laws that protect fish and wildlife habitat relative to the high priority the placed on it for allocation of more resources (mean = 2.18).

Environmental Diversity and Conservation

VDGIF functions related to environmental diversity received several of the lowest performance ratings (means = 2.45 – 3.19) given to agency functions (Appendix J). At the same time, employees gave high priority to allocating more resources to all items in this category (means = 1.99 to 2.33; Appendix K) except for conducting general biological research, which was of significantly lower priority (mean = 2.74). Employees felt that agency performance was poorest (of all VDGIF functions) relative to resource allocation priority for acquiring additional land and water for conservation (Figure 15, item 25). Employees also assigned relatively high priority for the allocation of additional resources to protecting rare and endangered habitats (item 34), managing fish and wildlife to maintain maximum diversity of native species (item 30) and reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat (item 33). In comparison, the performance rankings indicated employees felt that they were only doing a relatively fair job of performing these activities.

Education

Performance ratings were poorest and priority for additional resources was highest for educating and informing citizens, in general, about fish-, wildlife- and boating-related issues (Figure 16, item 38; Appendix K), providing education and outreach to schools (item 43), and for providing information for fish- and wildlife-associated recreation (item 42). Employees gave relatively poor

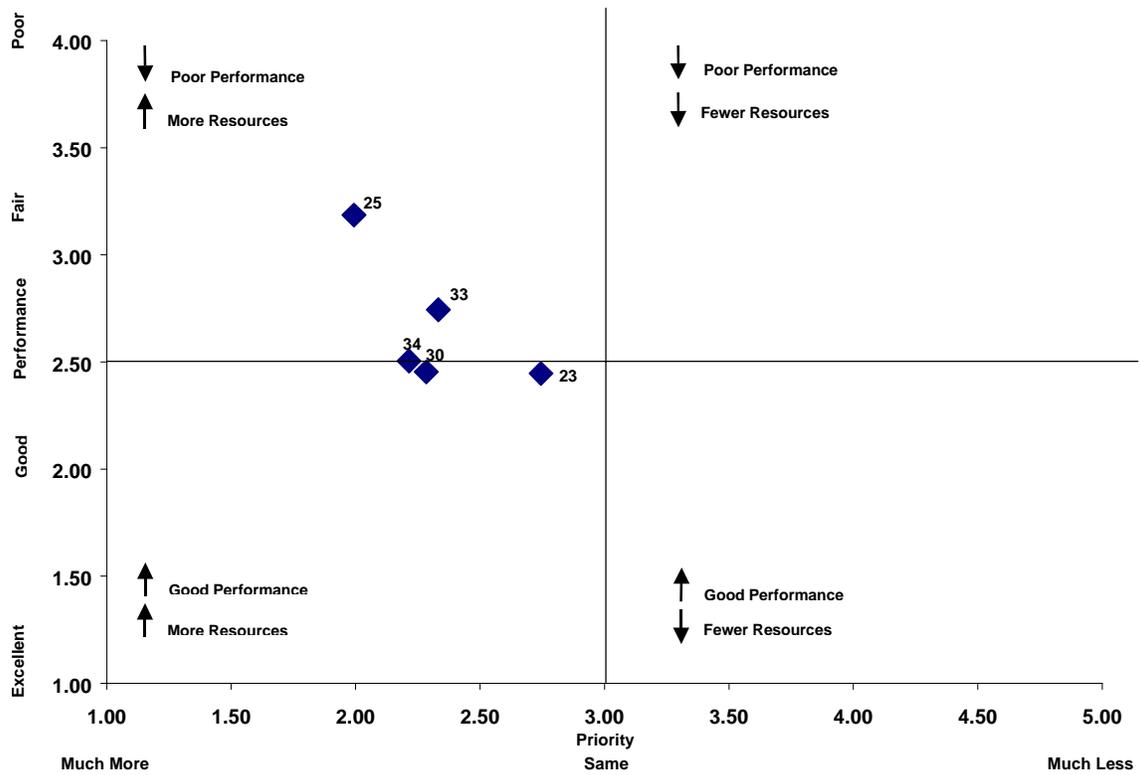


Figure 15. Comparison of the priority given to allocation of additional resources versus the current performance of environmental diversity and conservation-oriented VDGIF functions and programs. Data labels on the scatter plot correspond to agency activities listed below.

- (23) conducting general biological research
- (25) acquiring additional land and water for wildlife conservation
- (30) managing fish and wildlife to maintain maximum diversity of native species
- (33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat
- (34) protecting rare and endangered habitats

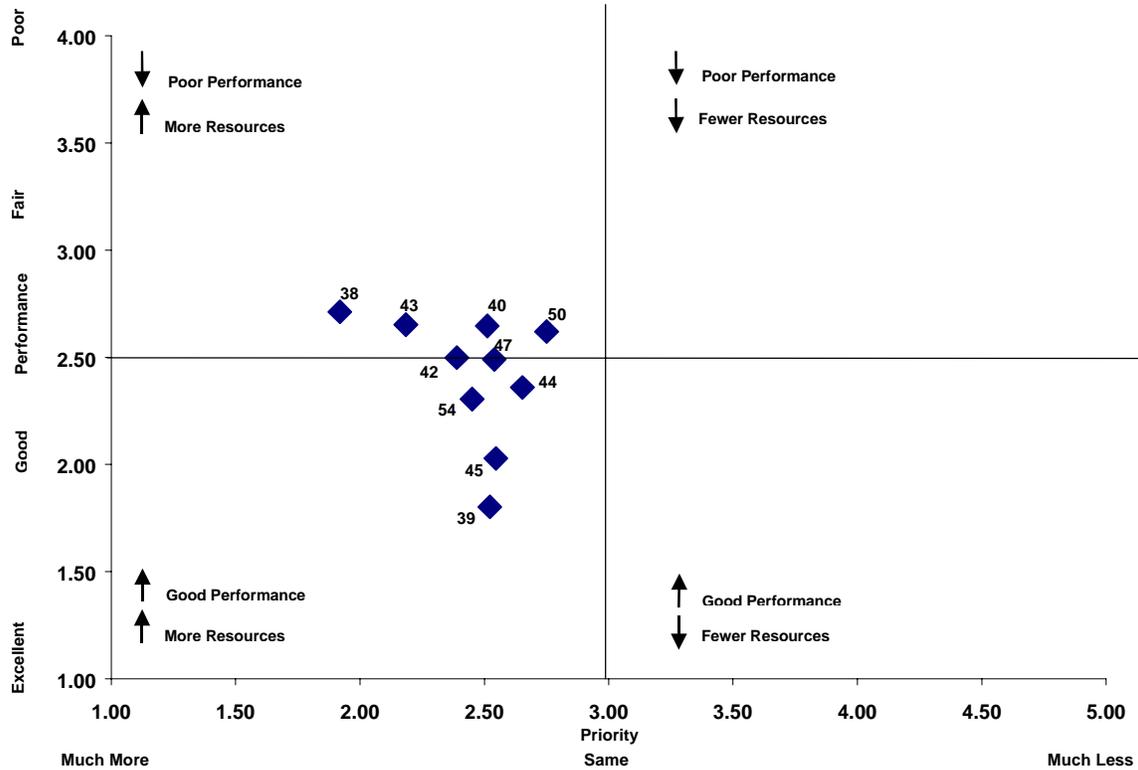


Figure 16. Comparison of the priority given to allocation of additional resources versus the current performance of education- and information-related VDGIF functions and programs. Data labels on the scatter plot correspond to agency activities listed below.

- (38) educating and informing citizens, in general, about fish, wildlife and boating related issues
- (39) Hunter education
- (43) Education and outreach to schools
- (40) providing education on skills needed to pursue wildlife-related outdoor recreation
- (42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)
- (47) providing general aquatic and wildlife education
- (50) Aquatic resources education
- (54) Boating safety education
- (44) providing education and information for women
- (45) providing safety training for hunters
- (46) including more resource conservation training for enforcement personnel

performance ratings to providing education on skills needed to pursue wildlife-related outdoor recreation (item 40) and to aquatic resources education (item 50), while they gave these items only moderate priority for additional resources. Providing hunter education (item 39), safety training for hunters (item 45) and boating safety education (item 54) received higher priority for additional resources than did several education functions, despite the fact that performance ratings for these three traditional use-related items were the highest of all the education functions.

Discussion

The priorities of the employees of VDGIF for allocation of additional resources covered a broad range of programs and functions and often differed greatly among divisions. However, employees throughout the agency generally agreed that education and improvement of programs and activities related to traditional uses of the fish and wildlife resources by traditional constituents should have highest priority for additional resources. Employees also placed high priority on acquiring and protecting wildlife habitat, with an emphasis on managing game fish and wildlife rather than nongame fish and wildlife.

Education and Information

Employees perceived a lack of public awareness of fish-, wildlife- and boating-related issues in general, and a lack of awareness of the functions and services provided by the Virginia Department of Game and Inland Fisheries. Many employees favored marketing the department like a private company, using commercial business practices, to increase agency visibility among constituents and to encourage and recruit potential users. Several employees maintained that informing people of the services and products VDGIF offered gave the constituents more opportunities to financially support VDGIF and also to receive something of value in return.

In addition to promoting public awareness of VDGIF programs, a roughly equal number of employees felt that more time and money should be spent educating and informing citizens, in general, about fish-, wildlife- and boating-related issues. Providing information such as maps and descriptions of facilities

to enable constituents to participate in fish- and wildlife-oriented recreation received higher resource allocation priority than did providing constituents with general aquatic and wildlife education.

Among constituent groups, employees placed higher priority for additional resources on educating, informing and providing fish and wildlife recreational opportunities for children and youth. Targeting children and youth will play an important role in ensuring that hunting, fishing and trapping continue into the 21st century. Almost 70% of anglers start fishing by age 9 and only 14% of anglers start fishing after age 14 (Harrington Market Research 1992).

Employees placed significantly less priority for additional resource allocation on educating, informing and providing fish and wildlife recreational opportunities for women and minorities. In light of the significant demographic changes occurring across the U.S. that are affecting participation in wildlife-related recreation, it is worthwhile not to underestimate the importance of these groups to the future of VDGIF. By 2025, our culture will be even more ethnically diverse than it is today, because 81% of the population growth in the U.S. will come from nonwhite populations (Spencer 1993). Although historically the nonwhite population has participated less in hunting and fishing, it is an audience that warrants reaching out to by virtue of its size alone. Research suggests there is often substantial latent interest in fishing and hunting among people who currently do not participate (Manfredo and Zinn 1996).

Focusing on recruiting and retaining women may also prove valuable to VDGIF. An encouraging trend seems to be an increase in the numbers of

women who are participating in shooting sports (National Shooting Sports Foundation 1991) and in fishing (33% of all adult anglers are women; Harrington Market Research 1991).

Despite the low overall priority for allocation of additional resources to functions related to urban/suburban constituents, offering urban/suburban constituents opportunities for hands-on experiences with the fish and wildlife resource (i.e., better education and recreational programs) may be a way of preventing unwanted wildlife interactions that often occur in urban/suburban areas. It would also be way of increasing awareness of VDGIF activities and programs, in general, among a constituency of nontraditional users of the resource who may be largely unaware of the services of the VDGIF.

There is little doubt that many of the survey results were colored by the demographic and ethnic characteristics of VDGIF employees. The VDGIF is largely a homogenous population of middle-aged, white males, mostly from rural or suburban areas. And like many professionals, particularly those who are specialists, they are likely to be influenced by ethnocentrism – the phenomenon of judging others by the standards of one's own culture or social group (Catton 1973, Magill 1988). The relative lack of cultural and ethnic diversity within the agency, coupled with ethnocentric propensities, helps explain the lower priority for additional resources given to providing services to women, nonwhite constituents and urban/suburban constituents. Because membership in these demographic groups is low within the agency itself, many employees may lack awareness of the existence, needs and preferences of these constituent groups.

Capital Improvements

Results of the employee survey showed that administrators' plans to use up to 50% of House Bill 38 money for capital improvements for the next several years is likely to get substantial support from a majority of agency employees. Eighty-two percent of all capital improvement questions fell within the upper 25 percentile of questions that received the highest priority for additional resources. Employees assigned higher priority for additional resources to capital improvement and land acquisition related questions than they did to any other category of questions.

Recreation Functions

Of the recreational activities managed by VDGIF, employees assigned highest priority for additional resources to providing hunting opportunities. Services and functions that improved the agency's ability to provide hunting opportunities, such as encouraging private landowners to open their lands for hunting access, providing boat access to significant hunting and fishing resources and managing game animals, all received high priority for more agency resources within their respective recreation indices. In comparison to providing hunting opportunities, providing wildlife viewing opportunities and managing nongame fish and wildlife received relatively low priority ratings from most employees for the allocation of additional resources.

Although employees placed greater emphasis on allocating additional resources for traditional uses than they did for nontraditional uses, they strongly supported activities that conserved and protected the resource as a whole.

Employees were particularly concerned about acquiring more land and water for fish and wildlife conservation, maintaining existing department lands, creating new wildlife management areas and enforcing laws that protect fish and wildlife habitat.

Additional Resource Allocation Priority versus Performance

VDGIF employees felt that the agency was doing a good to very good job performing many of its principal functions directed toward traditional users. These included items such as education and safety training for hunters, managing game fish and wildlife, and enforcing the fishing, hunting and boating laws of Virginia. At the same time, employees tended to be conservative in allocating additional resources to these activities. This suggests that employees felt that at current levels of funding, the agency performs these functions well and that allocation of additional resources for these functions is not a high priority.

Although employees, in general, favored allocating fewer additional resources to nontraditional uses of the resource, one of the largest gaps between additional resource allocation priority measures versus performance measures occurred for the activity of providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms). Despite the fact that employees felt only a moderate amount of additional resources should be allocated to this activity, they felt that the agency's performance of this activity was only fair. These results suggest that while VDGIF employees might favor allocation of more resources to provide traditional recreation opportunities, there is also an awareness among employees

that VDGIF does not supply the facilities to provide recreational opportunities to nontraditional users – the principal constituents to whom these types of recreation-oriented investments on WMAs most appeal – and that allocation of additional resources to creating these facilities is warranted.

On the other hand, priority for the allocation of additional resources appeared to closely match current performance for law enforcement functions. Employees felt that the agency did a good job enforcing the fishing, hunting and boating laws of the state and enforcing safety in fish-, wildlife- and boating-related recreation. They also indicated that these were not functions for which they felt considerably more additional resources should be allocated. Employees gave the least satisfactory performance rating (among law enforcement functions) to enforcing laws that protect fish and wildlife habitat while assigning it a high priority for the allocation of additional resources. Overall, these findings suggest that the Law Enforcement division is achieving its mission relatively well at present funding levels and further, that highest priority for additional resources should be given to the two areas where performance least matched the high priority given them for allocation of additional resources – acquiring additional land and water for conservation and educating and informing citizens, in general, about fish-, wildlife- and boating-related issues.

Conclusions

House Bill 38 offers the Virginia Department of Game and Inland Fisheries a rare opportunity to define its direction into the 21st century. Although it does not solve all the economic problems facing the agency, HB 38 improves the agency's ability to face the many challenges of providing wildlife-, fish-, and boating-related outdoor recreation to an ever-increasing and diversifying constituency. House Bill 38 also marks the broadening of the agency's constituency. For the first time in the agency's history, nontraditional users will be making a significant financial contribution to VDGIF and the management of Virginia's fish and wildlife resource. The agency's challenge will be to find ways to serve this new constituency while maintaining the support and ability to serve the needs of its traditional users.

Employees offer a valuable inside look into the agency and their input is critical in helping the VDGIF expand its ability to serve all its constituents. Employees' strong support for functions aimed at acquiring, protecting, and conserving fish and wildlife habitat perhaps highlight an important point; in order to fulfill the agency's mission and to become a comprehensive agency, there must be sufficient, well-conserved habitat to ensure a healthy fish and wildlife resource.

Employees' number one priority – enhancing public awareness of VDGIF and its programs – also indicates that VDGIF employees believe they have marketable services to offer to the citizens of Virginia and that these services should be promoted and publicized. This desire to create better lines of

communication between the agency and the people it serves bodes well for implementation of House Bill 38. It will take both maintaining a healthy resource and knowing and communicating with the public to enable the VDGIF to continue to serve the traditional users and to better serve nontraditional constituents.

A Comparison of Values and Priorities between External Constituents and VDGIF Employees

Introduction

The Virginia Department of Game and Inland Fisheries is a both a resource management organization and a service organization that provides recreational opportunities for the citizens of Virginia. For any service-oriented agency, examining the priorities and values of the constituents, compared to those of the agency's employees, can provide insight on: 1) how well the employees are tuned-in to the needs and wants of their constituents, and 2) where the agency should increase, maintain or direct its efforts to provide better service to its constituents.

In this section, I compared the values and priorities of VDGIF employees with those of 5 external constituent groups in Virginia who were recently surveyed by Responsive Management (McMullin et al. 2000). These groups were: hunters, anglers, boaters, wildlife viewers, and a sample of the general Virginia population.

Methods

For comparisons between employees and external constituents, I used data from the VDGIF mail survey and data from telephone surveys conducted by Responsive Management. The external constituent surveys included four separate surveys of 1) the general Virginia population, 2) hunters, 3) anglers and 4) wildlife viewers. Data were weighted for the general-population and boater surveys based upon the proportion of Virginia population (from 1998 Virginia

population estimates from the U.S. Census Bureau) within each VDGIF region. For each constituent group, Responsive Management attempted to obtain a sample of 160 completed surveys per VDGIF Administrative Region (Appendix A).

To compare the priorities of employees to those of external constituents and to compare responses to performance questions, I compared mean scores, mean differences and percent response. One mean value was considered significant from another if there was no overlap at ± 2 standard errors from the mean (95% confidence level).

Results

Values Associated with Wildlife-Related Recreation

The mean scores for the general population and VDGIF employees ranged from 1.42 to 1.84 for a majority of questions (5 out of 7) related to the value placed on wildlife and wildlife-related activities (Figure 17). This indicated that they felt the topics addressed in these questions were somewhat important to very important to both groups. However, the mean scores between these two constituent groups differed significantly for all questions except one (Table 23).

Both constituent groups placed greatest importance on knowing that wildlife exists in Virginia (employee mean = 1.42; general population mean = 1.66, difference = 0.24). Fifty-six percent of Virginia citizens and 72% of VDGIF employees said it was very important to know that wildlife exists (Table 24). The importance ratings for this question were higher than for any of the questions related to wildlife-related recreation, indicating that the existence value of wildlife was more important than the recreational value of wildlife for both the general population and VDGIF employees.

Although the general population attached substantially more importance to interference by wildlife with other activities than did VDGIF employees (employee mean = 3.04; general population mean = 2.47, difference = -0.57), this item received the lowest importance rating of all value questions from both groups.

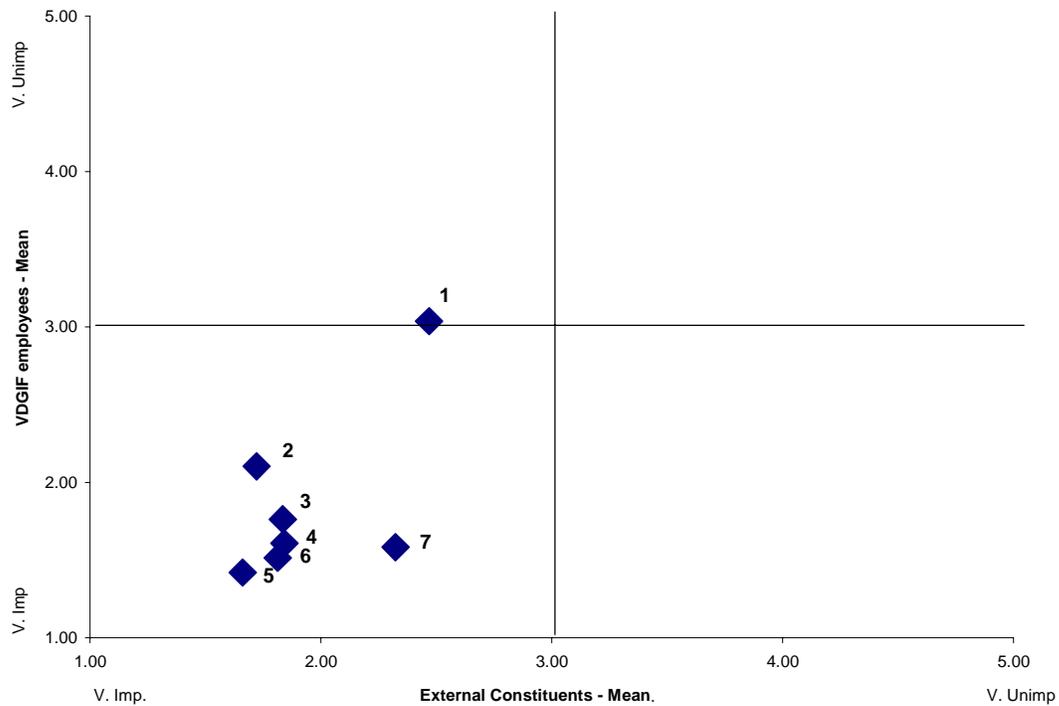


Figure 17. Comparison of mean scores¹ between VDGIF employees and external general population constituents on questions related to values placed on wildlife and wildlife-related topics.

- (1) to be sure that wildlife does not interfere with your other activities
- (2) to have the opportunity to view wildlife
- (3) to have the opportunity to boat
- (4) to have wildlife around your home
- (5) to know wildlife exists
- (6) to have the opportunity to fish
- (7) to have the opportunity to hunt

¹Responses were coded 1 = Very important, 2 = Somewhat important, 3 = Neutral/Don't know, 4 = Somewhat Unimportant, 5 = Very Unimportant

Table 23. Comparison of mean scores between general population and VDGIF employees on questions¹ related to values associated with wildlife.

	General Population Employees				Mean Difference	
	Mean	S.E.	Mean	S.E.		
That wildlife does not interfere with other activities	2.47	0.05	3.04	0.04	-0.57	*
To have the opportunity view wildlife	1.72	0.03	2.10	0.04	-0.38	*
To have the opportunity to boat	1.83	0.04	1.76	0.03	0.07	
To have wildlife around your home	1.84	0.04	1.61	0.03	0.23	*
To know wildlife exists	1.66	0.03	1.42	0.02	0.24	*
To have the opportunity to fish	1.81	0.04	1.51	0.03	0.30	*
To have the opportunity to hunt	2.32	0.05	1.58	0.03	0.74	*

¹Responses were coded 1 = Very important, 2 = Somewhat important, 3 = Neutral/Don't know, 4 = Somewhat Unimportant, 5 = Very Unimportant

*significant at alpha = 0.05

Table 24. Response (in percent) of general population and VDGIF employees to questions related to values associated with wildlife and wildlife-oriented activities.

	That wildlife does not interfere with other activities		To have the opportunity to view wildlife		To have the opportunity to boat		To have wildlife around your home		To know wildlife exists		To have the opportunity to fish		To have the opportunity to hunt	
	GP ¹	Emp ²	GP	Emp	GP	Emp	GP	Emp	GP	Emp	GP	Emp	GP	Emp
Very important	26.1	9.1	50.8	32.0	47.0	48.5	49.0	57.9	55.8	71.9	48.2	62.0	32.9	61.3
Somewhat important	38.8	32.0	37.4	40.5	37.8	34.4	34.9	29.9	33.0	18.7	38.1	27.8	39.1	25.1
Neutral/Don't know	7.7	20.8	2.6	16.6	3.5	10.8	2.7	7.5	2.9	6.2	2.2	7.7	4.1	9.5
Somewhat unimportant	16.9	22.0	7.6	6.7	7.9	4.6	9.6	3.1	5.9	1.7	7.5	1.7	10.5	2.3
Very unimportant	10.4	16.0	1.7	4.2	3.8	1.7	3.8	1.7	2.4	1.5	4.1	0.8	13.3	1.9

¹ General Population
n = 806

² VDGIF employees
n = 487

Of the recreational values associated with wildlife, employees and the general population differed most in their importance ranking for having the opportunity to view wildlife and for having the opportunity to hunt. The general population assigned more importance to having the opportunity to view wildlife than did employees. Eighty-eight percent of the general population (mean = 1.72) felt that having the opportunity to view wildlife was somewhat to very important. In contrast, 73% of VDGIF employees (mean = 2.10, difference = -0.38) answered somewhat to very important to this item.

Having the opportunity to hunt was significantly more important to employees than it was to the general population (employee mean = 1.58; general population mean = 2.32, difference = 0.74). Seventy-two percent of the general population felt it was somewhat to very important to have the opportunity to hunt (vs. 86% of the employees), but almost 25% of the general population felt that having the opportunity to hunt was somewhat unimportant to very unimportant. In contrast, only 5% of VDGIF employees answered somewhat to very unimportant to this question.

General Population Participation Rates and Latent Demand for Wildlife-Related Recreation

Over 63% of general population respondents said they participated in some form of wildlife-related recreation in Virginia within the last two years. Of these respondents, the largest number (42%) had been fishing (Table 25). Thirty-six percent had participated in some form of boating, while 20% had taken a trip to view wildlife. Only 8.5% of all Virginians had been hunting.

Currently nonparticipating Virginians expressed considerable interest in participating in all forms of wildlife-oriented recreation in the future (Table 26). Nonparticipants were most interested in wildlife viewing. Nearly one-half of the 80% of constituents who said they had not taken a trip to view wildlife in the past two years said they would be interested in taking a trip to do so in the future. Thirty-seven percent of nonanglers (out of 58% who currently did not participate) said they would be interested in going fishing and 33% of nonboaters (out of 64% current nonparticipants) expressed interest in going boating in the future (Table 25). Although current nonparticipants were least interested in going hunting in the future, 11% of the nonhunters (92% of Virginians) expressed interest in doing so in the future.

Virginians' latent interest in participation in wildlife-related recreation has important implications for the VDGIF. Comparing the percentage of actual participants with the percentage of nonparticipants expressing latent interest in

Table 25. Number and percent of general population¹ who reported participating in wildlife-related recreation within the last two years. Source: McMullin et al. 2000

	Yes	No
	%	%
Have you been hunting in the last 2 years?	8.5	91.5
Have you been fishing in the last 2 years?	42.1	57.9
Have you taken a trip to view wildlife in the last 2 years?	20.4	79.6
Have you participated in any type of boating?	35.7	64.3

¹n = 806

Table 26. Number and percent of general population in Virginia not currently participating in wildlife-related recreation who expressed an interest to do so in the future. Source: McMullin et al. 2000

	Would you be interested in going hunting		Would you be interested in going fishing		Would you be interested in taking a trip to view wildlife		Would you be interested in boating	
	No.	%	No.	%	No.	%	No.	%
Yes	84	11.4	196	36.7	299	46.6	171	33.0
No	649	88.0	333	62.6	334	52.0	344	66.3
Don't Know	4	0.6	4	0.7	9	1.4	3	0.6

wildlife-related recreation showed that 63.3% of Virginians are actual or potential anglers, 18.9% of Virginians are actual or potential hunters, 56.9% are actual or potential boaters and 57.5% are actual or potential wildlife viewers. This represents over 50% growth potential for fishing and boating, 100% growth potential for hunting and approximately 180% potential for growth in the number of nonresidential wildlife viewers.

Constituent Awareness of VDGIF and its Activities

While 1/3 of Virginia citizens said they knew a moderate amount to a great deal about the activities of the VDGIF, over 20% of them said they knew nothing at all about VDGIF activities (Table 27). Boaters reported knowing more about VDGIF and its activities than did other users (hunters and anglers).

Approximately 66% of boaters said they knew a moderate amount to a great deal about VDGIF's activities compared to 61% of hunters and 58% of anglers. Only 5% or less of traditional users knew nothing at all about the agency.

Not surprisingly, wildlife viewers were substantially less knowledgeable of VDGIF and its activities than were traditional users. Although 36% of wildlife viewers reported knowing a moderate amount to a great deal about the VDGIF and its programs, 20% reported knowing nothing at all about the agency.

Table 27. External constituent¹ response (in percent) to question asking how much respondents knew about the activities of the VDGIF.

	Gen Pop² n = 806	Viewers³ n = 811	Hunters n = 826	Anglers n = 793	Boaters n = 849
Great Deal	5.9	6.9	18.6	18.8	21.5
Moderate Amount	24.4	29.0	42.5	39.3	44.3
A Little	47.0	44.1	32.7	35.7	29.5
Nothing	21.3	19.4	5.1	5.2	4.3
Don't Know	1.3	0.7	1.1	1.0	0.5

¹Included survey of general population and surveys of Virginians who identified themselves as wildlife viewers, hunters, anglers and/or boaters

²Gen Pop = General population

³Viewers = Wildlife Viewers

VDGIF Functions and Programs - Comparing Importance Measures between External Constituents and Employees

The external constituent surveys asked respondents to rate the importance of various VDGIF functions and programs on a scale from very important to very unimportant. The employee survey asked VDGIF personnel to rate the importance of these same functions in terms of whether they felt more, the same, or less time and money should be spent on them. The general population ratings reflected how important or unimportant they felt a particular program was, while employees importance ratings reflected their wish to allocate more or fewer resources to that program.

The means for the 17 questions asking the general population to rate importance of VDGIF activities ranged from 1.24 to 2.63, i.e., from very important to just slightly important (Table 28). Almost 90% percent of these questions (15) had means less than 2.00 (range 1.24 – 1.96) which indicated that respondents felt a majority of VDGIF activities were somewhat to very important. The general population assigned highest importance ratings to enforcement issues and safety-related education (range of means = 1.24 – 1.31) followed by education and information functions. Ninety-five percent or more of respondents felt that enforcing laws that protect fish and wildlife habitat, enforcing fishing, hunting and boating laws, and providing boating and hunting safety education were somewhat to very important.

Table 28. General Population¹ mean scores and percent response to questions related to VDGIF functions and activities. Respondents were asked to rate² the questions on a scale from very important to very unimportant.

	Mean	VI	SI	N/DK	SU	VU
(45) Enforcing laws that protect fish and wildlife habitat	1.24	82.1	14.7	1.2	1.3	0.7
(44) Enforcing fishing, hunting and boating laws	1.29	78.0	18.0	1.4	2.0	0.6
(54) Providing boating safety education	1.30	78.7	16.7	1.4	3.1	0.2
(55) Providing hunter safety education	1.31	82.5	11.6	1.3	2.1	2.5
(61) Protecting threatened and endangered species	1.32	79.0	15.6	1.3	2.5	1.7
(53) Providing wildlife and environmental education	1.39	69.1	26.3	1.7	2.1	0.9
(60) Reviewing proposed developments to minimize effects on wildlife	1.57	59.2	30.7	5.5	3.4	1.2
(56) Providing information on fish and wildlife rec	1.66	51.6	39.9	1.5	4.5	2.4
(51) Providing wildlife viewing opportunities	1.70	51.2	38.3	2.7	4.9	2.9
(57) Acquiring additional land and water for conservation	1.75	52.4	33.6	3.9	7.0	3.2
(46) Managing nongame fish and wildlife	1.76	53.1	31.1	6.1	6.6	3.1
(58) Providing technical assistance to rural landowners	1.78	50.2	36.9	3.6	5.3	4.0
(49) Providing fishing opportunities	1.84	45.8	40.6	2.5	6.0	5.1
(59) Providing technical assistance to urban/suburban landowners	1.89	46.3	36.2	4.4	8.1	4.8
(50) Providing boating opportunities	1.96	40.5	43.0	3.0	7.5	6.1
(47) Providing hunting opportunities	2.26	32.5	41.1	5.3	9.8	11.2
(48) Providing recreational shooting opportunities	2.63	25.6	37.3	4.6	13.7	18.8

¹n = 806

²Responses were coded 1 = Very important, 2 = Somewhat important, 3 = Neutral/Don't know, 4 = Somewhat unimportant, 5 =Very unimportant

Except for wildlife viewing, providing recreation opportunities appeared closer to the bottom of the list of priorities. General population respondents gave the lowest importance ratings to providing hunting opportunities and providing recreational shooting opportunities (mean = 2.26 and mean = 2.63, respectively). These were the only activities that 20% or more of Virginians rated as somewhat or very unimportant.

Comparing the general population means of the importance questions with the employee means for the same questions revealed that there was no consistent relationship between how the general population rated the importance of the various VDGIF activities versus how employees rated the need for additional resources for these activities (Table 29). This was partially due, I believe, to the difference in question formats but it also reflected the differences in priorities and preferences between employees and the general public. Comparing the two groups' ranked mean scores suggested where the priorities of the general population and the priorities of the employees (with respect to allocation of additional or fewer resources) were most similar and the areas where their priorities were most different. This information could be useful for identifying areas of high demand by the public that are currently unrecognized by employees. The priorities of the general population differed substantially from employees' priorities (for allocation of additional resources) for issues related to wildlife viewing and hunting. Further comparisons between the two groups are discussed in more detail in the following sections.

Table 29. Comparison of relative priority given to VDGIF functions and activities by the general population and VDGIF employees - mean scores and rank. Difference in ranks in far-right column.

	Means		Means		Rank Dif.
	Gen. Pop. ¹ n = 806	Gen. Pop Rank	Employees ² n = 487	Employee Rank	
Environmental Diversity					
(57) Acquiring additional land and water for conservation	1.75	10	1.99	2	8
(46) Managing nongame fish and wildlife	1.76	11	2.83	17	-6
(58) Providing technical assistance to rural landowners	1.78	12	2.34	7	5
(61) Protecting threatened and endangered species	1.32	5	2.35	4	1
(60) Reviewing proposed developments to minimize effects on wildlife	1.57	7	2.33	6	1
(59) Providing technical assistance to urban/suburban landowners	1.89	14	2.58	13	1
Law Enforcement					
(44) Enforcing fishing, hunting and boating laws	1.29	2	2.49	11	-9
(45) Enforcing laws that protect fish and wildlife habitat	1.24	1	2.18	3	-2
Education					
(55) Providing hunter safety education	1.31	4	2.52	12	-8
(54) Providing boating safety education	1.30	3	2.45	10	-7
(53) Providing wildlife and environmental education	1.39	6	1.92	1	5
(56) Providing information on fish and wildlife recreation	1.66	8	2.39	8	0
Recreation					
(47) Providing hunting opportunities	2.26	16	2.22	5	11
(51) Providing wildlife viewing opportunities	1.70	9	2.75	15	-6
(49) Providing fishing opportunities	1.84	13	2.44	9	4
(48) Providing recreational shooting opportunities	2.63	17	2.66	14	3
(50) Providing boating opportunities	1.96	15	2.82	16	-1

¹Responses were coded 1 = Very important, 2 = Somewhat important, 3 = Neutral/Don't know, 4 = Somewhat unimportant, 5 =Very unimportant

²Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Environmental Diversity

Both the general population and VDGIF employees placed relatively high importance on most activities related to the protection of wildlife and wildlife habitat, such as protecting threatened and endangered species (general population rank = 5, employees rank = 4) and reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat (general population rank = 7, employees rank = 6). Employees gave high priority for additional resources to acquiring additional land and water for wildlife conservation, while the general population felt this was only moderately important (rank = 2 and rank = 10, respectively). Managing nongame fish and wildlife was substantially more important to external constituents than it was to employees - who gave this item lowest (resource allocation) priority of all items in this section (general population rank = 11, employees rank = 17). Relative to the other questions, both the general population and VDGIF employees attached relatively low priority to providing technical assistance to private landowners on how to manage wildlife on their properties (Table 29).

Law Enforcement

Enforcing laws that protect fish and wildlife habitat topped the list of priorities for the general population and was ranked third by VDGIF employees. Virginians also placed high importance on VDGIF's enforcement of fishing, hunting and boating laws (rank = 2). This activity received a much lower ranking among agency respondents (rank = 11). Although the ranking given to this activity by employees appears to indicate that it was of lesser importance to them

than it was to the general population, the ranking probably more accurately reflects employees feeling that currently sufficient resources are being allocated to this function and additional resources are not a high priority. I believe this to be true because: 1) a large amount of funds have been directed toward boating and boating law enforcement in recent years, and 2) employees gave almost all enforcement functions high priority for additional resources, as well as high performance ratings. This second point indicates that enforcement functions are extremely important to most agency employees.

Education

Among the Education functions, Virginians rated boating safety education (rank = 3) and hunter safety education (rank = 4) highest in priority. Following law enforcement and safety education, the general population placed high priority on providing general wildlife and environmental education (rank = 6); as did employees who gave educating and informing the citizens in general about fish-, wildlife- and boating- related issues (rank = 1) highest priority for additional resources.

Sixty-one percent of respondents who identified themselves as hunters indicated they would like VDGIF to put somewhat to much more effort on Hunter education (rank = 4), including firearm safety (Table 30). Similarly, 61% of boaters felt the agency should put somewhat to much more effort on boating safety education (rank = 3), such as providing courses and classes. In comparison, only 41% of VDGIF employees felt that additional resources should

Table 30. Means and response in percent to questions asking hunters¹ and boaters² if they felt VDGIF should spend more, the same or less effort on hunter education and boating safety education. Employees³ were asked if they felt more, the same or less time and money should be spent on these activities.

	Hunter Education		Boating Safety Education	
	Hunters mean = 2.16	Employees mean = 2.52	Boaters mean = 2.27	Employees mean = 2.45
Much more	33.7	15.6	29.1	14.2
Somewhat more	27.7	25.5	31.9	33.1
About the same	34.5	46.5	33.0	44.8
Somewhat less	0.5	4.9	0.4	4.3
Much less	0.5	2.5	0.0	1.6
Don't know	3.1	1.9	5.6	2.1

¹ n = 826

² n = 849

³ n = 827

be allocated to Hunter education (rank = 12) and 47% of employees felt additional resources should be allocated to boater safety education (rank = 10).

Again, I believe the difference in rankings between external constituents and employees for these items can be attributed primarily to question format. Although these programs were not high priority for additional resources, the high performance ratings given these items suggest employees consider these activities very important. However, if almost 2/3 of Virginia hunters and boaters feel the agency needs to provide more effort on hunting and boating safety education than it currently does, it would behoove the agency to address their concerns.

Recreation

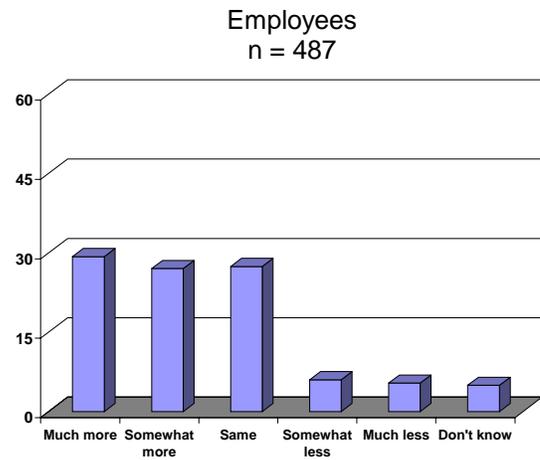
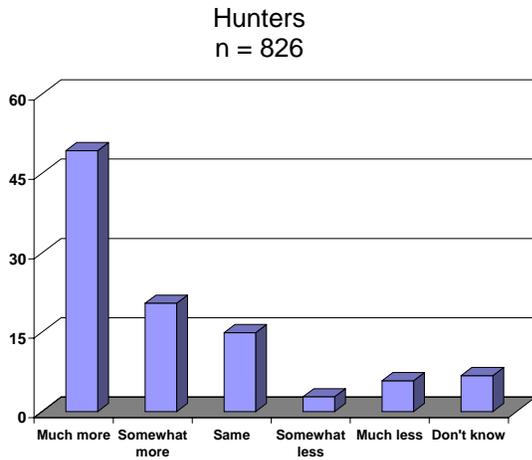
With a few exceptions, both the general public and VDGIF employees gave higher priority to issues related to Environmental Diversity, Enforcement, and Education than they did to issues related to Recreation (Table 29). Within the Recreation category, however, VDGIF employees placed substantially higher importance on providing hunting opportunities (rank = 5) than did the general population who ranked it second to the last in importance (rank = 16). Conversely, the general public placed much higher importance (rank = 9) on providing wildlife viewing opportunities than did VDGIF employees (rank = 15). In fact, of all recreational activities, the general population gave highest priority to providing wildlife viewing opportunities. They placed less importance on providing fishing opportunities (rank = 13), providing recreational shooting range opportunities (rank = 17) and providing boating opportunities (rank = 15).

In 1999, the VDGIF appropriated over \$6 million for managing game animals and providing hunting and trapping recreational opportunities, and over \$5 million for managing game fish and providing fishing opportunities (with law enforcement accounting for roughly half of each divisions' budget)(VDGIF 1998). In contrast, the VDGIF allocated \$295,000 to nongame management and just under \$38,000 to wildlife watching recreation. Given its low level of current resource allocation, combined with the low priority it received for additional resources, it is clear that wildlife viewing programs are severely underfunded and may continue to lack funding support. In this respect, the agency is very much out of touch with the needs and desires of a large part of its constituency.

Private Land Access

Issues related to access to private lands for traditional recreational uses appeared to be of slightly more concern to hunters and anglers than they were to employees. Seventy percent of hunters felt VDGIF should provide somewhat more to much more effort on encouraging private landowners to open access to their lands for hunting (Figure 18). Almost as many anglers (63%) felt the agency should provide somewhat more to much more effort on encouraging private landowners to open access to their waters for fishing. Although 55% percent of VDGIF employees felt the agency should be spending somewhat more to much more time and money encouraging private landowners to open their lands and waters for hunting and fishing, nearly 1/3 of employees felt that the agency was spending enough on these activities. In comparison, only about 15% of hunters and anglers felt the agency should provide the same amount of effort encouraging private land access.

Private land access for
Hunting



Private land access for
Fishing

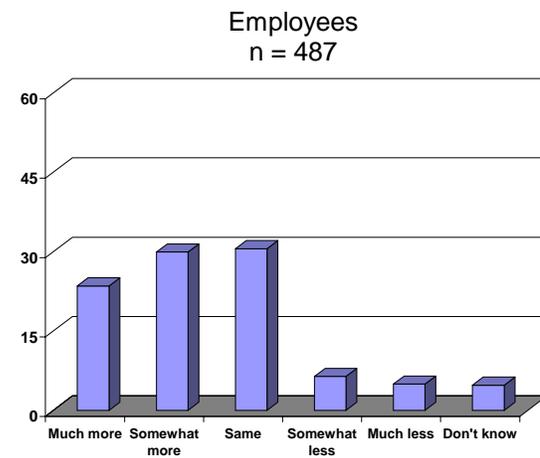
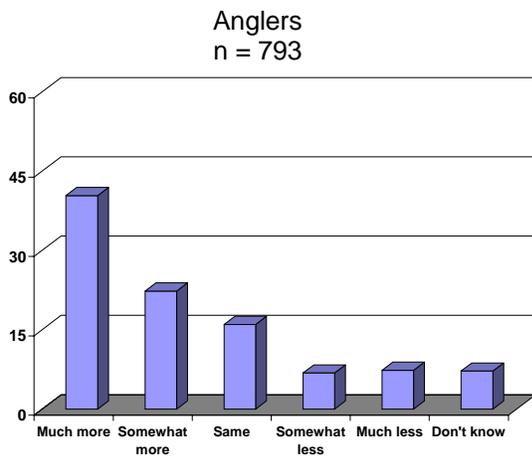


Figure 18. Response in percent to questions asking hunters and anglers to indicate whether they felt VDGIF should provide more, about the same or less effort on encouraging private land access for hunting and fishing. VDGIF employees were asked to indicate whether they felt more, about the same or less time and money should be spent encouraging private land access for hunting and fishing.

Incorporating Constituent Input into Management of Wildlife Resource

Three external constituent groups (hunters, anglers and wildlife viewers) were asked to rate how well they felt the VDGIF incorporated their needs and wants into management of the state's fish and wildlife resources. Nearly an equal percentage of wildlife viewers and VDGIF employees felt the agency did a good to excellent job incorporating wildlife viewers into the management of the state's fish and wildlife (Figure 19). Forty-eight percent of employees vs. 33% of wildlife viewers felt the agency did a fair to poor job in this activity. However, 28% of wildlife viewers (the largest percentage of any constituent group) did not know how the agency performed in incorporating their needs and wants in management of the resource. This indicates that wildlife viewers are a constituency with less direct connection to the VDGIF.

Performance ratings closely matched among hunters, anglers and VDGIF employees for incorporating stakeholders' needs into management of the state's wildlife resources. Approximately 60% of all three groups felt that the agency did a good to excellent job incorporating the needs and wants of hunters and anglers into the management of the state's fish and wildlife resource (Figure 20). Twenty-five percent of respondents from the three groups felt the agency did a fair job in this activity. Employees felt they did slightly poorer performing this function than did hunters and anglers. Eight percent of employees compared to only 4 – 5% of hunters and anglers felt the agency did a poor job incorporating hunters and anglers into the management of the resource.

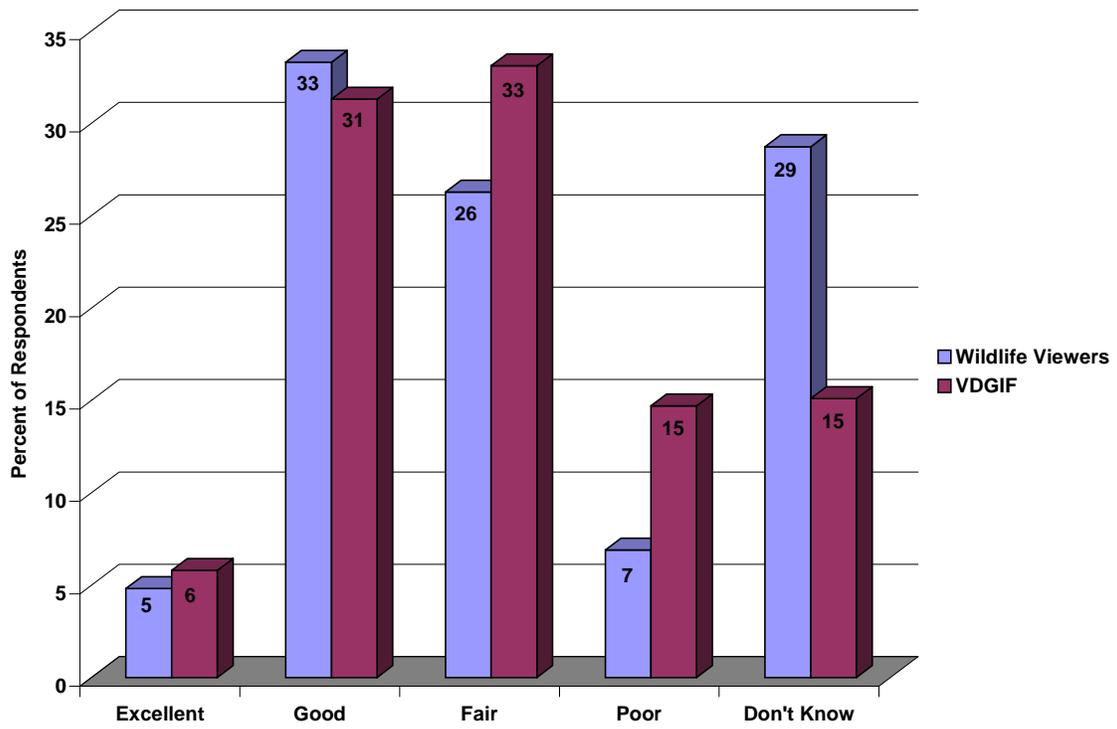


Figure 19. Wildlife viewers and VDGIF employee performance ratings (in percent) to question asking how well the agency did incorporating the needs and wants of wildlife viewers into the management of the state's fish and wildlife.

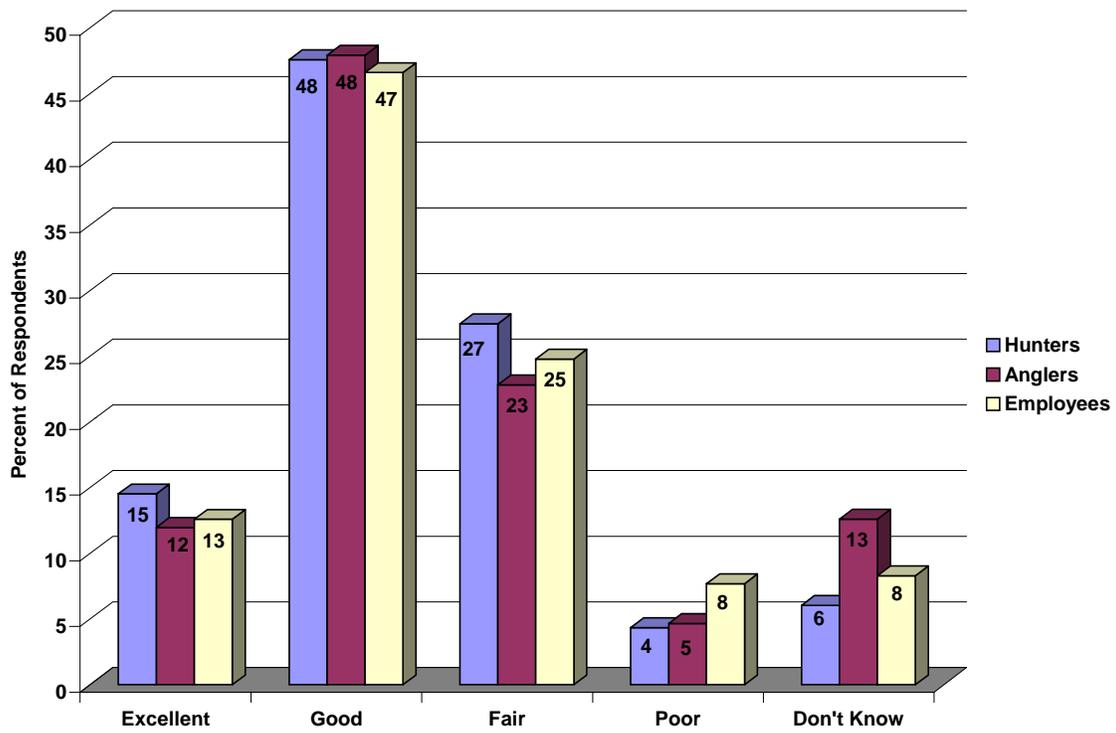


Figure 20. Hunters, Anglers and VDGIF employee performance ratings (in percent) to question asking how well the agency did incorporating the needs and wants of wildlife viewers into the management of the state's fish and wildlife.

Discussion

With House Bill 38, one of the primary challenges facing the Virginia Department of Game and Inland Fisheries will be to find ways to serve a new constituency of nontraditional users while continuing to serve and maintain the support of its traditional users. This study made clear that employees are strongly committed to traditional uses of the wildlife resource and do a good job providing recreational opportunities and services that support traditional users. Employees feel less committed to nontraditional users and uses of the resource. Although in touch with some of their constituency's highest priorities, employees were sometimes not well aligned with many other priorities of both traditional and nontraditional users and with current demographic trends that will affect participation in wildlife-related recreation in the future.

Nontraditional Uses of the Resource

Both the general Virginia population and VDGIF employees felt the existence value of wildlife was of greatest importance, the negativistic value of wildlife (wildlife not interfering with other activities) was of least importance, and the recreational value of wildlife was of intermediate importance. However, citizens and employees differed substantially in how they rated the importance of recreational opportunities related to wildlife. Although external constituents value and support traditional uses of the state's fish and wildlife resource, there is a clear and burgeoning interest among constituents for nontraditional services and uses of the resource. Virginians said wildlife viewing was more important to them than other forms of wildlife-oriented recreation. Employees, on the other hand,

indicated through current resource funding levels and low priority for additional resources that the opportunity to view wildlife was less important than having the opportunity to hunt and fish. I also believe that providing additional resources for hunting and fishing opportunities is a higher priority than it is for wildlife viewing opportunities because many employees perceive allocation of additional resources to nontraditional uses as a threat to traditional uses of the resource and they feel strongly compelled to defend them. One way to defend traditional uses is to give them higher resource priority than nontraditional uses.

Currently, neither employee resource allocation priorities nor formal VDGIF programs strongly acknowledge the interests of nontraditional users. Now that these nontraditional users will be contributing financially to the VDGIF, the agency will need to address their interests more directly. House Bill 38 revenues are tied to expenditures for wildlife-based recreation in Virginia as estimated by the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Of the \$2.04 billion the latest National Survey estimated that recreationists spent on wildlife-associated recreation in Virginia in 1996, wildlife viewers accounted for 34% of that total (McMullin et al. 2000, USDI/FWS 1997). This is sufficient justification for the VDGIF to increase allocations to nontraditional and nongame programs and activities substantially.

Traditional Uses of the Resource

Since a majority of agency funding has come and will continue to come from traditional users (primarily hunters and anglers), it is understandable why employees continue to place strong emphasis on services and functions that

improve the agency's ability to provide hunting and fishing opportunities.

Employees may also be influenced by their own personal interest and preference for traditional hunting and fishing recreation. Although we were unable to collect data from employees regarding their participation in fish- and wildlife-related recreation, other researchers have shown that natural resource professionals tend to exhibit stronger dominionistic attitudes toward wildlife than the general public (Peyton and Langenau 1985). The dominionistic scale as defined by Kellert (1980) includes several items reflecting a mastery of animals through sport hunting. Other studies have also shown that natural resource agency professionals tend to become more utilitarian as their seniority and length of service increases (Myers 1998), i.e., where the relevance of an animal is largely derived from its usefulness to people and its ability to facilitate some type of tangible advantage or reward (Kellert 1980). Utilitarian attitudes would be more apt to apply to traditional uses of the wildlife resource than to nontraditional uses.

It is clear that support for traditional uses should be maintained.

Employees gave the agency its highest performance ratings for services related to traditional resource uses. These included providing hunting education and safety training, managing game fish and wildlife and enforcing the fishing, wildlife and boating laws of Virginia.

In order to better serve traditional constituents, the issue of access to land, both private and public, has to be addressed. Over 70% of hunters felt the agency should be providing more effort on 1) encouraging private landowners to open access to their lands for more hunting use, and 2) acquiring more state-

owned lands to increase hunting opportunities (McMullin et al. 2000). Nearly half of anglers felt the agency should provide much more effort on acquiring more public areas for fishing.

Employees placed lowest priority for additional resources on three programs that address concerns of private landowners – The Deer Management Assistance Program (DMAP), the Damage Control Assistance Program (DCAP) and issuing out-of-season kill permits. Although, employees clearly support activities that enhance hunting and fishing opportunities they seem unwilling to spend additional resources on assisting landowners with wildlife management. Without successful application of these VDGIF programs designed to help private landowners manage wildlife on their lands, or without programs encouraging them to allow access to their lands, hunting will inevitably decline on private lands.

Another advantage to encouraging private landowners to open access by helping them manage fish and wildlife on their lands is that it would help relieve the pressure of use and overuse on public lands. Many of the current nonparticipants who expressed a latent interest in wildlife-related recreation will come from urban areas with little or no access to private land. These new hunters and anglers may have to rely more on public lands for their recreation needs. Opening up more access to private lands would broaden the usable land base for current and new users while minimizing problems and user dissatisfaction associated with over-crowding of public lands.

Virginians' Top Priorities and VDGIF Performance

In some respects, VDGIF employees appeared to be in tune with what was most important to their constituents. Public support for enforcing the wildlife laws of Virginia, enforcing laws that protect fish and wildlife habitat and providing hunter and boater safety education is particularly strong. Employees rated their performance of these activities very high. Three out of 4 of these items fell within the upper 25th percentile of all performance rankings from VDGIF employees.

Environmental Diversity and Conservation

Both employees and the general Virginia population placed greater importance on the existence value of wildlife than they did on its recreational value. Both groups also placed high priority on environmental diversity issues and closely matched importance rankings on such issues as protecting rare and endangered species and reviewing proposed developments to minimize their effects on wildlife habitat. Well over 2/3 of hunters, anglers and wildlife viewers expressed an interest finding out how they could become more involved in wildlife conservation (McMullin et al. 2000). This provides the VDGIF with a good opportunity to develop partnerships with citizen groups and obtain volunteers to assist in agency conservation programs.

Although Virginians are interested in conservation, employees attached much greater importance to acquiring additional land for wildlife conservation than did the general population. Employees placed high resource allocation priority on all aspects of land acquisition. Employees also identified maintenance

of department-owned lands as a high priority for additional resources. Although half of HB 38 funds (\$6 million) can be used for capital investments such as land acquisition, there is such a backlog of capital improvement needs that VDGIF will need to allocate these new capital resources judiciously.

Latent Interest in Wildlife-Related Recreation

This study revealed substantial latent interest in fish and wildlife-oriented recreation among Virginians who currently do not participate and that all forms of wildlife-related recreation in Virginia have substantial growth potential. Despite statistics showing a decreasing percentage of hunters in Virginia (with no significant change in absolute numbers), there is a latent hunting market in Virginia, which if tapped could effectively double the current number of statewide hunters. Similarly, there is substantial latent demand for fishing and boating. Virginians who currently do not participate in any form of wildlife-related recreation expressed most interest in wildlife viewing, and of all recreational activities, wildlife viewing showed greatest potential for growth. Nearly 40% of all Virginians, approximately two million people, do not currently take trips to view wildlife but are interested in doing so in the future.

Capitalizing on this latent interest will require the agency to become more comprehensive in the services it provides. It will require the agency to understand the demographic changes that are affecting participation in wildlife-related recreation today, and how these changes stand to impact the future of the VDGIF. The agency then must design ways to attract interested nonparticipants

to participate in existing VDGIF programs and design new programs tailored to the needs and interests of these latent participants.

Incorporating Stakeholders' Needs into Management of the Wildlife Resource

Nearly 2/3 of hunters, anglers and VDGIF employees felt the agency did a good to excellent job incorporating the needs and wants of hunters and anglers into the management of the state's fish and wildlife. In contrast, only a little over 1/3 of wildlife viewers and VDGIF employees felt the agency did a good to excellent job incorporating the needs and wants of wildlife viewers into the management of the resource. The lack of connection between wildlife viewers and the VDGIF was reflected by the fact that nearly 1/3 of wildlife viewers said they didn't know how well the agency incorporated their needs and wants. In comparison, only 6% of hunters and 13% of anglers felt they didn't know how well the agency incorporated their needs into fish and wildlife management.

House Bill 38 passed due to the efforts of both traditional and nontraditional users, and each of these groups will expect to benefit from HB38. To maintain the same high degree of confidence from its traditional users, the VDGIF will have to address their most important issues and make issues such as increasing access to all types of fishing and hunting areas a priority. The agency would be well advised to use a portion of House Bill 38 Capital Funds to create some facilities for nontraditional users such as hiking trails, interpretive facilities and observation platforms. This modest investment would not only show nontraditional users that they are benefiting from HB 38 but that the agency is

committed to incorporating their needs, as well as those of traditional users, into management of Virginia's wildlife resource.

Enhancing Public Awareness and Education Efforts

Virginians clearly lack awareness of the VDGIF and its programs.

Although 1/3 of Virginians said they knew a moderate amount or more about the VDGIF and its activities, almost 25% of them said they knew nothing at all.

Wildlife viewers were substantially less knowledgeable about VDGIF's activities than were traditional users. Employees recognized this lack of awareness among its constituents and placed high priority on providing funds for enhancing public awareness of VDGIF and its functions and educating and informing citizens in general.

Despite the low awareness of the agency, all constituent groups expressed high levels of interest in receiving information from the agency. This study showed that VDGIF employees themselves are potentially among the most effective vehicles to enhance public awareness and disseminate information and education. Nearly ½ of all employees said that more than 25% of their job involved informing and educating the public. Some divisions reported this figure to be as high as 70 – 85%. VDGIF could capitalize on this “built-in” potential for enhancing public awareness and education efforts by giving employees the tools, training and support necessary to be effective spokespeople for the agency and its programs.

The agency also should increase its efforts to communicate with constituents via the World Wide Web (internet) and other types of electronic

communication (McMullin et al. 2000). Wildlife viewers and boaters indicated that the internet was the second best means of providing them with information (only direct mail ranked higher). Hunters and anglers also said the internet was a good way to provide them with information – better than television, radio, and Virginia Wildlife magazine. Among younger Virginians, the internet is often the first avenue used to find information (McMullin et al. 2000).

Conclusions

Although it does not solve all the economic problems facing the VDGIF, House Bill 38 improves the agency's ability to face the many challenges of providing wildlife, fish and boating related recreation to Virginia citizens. In addition to helping the agency remain solvent longer, House Bill 38 marks the broadening of the agency's constituency to include newly contributing nontraditional users. In order to serve all of its constituency, VDGIF must embrace its mission fully and become a more comprehensive agency in practice. The agency does well incorporating the needs and wants of its traditional users but it must make greater efforts to understand and incorporate the needs of its nontraditional users. It must be proactively aware of the demographic changes that will inevitably affect wildlife-oriented recreation in the future and provide more services for women, minorities and urban residents. The agency must support its employees as effective venues for improving public awareness and expand ways to disseminate education and information to its constituents. And finally, VDGIF should tap into the latent interest of Virginians for wildlife-related recreation opportunities and direct its efforts to provide services for these potential markets.

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Appendix A

VDGIF Administrative Regions and Programmatic Budget Categories

VDGIF Mission Statement

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VDGIF Programmatic Budget Categories & Sub-categories Used for Issue Identification

Recreation

Hunting/trapping – including law enforcement and operations

Fishing – including law enforcement and operations

Boating – including law enforcement and operations

Wildlife Watching

Environmental Diversity

Habitat enhancement/diversity

Protecting/managing wildlife

Biological information management

Nongame

Education

Wildlife Education – Project Wild, teacher materials, workshops, Women in Outdoors

Hunter/trapper education

Boating education

Aquatic resources education – including angler education

Administration

Personnel selection, training and development

Lands and facilities

VDGIF Mission Statement

To manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth; to provide opportunity for all to enjoy wildlife, inland fish, boating and related outdoor recreation; to promote safety for persons and property in connection with boating, hunting and fishing.

Appendix B

Survey and Cover Letters

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Given the following VDGIF functions and issues related to these functions, do you feel that more, about the same, or less time and money should be spent on:

Recreation

	└─┘ Much More	└─┘ Slightly More	└─┘ About the Same	└─┘ Slightly Less	└─┘ Much Less	└─┘ Don't Know/No Opinion
(1) enforcing fishing and hunting regulations . . .	<input type="checkbox"/>					
(2) providing wildlife viewing opportunities . . .	<input type="checkbox"/>					
(3) enforcing safety in fish, wildlife and boating related recreation	<input type="checkbox"/>					
(4) providing recreational shooting range opportunities	<input type="checkbox"/>					
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	<input type="checkbox"/>					
(6) providing boat access to significant hunting and fishing resources	<input type="checkbox"/>					
(7) enforcing boating laws and regulations . . .	<input type="checkbox"/>					
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	<input type="checkbox"/>					
(9) providing more primitive access to river sections where outboard motors are not generally used	<input type="checkbox"/>					
(10) providing hunting opportunities	<input type="checkbox"/>					
(11) increasing visible presence of existing enforcement personnel to external constituents	<input type="checkbox"/>					
(12) providing more fish and wildlife recreational opportunities for <i>children and youth</i>	<input type="checkbox"/>					
(13) managing game fish such as trout and bass	<input type="checkbox"/>					
(14) providing boating access for recreational boating	<input type="checkbox"/>					
(15) encouraging private landowners to open their lands for more hunting access	<input type="checkbox"/>					
(16) providing more fish and wildlife recreational opportunities for <i>minorities</i>	<input type="checkbox"/>					
(17) focusing on the fish and wildlife of Virginia, rather than recreational users	<input type="checkbox"/>					
(18) providing boating opportunities	<input type="checkbox"/>					
(19) providing fishing opportunities	<input type="checkbox"/>					
(20) encouraging private landowners to open access to their waters for more fishing use	<input type="checkbox"/>					
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	<input type="checkbox"/>					

Do you feel that more, about the same, or less time and money should be spent on:

Environmental Diversity

	Much More	Slightly More	About the Same	Slightly Less	Much Less	Don't Know/No Opinion
(22) coordinating technical assistance to <i>urban/suburban</i> landowners on how to manage wildlife on their properties	<input type="checkbox"/>					
(23) conducting general biological research . . .	<input type="checkbox"/>					
(24) the Damage Control Assistance Program (DCAP)	<input type="checkbox"/>					
(25) acquiring additional land and water for wildlife conservation	<input type="checkbox"/>					
(26) issuing out of season deer kill permits	<input type="checkbox"/>					
(27) the Deer Management Assistance Program (DMAP)	<input type="checkbox"/>					
(28) monitoring/inventory of wildlife populations on Department owned lands	<input type="checkbox"/>					
(29) enforcing laws that protect fish and wildlife habitat	<input type="checkbox"/>					
(30) managing fish and wildlife to maintain maximum diversity of native species	<input type="checkbox"/>					
(31) protecting threatened and endangered species	<input type="checkbox"/>					
(32) coordinating technical assistance to <i>rural</i> landowners on how to manage wildlife on their properties	<input type="checkbox"/>					
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	<input type="checkbox"/>					
(34) protecting rare and endangered habitats . .	<input type="checkbox"/>					
(35) cost share programs for habitat enhancement	<input type="checkbox"/>					
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	<input type="checkbox"/>					

Education

(37) enhancing public awareness of VDGIF and its programs	<input type="checkbox"/>					
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	<input type="checkbox"/>					
(39) <i>Hunter</i> education	<input type="checkbox"/>					
(40) providing education on skills needed to pursue wildlife-related outdoor recreation .	<input type="checkbox"/>					
(41) the number of education/information personnel in field offices	<input type="checkbox"/>					

Please rate the importance of each of the following topics related to the Values you associate with wildlife.

How important is it to you....

	Very Important	Somewhat Important	Neutral/Don't Know	Somewhat Unimportant	Very Unimportant
(66) to be sure that wildlife does not interfere with your other activities (for example - farming, gardening, etc.)	<input type="checkbox"/>				
(67) to know that wildlife exists in Virginia	<input type="checkbox"/>				
(68) to know that people have the opportunity to take wildlife viewing trips in Virginia	<input type="checkbox"/>				
(69) to know that people have the opportunity to fish in Virginia	<input type="checkbox"/>				
(70) to know that people have the opportunity to boat in Virginia	<input type="checkbox"/>				
(71) to know that you have wildlife around your home	<input type="checkbox"/>				
(72) to know that people have the opportunity to hunt in Virginia	<input type="checkbox"/>				

Please indicate whether you think the Department is doing an excellent, good, fair, or poor job in the performance of the following functions:

	Excellent	Good	Fair	Poor	Don't Know/No Opinion
(73) enforcing laws that protect fish and wildlife habitat	<input type="checkbox"/>				
(74) coordinating technical assistance to urban/suburban residents on how to manage wildlife on their properties	<input type="checkbox"/>				
(75) providing aquatic resource education	<input type="checkbox"/>				
(76) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	<input type="checkbox"/>				
(77) providing general fish and wildlife education	<input type="checkbox"/>				
(78) incorporating wildlife viewers' wants and needs into the management of the state's fish and wildlife	<input type="checkbox"/>				
(79) managing nongame fish and wildlife (i.e., not hunted or fished)	<input type="checkbox"/>				
(80) providing hunting opportunities	<input type="checkbox"/>				
(81) enforcing the boating laws of Virginia	<input type="checkbox"/>				
(82) providing recreational shooting range opportunities	<input type="checkbox"/>				
(83) enforcing the fish and wildlife laws of Virginia	<input type="checkbox"/>				
(84) managing game fish such as trout and bass	<input type="checkbox"/>				
(85) providing hunter education	<input type="checkbox"/>				
(86) providing boater safety education	<input type="checkbox"/>				
(87) providing safety training for hunters	<input type="checkbox"/>				
(88) managing fish and wildlife to sustain maximum diversity of native species	<input type="checkbox"/>				

Please indicate whether you think the Department is doing an excellent, good, fair, or poor job in the performance of the following functions:

	Excellent	Good	Fair	Poor	Don't Know/No Opinion
(89) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms) . . .	<input type="checkbox"/>				
(90) providing education and information to women .	<input type="checkbox"/>				
(91) educating and informing citizens, in general, about fish, wildlife and boating related issues . .	<input type="checkbox"/>				
(92) acquiring additional land and water for wildlife conservation	<input type="checkbox"/>				
(93) conducting general biological research	<input type="checkbox"/>				
(94) providing education on skills needed to pursue wildlife-related outdoor recreation	<input type="checkbox"/>				
(95) providing boat access for hunting, fishing and recreational boating	<input type="checkbox"/>				
(96) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	<input type="checkbox"/>				
(97) providing resource conservation training for enforcement personnel	<input type="checkbox"/>				
(98) providing fishing opportunities	<input type="checkbox"/>				
(99) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	<input type="checkbox"/>				
(100) providing safety education for boaters	<input type="checkbox"/>				
(101) providing education and outreach to schools . . .	<input type="checkbox"/>				
(102) enforcing safety in fish, wildlife and boating related recreation	<input type="checkbox"/>				
(103) providing boating opportunities	<input type="checkbox"/>				
(104) coordinating technical assistance to rural landowners regarding management of wildlife on their properties	<input type="checkbox"/>				
(105) protecting threatened and endangered species .	<input type="checkbox"/>				
(106) incorporating hunters' and anglers' wants and needs into the management of the state's fish and wildlife	<input type="checkbox"/>				

You are almost finished.

Please turn page to complete questionnaire

April 27, 1999

To: Virginia Department of Game and Inland Fisheries employees

Passage of House Bill 38 broadened and stabilized the funding base of the Virginia Department of Game and Inland Fisheries. It also created a rare opportunity to proactively define both the current and future direction of the agency. The enclosed questionnaire, which will take approximately 15 minutes to complete, provides a chance for you to help the Department determine its course into the next century.

Even with House Bill 38, resources always will be limiting and choices will have to be made. The reality is the Department can't spend more money on all programs. In order to set priorities for the future, the Department needs to know how well its programs and services meet the needs of its constituents. As internal constituents, employee feedback to the Department is very valuable. The information you provide, in combination with information we will collect from the Department's external constituents, will be used to help improve Department functions and programs.

Recently, you should have received a memo from Director Woodfin encouraging you to be candid and sincere in responding to this survey. We would like to reiterate his assurance of complete confidentiality. Your name will never be associated with your responses to the questionnaire and, as you can see from the enclosed return envelope, your completed survey will come directly to Virginia Tech. No one from the Department will see your individual responses. Once we have received your survey and after we have entered your anonymous responses into the database we will destroy the questionnaire. The identification number on your questionnaire is solely for administration of the survey. It allows us to know when you have responded so you will not be sent further reminders.

A final report of the survey findings will be delivered to the Department by March 1, 2000. We will not report data for employee groups small enough to compromise a respondent's confidentiality.

We thank you for taking the time out of your busy schedule to help the Department think strategically about its future. If you have any questions, please feel free to call us (Steve McMullin 540-231-8847 or Jim Watkins 540-231-5059) or send us an e-mail message (smcmulli@vt.edu or jawatkin@vt.edu).

Sincerely,

Steve L. McMullin
Associate Professor

James R. Watkins
Graduate Research Assistant

May 28, 1999

TO: Virginia Department of Game and Inland Fisheries employees

A few weeks ago, Jim Watkins and I sent you a questionnaire designed to assess your opinions of what the priorities of the Department of Game and Inland Fisheries should be as additional funding from House Bill 38 becomes a reality. Your input in this planning process is important, and since we have not yet received your completed questionnaire, we are enclosing another one with this letter. If you have already completed the questionnaire, please disregard this letter and toss the additional questionnaire. If you have not completed the questionnaire, we hope you will take a few minutes to do so today.

Even with HB 38 funding, the Department will face tough choices about allocation of funds and manpower. Your response to the survey will help us in making recommendations to the Department leadership based on priorities identified by employees. When coupled with similar information we will be collecting from hunters, anglers, boaters, wildlife enthusiasts, landowners and Virginia citizens in general, these data will provide Department leaders with solid information about values and priorities of internal and external constituents of the Department.

You should have received an electronic memo from Director Woodfin in April, encouraging you to respond candidly and sincerely to the questionnaire. Neither the director, nor anyone else in the department will see your individual responses to the survey. When Jim and I receive your survey, we will use the identification number to remove your name from the mailing list so we won't bother you again. Our report to Director Woodfin will summarize results by employee groups (divisions, regions, etc.) but we will not provide analysis of employee groups small enough to compromise confidentiality.

We will be holding numerous meetings around the Commonwealth this fall to present a summary of the results of our surveys and draft recommendations based on the findings. You will be notified of the schedule of meetings and we welcome additional feedback. Thanks again for taking the time to help the Department think strategically about its future. If you have any questions, do not hesitate to contact me (231-8847 or smcmulli@vt.edu) or Jim Watkins (231-5059, jawatkin@vt.edu).

Sincerely,

Steve L. McMullin

June 21, 1999

TO: Virginia Department of Game and Inland Fisheries employees

We are still very interested in your opinions of what the priorities of the Department of Game and Inland Fisheries should be as additional funding from House Bill 38 becomes a reality. Your input in this planning process is important, and since we have not yet received your completed questionnaire, we are enclosing another one with this letter. If you have already completed the questionnaire, please disregard this letter and toss the additional questionnaire. **This will be our final mailing and the last opportunity to have your opinions and input included in this HB38 planning process.** If you have not completed the questionnaire, we hope you will take a few minutes to do so today.

Even with HB 38 funding, the Department will face tough choices about allocation of funds and manpower. Your response to the survey will help us in making recommendations to the Department leadership based on priorities identified by employees. When coupled with similar information we will be collecting from hunters, anglers, boaters, wildlife enthusiasts, landowners and Virginia citizens in general, these data will provide Department leaders with solid information about values and priorities of internal and external constituents of the Department.

You should have received an electronic memo from Director Woodfin in April, encouraging you to respond candidly and sincerely to the questionnaire. Neither the director, nor anyone else in the department will see your individual responses to the survey. When Jim and I receive your survey, we will use the identification number to remove your name from the mailing list so we won't bother you again. Our report to Director Woodfin will summarize results by employee groups (divisions, regions, etc.) but we will not provide analysis of employee groups small enough to compromise confidentiality.

We will be holding numerous meetings around the Commonwealth this fall to present a summary of the results of our surveys and draft recommendations based on the findings. You will be notified of the schedule of meetings and we welcome additional feedback. Thanks again for taking the time to help the Department think strategically about its future. If you have any questions, do not hesitate to contact me (231-8847 or smcmulli@vt.edu) or Jim Watkins (231-5059, jawatkin@vt.edu).

Sincerely,

Steve L. McMullin

Appendix C. Employee response (%) to all Priority survey questions. Employees were asked whether VDGIF should allocate more, about the same or less time and money to VDGIF programs and functions.

Survey Questions	Means ¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Recreation	2.53	18.3	25.6	40.3	6.7	5.1	3.9
(1) enforcing fishing and hunting regulations	2.39	26.2	22.3	38.1	7.8	3.5	2.1
(2) providing wildlife viewing opportunities	2.75	12.4	25.2	41.9	10.3	7.6	2.7
(3) enforcing safety in fish, wildlife and boating related recreation	2.33	24.5	27.0	39.4	5.2	2.5	1.4
(4) providing recreational shooting range opportunities	2.66	15.7	27.8	33.0	9.1	8.9	5.6
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.57	17.1	31.1	32.0	7.0	8.5	4.3
(6) providing boat access to significant hunting and fishing resources	2.44	16.3	32.8	38.6	4.9	3.3	4.1
(7) enforcing boating laws and regulations	2.58	19.8	19.0	44.9	9.5	4.1	2.7
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	2.51	15.7	28.5	44.7	6.4	2.9	1.9
(9) providing more primitive access to river sections where outboard motors are not generally used	2.62	12.8	30.5	39.8	5.6	7.0	4.3
(10) providing hunting opportunities	2.22	26.9	28.9	34.5	3.3	2.3	4.1
(11) increasing visible presence of existing enforcement personnel to external constituents	2.60	19.8	23.3	37.3	8.7	7.6	3.3
(12) providing more fish and wildlife recreational opportunities for children and youth	1.84	39.0	37.7	20.0	0.6	0.8	1.9
(13) managing game fish such as trout and bass	2.72	12.2	17.1	57.3	6.8	3.9	2.7
(14) providing boating access for recreational boating	2.77	10.1	22.9	48.9	9.3	5.8	3.1
(15) encouraging private landowners to open their lands for more hunting access	2.28	29.3	27.0	27.4	6.0	5.4	4.9
(16) providing more fish and wildlife recreational opportunities for minorities	2.98	6.8	13.6	52.6	6.2	9.5	11.3
(17) focusing on the fish and wildlife of Virginia, rather than recreational users	2.46	20.5	22.9	42.4	6.4	2.9	5.0

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix C. (Continued)

Survey Questions	Means ¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
(18) providing boating opportunities	2.82	7.6	18.8	57.9	7.6	4.3	3.7
(19) providing fishing opportunities	2.44	13.6	31.8	48.5	2.5	0.8	2.9
(20) encouraging private landowners to open access to their waters for more fishing use	2.36	23.5	29.9	30.5	6.4	4.9	4.7
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	15.1	20.2	37.5	11.3	11.5	4.3
Environmental Diversity	2.59	17.5	24.4	40.1	6.8	6.8	4.4
(22) coordinating technical assistance to urban/suburban landowners on how to manage wildlife on their properties	2.58	14.6	30.8	38.0	7.6	5.7	3.3
(23) conducting general biological research	2.74	14.6	20.7	42.5	12.1	6.6	3.5
(24) the Damage Control Assistance Program (DCAP)	3.35	3.3	9.1	50.4	12.3	18.1	6.8
(25) acquiring additional land and water for wildlife conservation	1.99	40.5	26.5	23.6	3.5	3.1	2.9
(26) issuing out of season deer kill permits	3.53	4.3	6.8	43.9	11.5	26.5	7.0
(27) the Deer Management Assistance Program (DMAP)	3.15	4.9	16.2	47.8	7.8	16.2	7.0
(28) monitoring/inventory of wildlife populations on Department owned lands	2.66	12.9	21.4	51.1	6.4	4.1	4.1
(29) enforcing laws that protect fish and wildlife habitat	2.18	28.5	30.2	33.3	4.3	1.4	2.3
(30) managing fish and wildlife to maintain maximum diversity of native species	2.28	22.4	30.4	39.8	2.9	1.4	3.1
(31) protecting threatened and endangered species	2.35	23.6	27.1	40.0	4.7	2.7	1.8
(32) coordinating technical assistance to rural landowners on how to manage wildlife on their properties	2.34	18.9	36.0	36.0	5.3	1.6	2.1
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.33	20.7	29.4	37.6	4.1	2.1	6.2
(34) protecting rare and endangered habitats	2.21	27.7	29.2	34.9	4.1	1.8	2.3
(35) cost share programs for habitat enhancement	2.54	14.8	29.6	35.1	6.0	5.5	9.0

¹ Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix C. (Continued)

Survey Questions	Means ¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	2.71	11.5	23.2	47.2	8.8	4.9	4.3
Education	2.45	16.8	29.0	43.7	4.3	2.9	3.4
(37) enhancing public awareness of VDGIF and its programs	1.81	43.7	33.7	18.5	1.0	1.6	1.4
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	1.92	36.1	38.4	21.6	1.4	1.2	1.2
(39) Hunter education	2.52	15.6	25.5	49.6	4.9	2.5	1.9
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	2.51	12.9	31.0	46.6	3.7	2.9	2.9
(41) the number of education/information personnel in field offices	2.49	18.5	27.5	39.8	7.2	3.9	3.1
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.39	13.6	36.8	45.0	1.8	1.0	1.8
(43) Education and outreach to schools	2.18	20.3	42.9	31.8	2.1	0.8	2.1
(44) providing education and information for women	2.65	10.1	25.1	52.6	4.5	3.7	4.1
(45) providing safety training for hunters	2.55	14.8	20.9	57.3	3.3	1.4	2.3
(46) Including more resource conservation training for enforcement personnel	2.45	18.5	28.8	40.9	3.3	4.5	3.9
(47) providing general aquatic and wildlife education	2.54	12.5	26.7	52.2	3.9	1.6	3.1
(48) providing education and information for urban/suburban constituents	2.52	14.6	25.5	49.3	4.7	2.1	3.9
(49) providing education and information for minority constituents	2.87	7.8	16.0	55.2	5.7	6.8	8.4
(50) Aquatic resources education	2.75	7.4	22.8	53.8	7.0	3.5	5.5
(51) Project Wild education efforts	2.83	7.0	22.8	49.3	9.2	5.7	6.0
(52) providing education and information for youth	2.07	26.1	40.5	29.2	1.4	0.4	2.5
(53) Women in the Outdoors program	2.75	9.4	23.4	49.9	6.8	6.0	4.5
(54) Boating safety education	2.45	14.2	33.1	44.8	4.3	1.6	2.1

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix C. (Continued)

Survey Questions	Means ¹	Much more	Slightly more	About the same	Slightly less	Much less	Don't know
Capital Investments	2.21	28.8	28.9	30.5	4.4	3.1	4.2
(55) acquiring new lands	1.93	44.6	27.1	17.2	3.9	4.3	2.9
(56) maintenance of Department lands, buildings and facilities	1.98	32.0	36.1	28.1	0.6	0.2	2.9
(57) building/renovating Department office buildings	2.39	22.2	28.3	36.8	5.3	4.3	3.1
(58) acquiring access to lakes and streams	2.20	23.2	37.4	31.4	3.5	1.2	3.3
(59) acquiring inholdings/adjacent lands to existing WMAs	2.15	29.8	28.2	30.7	2.9	2.3	6.2
(60) acquiring/protecting rare and endangered habitats	2.30	24.6	28.7	35.3	5.5	2.3	3.5
(61) acquiring new Wildlife Management Areas	2.09	36.4	26.1	24.5	4.9	3.5	4.5
(62) renovating existing fish hatcheries	2.22	24.8	33.3	31.4	3.1	2.7	4.7
(63) acquiring forested uplands	2.20	29.0	27.9	30.4	4.3	3.1	5.3
(64) acquiring wetlands and riparian areas	2.19	32.2	24.4	31.6	4.9	2.9	3.9
(65) acquiring areas near urban centers	2.65	18.1	20.5	38.4	9.0	7.6	6.4

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. Mean Scores¹ and standardized errors (including finite population adjustment) for all Priority questions related to VDGIF programs and functions by division.

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Recreation	2.53	0.01	2.65	0.02	2.44	0.02	2.56	0.01	2.48	0.01	2.52	0.01	2.71	0.02
(1) enforcing fishing and hunting regulations	2.39	0.02	3.08	0.03	2.59	0.03	2.78	0.02	1.68	0.01	2.90	0.02	3.17	0.03
(2) providing wildlife viewing opportunities	2.75	0.02	2.16	0.03	2.83	0.04	2.78	0.02	3.12	0.01	2.45	0.02	1.77	0.04
(3) enforcing safety in fish, wildlife and boating related recreation	2.33	0.02	2.52	0.03	2.20	0.04	2.73	0.02	1.84	0.01	2.71	0.02	2.80	0.03
(4) providing recreational shooting range opportunities	2.66	0.02	2.50	0.05	2.67	0.04	2.85	0.02	2.51	0.02	2.60	0.02	3.15	0.05
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.57	0.02	2.00	0.04	2.60	0.04	2.37	0.02	2.95	0.02	2.38	0.02	1.94	0.04
(6) providing boat access to significant hunting and fishing resources	2.44	0.02	3.05	0.03	2.25	0.04	2.54	0.02	2.25	0.01	2.55	0.02	2.68	0.04
(7) enforcing boating laws and regulations	2.58	0.02	2.83	0.03	2.23	0.04	3.01	0.02	2.09	0.02	2.99	0.02	3.06	0.03
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	2.51	0.02	2.92	0.04	2.40	0.03	2.46	0.02	2.65	0.01	1.97	0.02	3.20	0.04

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(9) providing more primitive access to river sections where outboard motors are not generally used	2.62	0.02	2.73	0.04	2.52	0.04	2.50	0.02	2.70	0.01	2.67	0.02	2.40	0.04
(10) providing hunting opportunities	2.22	0.02	2.71	0.03	2.21	0.04	2.35	0.02	2.08	0.01	1.96	0.02	3.00	0.04
(11) increasing visible presence of existing enforcement personnel to external constituents	2.60	0.02	2.88	0.03	2.41	0.04	3.11	0.02	2.07	0.01	2.68	0.02	3.71	0.04
(12) providing more fish and wildlife recreational opportunities for children and youth	1.84	0.02	1.96	0.03	1.97	0.03	1.71	0.02	1.90	0.01	1.70	0.02	2.14	0.03
(13) managing game fish such as trout and bass	2.72	0.02	2.87	0.03	2.61	0.03	2.25	0.02	2.93	0.01	2.68	0.02	3.08	0.03
(14) providing boating access for recreational boating	2.77	0.02	3.00	0.02	2.27	0.03	2.93	0.02	2.59	0.01	3.01	0.02	3.00	0.04
(15) encouraging private landowners to open their lands for more hunting access	2.28	0.02	2.76	0.04	2.45	0.05	2.21	0.02	2.25	0.02	2.06	0.02	2.74	0.05
(16) providing more fish and wildlife recreational opportunities for minorities	2.98	0.02	2.57	0.03	2.77	0.04	2.94	0.02	3.11	0.01	3.05	0.02	2.64	0.04
(17) focusing on the fish and wildlife of Virginia, rather than recreational users	2.46	0.02	2.73	0.05	2.55	0.05	2.22	0.02	2.70	0.01	2.10	0.02	2.52	0.04

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(18) providing boating opportunities	2.82	0.02	3.09	0.02	2.13	0.03	2.95	0.01	2.67	0.01	2.99	0.02	3.21	0.03
(19) providing fishing opportunities	2.44	0.02	2.64	0.02	2.37	0.03	2.17	0.02	2.45	0.01	2.55	0.02	2.79	0.03
(20) encouraging private landowners to open access to their waters for more fishing use	2.36	0.02	2.70	0.04	2.43	0.05	2.05	0.02	2.42	0.01	2.33	0.02	2.79	0.05
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	0.02	2.21	0.04	3.04	0.05	2.78	0.02	3.29	0.02	2.61	0.02	1.42	0.03
Environmental Diversity	2.59	0.01	2.39	0.02	2.56	0.02	2.54	0.01	2.82	0.01	2.44	0.01	2.02	0.02
(22) coordinating technical assistance to urban/suburban landowners on how to manage wildlife on their properties	2.58	0.02	2.00	0.04	2.67	0.03	2.62	0.02	2.84	0.02	2.33	0.02	2.00	0.03
(23) conducting general biological research	2.74	0.02	2.73	0.05	2.67	0.03	2.55	0.02	3.22	0.01	2.35	0.02	1.81	0.03
(24) the Damage Control Assistance Program (DCAP)	3.35	0.02	2.89	0.03	2.89	0.04	3.28	0.02	3.68	0.02	3.03	0.02	3.23	0.03
(25) acquiring additional land and water for wildlife conservation	1.99	0.02	2.21	0.03	2.40	0.03	1.99	0.02	2.19	0.02	1.60	0.02	1.47	0.02
(26) issuing out of season deer kill permits	3.53	0.02	2.73	0.03	2.93	0.04	3.46	0.02	3.74	0.02	3.69	0.02	3.13	0.04
(27) the Deer Management Assistance Program (DMAP)	3.15	0.02	2.71	0.03	2.79	0.03	2.99	0.02	3.50	0.02	2.77	0.02	3.29	0.04

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(28) monitoring/inventory of wildlife populations on Department owned lands	2.66	0.02	2.63	0.03	2.66	0.03	2.66	0.02	3.03	0.01	2.19	0.02	1.92	0.02
(29) enforcing laws that protect fish and wildlife habitat	2.18	0.02	2.60	0.04	2.52	0.04	2.29	0.02	1.88	0.01	2.51	0.02	2.06	0.03
(30) managing fish and wildlife to maintain maximum diversity of native species	2.28	0.02	2.09	0.03	2.27	0.03	2.28	0.02	2.52	0.01	2.14	0.02	1.53	0.03
(31) protecting threatened and endangered species	2.35	0.02	2.08	0.03	2.53	0.04	2.27	0.02	2.54	0.01	2.42	0.02	1.33	0.03
(32) coordinating technical assistance to rural landowners on how to manage wildlife on their properties	2.34	0.02	2.17	0.04	2.55	0.03	2.43	0.02	2.53	0.01	2.04	0.02	1.71	0.02
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.33	0.02	2.20	0.04	2.41	0.03	2.28	0.02	2.53	0.01	2.30	0.02	1.54	0.02
(34) protecting rare and endangered habitats	2.21	0.02	2.08	0.04	2.27	0.03	2.12	0.02	2.48	0.01	2.20	0.02	1.22	0.01
(35) cost share programs for habitat enhancement	2.54	0.02	2.63	0.06	2.39	0.03	2.24	0.02	2.80	0.02	2.50	0.03	2.07	0.04

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	2.71	0.02	2.39	0.04	2.73	0.03	2.77	0.02	2.81	0.02	2.57	0.02	2.57	0.04
Education	2.45	0.01	2.30	0.02	2.43	0.02	2.46	0.01	2.56	0.01	2.36	0.01	2.26	0.02
(37) enhancing public awareness of VDGIF and its programs	1.81	0.02	1.84	0.03	2.10	0.03	1.92	0.02	1.73	0.01	1.81	0.02	1.72	0.03
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	1.92	0.02	1.92	0.03	1.93	0.03	2.03	0.02	1.92	0.01	1.83	0.02	1.83	0.03
(39) Hunter education	2.52	0.02	2.60	0.03	2.69	0.03	2.58	0.02	2.47	0.01	2.32	0.02	2.97	0.03
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	2.51	0.02	2.12	0.03	2.30	0.03	2.50	0.02	2.64	0.01	2.48	0.02	2.40	0.03
(41) the number of education/information personnel in field offices	2.49	0.02	2.42	0.03	2.17	0.03	2.47	0.02	2.79	0.02	2.37	0.02	1.56	0.03
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.39	0.02	2.29	0.03	2.34	0.03	2.24	0.02	2.51	0.01	2.44	0.02	2.11	0.03
(43) Education and outreach to schools	2.18	0.02	1.92	0.03	2.23	0.03	2.08	0.01	2.34	0.01	2.11	0.02	2.00	0.03
(44) providing education and information for women	2.65	0.02	2.33	0.03	2.60	0.03	2.62	0.02	2.76	0.01	2.51	0.02	2.80	0.03

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(45) providing safety training for hunters	2.55	0.02	2.48	0.04	2.34	0.03	2.61	0.02	2.55	0.01	2.46	0.02	2.79	0.03
(46) Including more resource conservation training for enforcement personnel	2.45	0.02	2.25	0.03	2.66	0.03	2.52	0.02	2.50	0.02	2.40	0.02	2.03	0.03
(47) providing general aquatic and wildlife education	2.54	0.02	2.29	0.03	2.47	0.03	2.50	0.02	2.77	0.01	2.43	0.02	1.97	0.03
(48) providing education and information for urban/suburban constituents	2.52	0.02	2.24	0.03	2.47	0.03	2.57	0.02	2.70	0.01	2.36	0.02	2.11	0.03
(49) providing education and information for minority constituents	2.87	0.02	2.29	0.03	2.61	0.04	2.81	0.02	3.11	0.01	2.82	0.02	2.47	0.04
(50) Aquatic resources education	2.75	0.02	2.63	0.03	2.76	0.02	2.40	0.02	3.05	0.01	2.73	0.02	2.26	0.03
(51) Project Wild education efforts	2.83	0.02	2.48	0.03	3.08	0.04	2.88	0.02	3.02	0.01	2.53	0.02	2.46	0.04
(52) providing education and information for youth	2.07	0.02	2.00	0.03	2.23	0.03	1.99	0.02	2.17	0.01	1.97	0.02	1.97	0.03
(53) Women in the Outdoors program	2.75	0.02	2.40	0.03	2.93	0.03	2.73	0.02	2.90	0.02	2.47	0.02	2.86	0.03
(54) Boating safety education	2.45	0.02	2.42	0.03	1.97	0.03	2.79	0.02	2.27	0.01	2.57	0.02	2.59	0.03

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix D. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Capital Improvements	2.21	0.01	2.37	0.03	2.32	0.02	2.22	0.01	2.34	0.01	1.95	0.01	1.96	0.02
(55) acquiring new lands	1.93	0.02	2.43	0.05	2.48	0.04	2.09	0.02	1.99	0.02	1.43	0.02	1.69	0.03
(56) maintenance of Department lands, buildings and facilities	1.98	0.02	2.17	0.03	2.00	0.03	1.83	0.02	2.19	0.01	1.61	0.01	2.09	0.03
(57) building/renovating Department office buildings	2.39	0.02	2.44	0.04	2.25	0.04	2.57	0.02	2.30	0.01	2.51	0.02	2.17	0.03
(58) acquiring access to lakes and streams	2.20	0.02	2.65	0.04	2.13	0.03	2.06	0.02	2.24	0.01	2.20	0.02	2.09	0.03
(59) acquiring inholdings/adjacent lands to existing WMAs	2.15	0.02	2.45	0.05	2.19	0.03	2.34	0.02	2.33	0.02	1.56	0.02	1.94	0.03
(60) acquiring/protecting rare and endangered habitats	2.30	0.02	2.13	0.04	2.54	0.04	2.17	0.02	2.57	0.01	2.15	0.02	1.50	0.03
(61) acquiring new Wildlife Management Areas	2.09	0.02	2.43	0.05	2.36	0.04	2.33	0.02	2.17	0.02	1.60	0.02	1.82	0.03
(62) renovating existing fish hatcheries	2.22	0.02	2.18	0.04	2.15	0.04	1.69	0.02	2.49	0.01	2.29	0.02	2.18	0.04
(63) acquiring forested uplands	2.20	0.02	2.42	0.05	2.44	0.03	2.38	0.02	2.30	0.02	1.75	0.02	2.03	0.03
(64) acquiring wetlands and riparian areas	2.19	0.02	2.38	0.04	2.63	0.04	2.21	0.02	2.39	0.02	1.74	0.02	1.69	0.03
(65) acquiring areas near urban centers	2.65	0.02	2.24	0.04	2.67	0.04	2.60	0.02	2.84	0.02	2.49	0.03	2.44	0.04

1Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix E. Employee response (in percent) to survey questions related to Capital Improvements . Employees were asked whether VDGIF should spend more, about the same or less time and money on these areas of capital improvement.

	Administration				Boating				Fisheries				Law Enforcement				Wildlife				Wildlife Diversity			
	Mean = 2.35				Mean = 2.35				Mean = 2.20				Mean = 2.35				Mean = 1.93				Mean = 1.96			
	(n=27)				(n=30)				(n=105)				(n=194)				(n=92)				n=37			
Capital Improvements	More	Same	Less	DK ¹	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK
(55) acquiring new lands	40.7	29.6	7.4	22.2	56.7	26.7	13.3	3.3	64.8	23.8	9.5	1.9	71.6	18.0	9.8	0.5	90.4	3.2	4.3	2.1	78.4	13.5	2.7	5.4
(56) maintenance of Department lands, buildings and facilities	55.6	33.3	0.0	11.1	66.7	30.0	0.0	3.3	68.6	28.6	1.0	1.9	61.9	35.6	1.5	1.0	87.2	10.6	0.0	2.1	62.2	27.0	0.0	10.8
(57) building/renovating Department office buildings	48.1	33.3	11.1	7.4	53.3	33.3	6.7	6.7	41.0	41.9	14.3	2.9	54.6	37.6	6.2	1.5	46.8	35.1	13.8	4.3	64.9	27.0	5.4	2.7
(58) acquiring access to lakes and streams	29.6	44.4	11.1	14.8	66.7	33.3	0.0	0.0	68.6	24.8	3.8	2.9	60.8	34.0	4.6	0.5	57.4	31.9	4.3	6.4	62.2	24.3	8.1	5.4
(59) acquiring inholdings/adjacent lands to existing WMAs	37.0	25.9	11.1	25.9	53.3	36.7	0.0	10.0	50.5	38.1	4.8	6.7	53.1	35.1	8.8	3.1	80.9	14.9	1.1	3.2	64.9	24.3	0.0	10.8
(60) acquiring/protecting rare and endangered habitats	51.9	29.6	3.7	14.8	40.0	43.3	10.0	6.7	62.9	29.5	5.7	1.9	42.8	44.3	10.3	2.6	56.4	33.0	7.4	3.2	86.5	8.1	2.7	2.7
(61) acquiring new Wildlife Management Areas	44.4	18.5	14.8	22.2	50.0	33.3	10.0	6.7	55.2	30.5	11.4	2.9	60.3	27.3	10.3	2.1	80.9	12.8	2.1	4.3	70.3	18.9	2.7	8.1
(62) renovating existing fish hatcheries	51.9	25.9	3.7	18.5	60.0	26.7	3.3	10.0	75.2	21.0	1.9	1.9	49.5	41.8	7.2	1.5	56.4	29.8	6.4	7.4	62.2	18.9	10.8	8.1
(63) acquiring forested uplands	37.0	22.2	11.1	29.6	40.0	43.3	6.7	10.0	52.4	34.3	8.6	4.8	54.6	35.1	8.8	1.5	76.6	13.8	4.3	5.3	59.5	32.4	2.7	5.4
(64) acquiring wetlands and riparian areas	40.7	29.6	7.4	22.2	33.3	43.3	13.3	10.0	56.2	34.3	7.6	1.9	49.5	39.2	9.8	1.5	75.5	16.0	5.3	3.2	78.4	16.2	0.0	5.4
(65) acquiring areas near urban centers	48.1	22.2	7.4	22.2	33.3	43.3	13.3	10.0	39.0	44.8	10.5	5.7	32.0	42.3	23.2	2.6	47.9	28.7	14.9	8.5	45.9	32.4	13.5	8.1

¹DK = Don't Know/No opinion

Appendix F. Mean scores¹ by region of all Priority survey questions. Employees were asked whether VDGIF should allocate more, about the same or less time and money to VDGIF programs and functions.

	Region 1 (n=79)	S.E	Region 2 (n=75)	S.E	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E	Region 5 (n=74)	S.E	Richmond HQ (n=95)	S.E.
Recreation												
(1) enforcing fishing and hunting regulations	2.24	0.02	2.31	0.03	2.30	0.03	2.35	0.03	2.23	0.02	2.79	0.02
(2) providing wildlife viewing opportunities	2.76	0.02	2.85	0.02	2.81	0.02	2.93	0.03	2.87	0.03	2.30	0.02
(3) enforcing safety in fish, wildlife and boating related recreation	2.14	0.02	2.14	0.02	2.65	0.03	2.32	0.03	2.18	0.02	2.46	0.02
(4) providing recreational shooting range opportunities	2.65	0.03	2.73	0.02	2.71	0.03	2.36	0.03	2.64	0.03	2.72	0.03
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.53	0.02	2.66	0.02	2.51	0.03	2.60	0.03	2.69	0.03	2.40	0.03
(6) providing boat access to significant hunting and fishing resources	2.21	0.02	2.31	0.02	2.65	0.02	2.46	0.03	2.28	0.02	2.55	0.02
(7) enforcing boating laws and regulations	2.47	0.02	2.49	0.03	2.86	0.03	2.44	0.03	2.48	0.03	2.67	0.02
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	2.40	0.02	2.64	0.02	2.48	0.02	2.14	0.03	2.57	0.02	2.84	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E	Region 2 (n=75)	S.E	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E	Region 5 (n=74)	S.E	Richmond HQ (n=95)	S.E.
(9) providing more primitive access to river sections where outboard motors are not generally used	2.58	0.03	2.57	0.02	2.84	0.02	2.52	0.03	2.42	0.02	2.67	0.02
(10) providing hunting opportunities	1.88	0.02	2.22	0.02	2.33	0.02	2.11	0.02	2.01	0.02	2.54	0.02
(11) increasing visible presence of existing enforcement personnel to external constituents	2.49	0.03	2.38	0.03	2.73	0.03	2.65	0.03	2.43	0.03	2.81	0.03
(12) providing more fish and wildlife recreational opportunities for children and youth	1.74	0.02	1.72	0.02	2.06	0.02	1.79	0.02	1.77	0.02	1.87	0.02
(13) managing game fish such as trout and bass	2.77	0.02	2.75	0.02	2.74	0.03	2.60	0.03	2.74	0.02	2.78	0.02
(14) providing boating access for recreational boating	2.58	0.03	2.71	0.02	3.11	0.02	2.66	0.03	2.74	0.02	2.71	0.02
(15) encouraging private landowners to open their lands for more hunting access	2.04	0.03	2.23	0.02	2.43	0.03	2.36	0.03	2.01	0.03	2.51	0.03
(16) providing more fish and wildlife recreational opportunities for minorities	2.95	0.02	3.04	0.02	3.13	0.02	2.98	0.03	3.06	0.03	2.62	0.02
(17) focusing on the fish and wildlife of Virginia, rather than recreational users	2.46	0.02	2.31	0.02	2.46	0.03	2.42	0.03	2.58	0.03	2.66	0.02
(18) providing boating opportunities	2.68	0.02	2.70	0.02	3.04	0.02	2.71	0.03	2.81	0.02	2.83	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E.	Region 2 (n=75)	S.E.	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E.	Region 5 (n=74)	S.E.	Richmond HQ (n=95)	S.E.
(19) providing fishing opportunities	2.26	0.02	2.37	0.02	2.53	0.02	2.32	0.02	2.36	0.02	2.59	0.02
(20) encouraging private landowners to open access to their waters for more fishing use	2.27	0.02	2.22	0.02	2.46	0.03	2.38	0.03	2.26	0.03	2.53	0.03
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	0.02	2.96	0.03	2.86	0.03	2.87	0.04	2.97	0.03	2.40	0.03
Environmental Diversity												
(22) coordinating technical assistance to urban/suburban landowners on how to manage wildlife on their properties	2.44	0.02	2.57	0.02	2.85	0.02	2.69	0.03	2.65	0.03	2.30	0.02
(23) conducting general biological research	2.57	0.02	2.89	0.02	2.63	0.03	2.75	0.04	3.04	0.03	2.61	0.02
(24) the Damage Control Assistance Program (DCAP)	3.74	0.03	3.38	0.02	3.28	0.02	3.19	0.03	3.46	0.02	3.15	0.02
(25) acquiring additional land and water for wildlife conservation	1.78	0.02	1.88	0.02	2.29	0.03	2.04	0.03	1.93	0.03	2.09	0.02
(26) issuing out of season deer kill permits	3.88	0.03	3.47	0.02	3.96	0.03	3.61	0.03	3.28	0.03	3.08	0.02
(27) the Deer Management Assistance Program (DMAP)	3.41	0.03	3.39	0.02	3.06	0.03	2.92	0.03	3.04	0.03	3.02	0.02
(28) monitoring/inventory of wildlife populations on Department owned lands	2.64	0.02	2.90	0.02	2.54	0.02	2.76	0.02	2.62	0.02	2.55	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E	Region 2 (n=75)	S.E	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E	Region 5 (n=74)	S.E	Richmond HQ (n=95)	S.E.
(29) enforcing laws that protect fish and wildlife habitat	2.09	0.02	2.24	0.02	2.06	0.02	2.20	0.03	2.14	0.02	2.40	0.02
(30) managing fish and wildlife to maintain maximum diversity of native species	2.24	0.02	2.45	0.02	2.31	0.02	2.31	0.03	2.34	0.02	2.16	0.02
(31) protecting threatened and endangered species	2.23	0.02	2.49	0.02	2.42	0.02	2.44	0.03	2.46	0.02	2.13	0.02
(32) coordinating technical assistance to rural landowners on how to manage wildlife on their properties	2.26	0.02	2.31	0.02	2.43	0.02	2.38	0.03	2.45	0.02	2.29	0.02
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.27	0.02	2.32	0.02	2.31	0.02	2.46	0.03	2.42	0.02	2.25	0.02
(34) protecting rare and endangered habitats	2.12	0.02	2.26	0.02	2.15	0.02	2.31	0.03	2.40	0.02	2.07	0.02
(35) cost share programs for habitat enhancement	2.35	0.02	2.51	0.02	2.60	0.03	2.60	0.03	2.68	0.03	2.49	0.02
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	2.69	0.03	2.70	0.02	2.82	0.02	2.63	0.02	2.73	0.03	2.67	0.02
Recreation												
(37) enhancing public awareness of VDGIF and its programs	1.65	0.02	1.64	0.02	2.12	0.02	1.80	0.03	1.73	0.02	1.84	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E	Region 2 (n=75)	S.E	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E	Region 5 (n=74)	S.E	Richmond HQ (n=95)	S.E.
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	1.79	0.02	1.78	0.02	2.04	0.02	1.82	0.02	2.01	0.02	1.94	0.02
(39) Hunter education	2.43	0.02	2.32	0.02	2.56	0.02	2.35	0.02	2.65	0.02	2.84	0.02
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	2.41	0.02	2.47	0.02	2.62	0.02	2.55	0.03	2.65	0.02	2.35	0.02
(41) the number of education/information personnel in field offices	2.46	0.02	2.54	0.02	2.53	0.03	2.55	0.03	2.63	0.03	2.26	0.02
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.21	0.02	2.53	0.02	2.51	0.02	2.37	0.02	2.43	0.02	2.25	0.02
(43) Education and outreach to schools	2.08	0.02	2.21	0.02	2.34	0.02	2.11	0.02	2.24	0.02	2.07	0.02
(44) providing education and information for women	2.53	0.02	2.68	0.02	2.72	0.02	2.58	0.03	2.70	0.03	2.62	0.02
(45) providing safety training for hunters	2.52	0.02	2.46	0.02	2.53	0.02	2.44	0.02	2.70	0.02	2.69	0.02
(46) Including more resource conservation training for enforcement personnel	2.26	0.02	2.32	0.02	2.55	0.02	2.55	0.03	2.53	0.02	2.46	0.02
(47) providing general aquatic and wildlife education	2.37	0.02	2.63	0.02	2.65	0.02	2.50	0.03	2.65	0.02	2.40	0.02
(48) providing education and information for urban/suburban constituents	2.36	0.02	2.55	0.02	2.75	0.02	2.56	0.03	2.46	0.02	2.36	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E	Region 2 (n=75)	S.E	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E	Region 5 (n=74)	S.E	Richmond HQ (n=95)	S.E.
(49) providing education and information for minority constituents	2.81	0.02	2.93	0.02	3.03	0.02	2.83	0.03	3.04	0.02	2.49	0.02
(50) Aquatic resources education	2.62	0.02	2.83	0.02	2.80	0.02	2.63	0.02	2.96	0.02	2.61	0.02
(51) Project Wild education efforts	2.63	0.02	2.90	0.02	2.87	0.02	2.84	0.03	2.90	0.02	2.77	0.02
(52) providing education and information for youth	2.08	0.02	2.01	0.02	2.09	0.02	1.96	0.02	2.15	0.02	2.08	0.02
(53) Women in the Outdoors program	2.53	0.02	2.75	0.02	2.86	0.02	2.71	0.03	2.91	0.03	2.77	0.02
(54) Boating safety education	2.27	0.02	2.32	0.02	2.72	0.02	2.44	0.02	2.45	0.02	2.50	0.02
Capital Improvements												
(55) acquiring new lands	1.63	0.02	1.74	0.02	2.38	0.03	1.79	0.03	1.88	0.03	2.10	0.02
(56) maintenance of Department lands, buildings and facilities	2.08	0.02	1.97	0.02	1.88	0.02	1.78	0.02	2.08	0.02	2.13	0.02
(57) building/renovating Department office buildings	2.30	0.02	2.27	0.02	2.32	0.03	2.83	0.03	2.49	0.02	2.36	0.02
(58) acquiring access to lakes and streams	1.97	0.02	2.04	0.02	2.34	0.02	2.26	0.02	2.18	0.02	2.37	0.02
(59) acquiring inholdings/adjacent lands to existing WMAs	1.94	0.02	2.11	0.02	2.30	0.03	2.02	0.02	2.21	0.03	2.20	0.02
(60) acquiring/protecting rare and endangered habitats	2.14	0.02	2.22	0.02	2.24	0.02	2.48	0.03	2.56	0.02	2.17	0.02
(61) acquiring new Wildlife Management Areas	1.73	0.02	2.01	0.02	2.47	0.03	2.13	0.03	2.03	0.03	2.24	0.02

Appendix F. (Continued)

	Region 1 (n=79)	S.E.	Region 2 (n=75)	S.E.	Region 3 (n=79)	S.E.	Region 4 (n=57)	S.E.	Region 5 (n=74)	S.E.	Richmond HQ (n=95)	S.E.
(62) renovating existing fish hatcheries	2.29	0.02	2.33	0.02	2.23	0.03	1.98	0.02	2.39	0.02	2.20	0.02
(63) acquiring forested uplands	1.93	0.02	2.04	0.02	2.42	0.03	2.11	0.03	2.43	0.03	2.28	0.02
(64) acquiring wetlands and riparian areas	1.91	0.02	2.11	0.02	2.47	0.03	2.18	0.03	2.21	0.03	2.28	0.02
(65) acquiring areas near urban centers	2.40	0.02	2.55	0.02	3.04	0.03	2.83	0.03	2.64	0.03	2.37	0.02

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

Appendix G. Employee response (%) to survey questions organized into groups of similar Environmental Diversity topics. Employees were asked whether VDGIF should spend more, about the same or less time and money on these environmental diversity programs and functions.

	Administration mean = 2.39 (n=27)				Boating mean = 2.57 (n=30)				Fisheries mean = 2.54 (n=105)				Law Enforcement mean = 2.82 (n=194)				Wildlife mean = 2.44 (n=92)				Wildlife Diversity mean = 2.02 n=37			
	More	Same	Less	DK ¹	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK
Technical Assistance																								
(36) coordinating assistance to landowners in managing wildlife damage to their property (for example - crop damage)	44.4	33.3	7.4	14.8	33.3	53.3	13.3	0.0	28.6	55.2	13.3	2.9	32.0	47.4	18.0	2.6	42.6	46.8	8.5	2.1	40.5	29.7	10.8	18.9
(22) coordinating technical assistance to urban/suburban landowners on how to manage wildlife on their properties	63.0	14.8	7.4	14.8	33.3	46.7	10.0	10.0	40.0	43.8	12.4	3.8	35.1	43.8	19.6	1.5	61.7	28.7	8.5	1.1	70.3	24.3	2.7	2.7
(35) cost share programs for habitat enhancement	37.0	18.5	14.8	29.6	46.7	43.3	3.3	6.7	53.3	36.2	3.8	6.7	33.5	43.8	14.9	7.7	54.3	24.5	17.0	4.3	54.1	18.9	5.4	21.6
(32) coordinating technical assistance to rural landowners on how to manage wildlife on their properties	51.9	25.9	7.4	14.8	33.3	60.0	3.3	3.3	51.4	39.0	8.6	1.0	47.9	40.7	10.8	0.5	69.1	27.7	2.1	1.1	83.8	10.8	0.0	5.4
Deer Management and Damage Control																								
(26) issuing out of season deer kill permits	18.5	59.3	3.7	18.5	23.3	56.7	13.3	6.7	15.2	38.1	36.2	10.5	7.7	42.8	46.9	2.6	7.4	41.5	45.7	5.3	10.8	51.4	21.6	16.2
(24) the Damage Control Assistance Program (DCAP)	14.8	44.4	7.4	33.3	26.7	50.0	16.7	6.7	7.6	58.1	24.8	9.5	9.3	42.8	46.4	1.5	21.3	54.3	22.3	2.1	5.4	62.2	13.5	18.9
(27) the Deer Management Assistance Program (DMAP)	25.9	44.4	7.4	22.2	26.7	60.0	6.7	6.7	21.0	52.4	15.2	11.4	13.9	44.3	38.7	3.1	37.2	45.7	14.9	2.1	10.8	51.4	21.6	16.2
Diversity and Conservation																								
(23) conducting general biological research	33.3	25.9	22.2	18.5	33.3	50.0	6.7	10.0	43.8	36.2	16.2	3.8	14.4	56.2	28.4	1.0	55.3	30.9	11.7	2.1	73.0	24.3	0.0	2.7
(28) monitoring/inventory of wildlife populations on Department owned lands	29.6	51.9	7.4	11.1	26.7	63.3	6.7	3.3	29.5	54.3	7.6	8.6	17.0	62.9	18.6	1.5	62.8	30.9	3.2	3.2	75.7	21.6	0.0	2.7
(31) protecting threatened and endangered species	55.6	37.0	0.0	7.4	50.0	33.3	16.7	0.0	52.4	40.0	5.7	1.9	41.8	49.0	7.7	1.5	50.0	39.4	9.6	1.1	91.9	2.7	2.7	2.7
(33) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	40.7	29.6	3.7	25.9	46.7	50.0	0.0	3.3	53.3	34.3	7.6	4.8	41.8	44.8	9.3	4.1	54.3	35.1	3.2	7.4	83.8	10.8	0.0	5.4
(30) managing fish and wildlife to maintain maximum diversity of native species	59.3	25.9	0.0	14.8	50.0	46.7	3.3	0.0	57.1	34.3	5.7	2.9	40.2	52.6	5.2	2.1	61.7	30.9	4.3	3.2	81.1	16.2	0.0	2.7
(34) protecting rare and endangered habitats	51.9	40.7	0.0	7.4	56.7	36.7	6.7	0.0	66.7	25.7	6.7	1.0	44.3	44.3	8.8	2.6	57.4	37.2	3.2	2.1	97.3	0.0	0.0	2.7
(25) acquiring additional land and water for wildlife conservation	51.9	37.0	0.0	11.1	43.3	53.3	3.3	0.0	66.7	21.9	5.7	5.7	61.9	26.8	10.3	1.0	81.9	10.6	5.3	2.1	86.5	10.8	0.0	2.7

¹ DK = Don't Know/No opinion

Appendix H. Employee response (%) to survey questions organized into similar Education topics. Employees were asked whether VDGIF should spend more, the same or less time and money on these education programs and functions.

	Administration mean = 2.27 (n=27)				Boating mean = 2.43 (n=30)				Fisheries mean = 2.46 (n=105)				Law Enforcement mean = 2.56 (n=194)				Wildlife mean = 2.36 (n=92)				Wildlife Diversity mean = 2.27 n=37		
	More	Same	Less	DK ¹	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less
General Education																							
(47) providing general aquatic and wildlife education	51.9	37.0	0.0	11.1	43.3	56.7	0.0	0.0	40.0	53.3	4.8	1.9	27.8	59.3	9.8	3.1	43.6	51.1	2.1	3.2	73.0	21.6	2.7
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	63.0	25.9	3.7	7.4	56.7	43.3	0.0	0.0	41.0	52.4	3.8	2.9	39.2	50.0	8.8	2.1	42.6	46.8	7.4	3.2	56.8	29.7	8.1
(41) the number of education/information personnel in field offices	44.4	40.7	3.7	11.1	60.0	40.0	0.0	0.0	45.7	43.8	8.6	1.9	35.1	45.4	18.0	1.5	52.1	34.0	9.6	4.3	78.4	13.5	0.0
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	59.3	25.9	3.7	11.1	50.0	46.7	0.0	3.3	58.1	37.1	2.9	1.9	43.8	51.5	4.1	0.5	48.9	47.9	2.1	1.1	59.5	37.8	0.0
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	74.1	18.5	0.0	7.4	73.3	23.3	3.3	0.0	69.5	26.7	2.9	1.0	76.3	20.1	3.6	0.0	77.7	20.2	1.1	1.1	73.0	18.9	2.7
(37) enhancing public awareness of VDGIF and its programs	74.1	18.5	0.0	7.4	70.0	23.3	6.7	0.0	70.5	25.7	1.9	1.9	80.4	16.5	2.6	0.5	78.7	17.0	3.2	1.1	86.5	8.1	2.7
Education Programs																							
(51) Project Wild education efforts	37.0	40.7	0.0	22.2	23.3	43.3	20.0	13.3	25.7	57.1	12.4	4.8	23.2	51.5	22.2	3.1	41.5	44.7	7.4	6.4	45.9	37.8	10.8
(53) Women in the Outdoors program	44.4	48.1	0.0	7.4	23.3	56.7	13.3	6.7	32.4	52.4	10.5	4.8	26.8	53.6	16.5	3.1	45.7	39.4	9.6	5.3	32.4	45.9	16.2
(50) Aquatic resources education	33.3	48.1	7.4	11.1	23.3	70.0	3.3	3.3	47.6	44.8	3.8	3.8	16.0	61.9	18.0	4.1	33.0	50.0	8.5	8.5	51.4	37.8	2.7
(45) providing safety training for hunters	44.4	40.7	7.4	7.4	43.3	50.0	3.3	3.3	28.6	63.8	5.7	1.9	37.1	58.8	3.6	0.5	39.4	57.4	1.1	2.1	27.0	48.6	16.2
(39) Hunter education	40.7	40.7	11.1	7.4	41.4	44.8	13.8	0.0	36.2	53.3	8.6	1.9	42.8	52.6	4.1	0.5	51.1	45.7	2.1	1.1	21.6	43.2	27.0
(54) Boating safety education	40.7	55.6	0.0	3.7	73.3	23.3	3.3	0.0	25.7	61.9	9.5	2.9	61.9	33.0	4.6	0.5	39.4	52.1	6.4	2.1	35.1	48.6	8.1
Education and Constituents																							
(49) providing education and information for minority constituents	44.4	44.4	0.0	11.1	33.3	53.3	6.7	6.7	26.7	58.1	12.4	2.9	13.9	60.8	16.5	8.8	24.5	51.1	12.8	11.7	43.2	37.8	5.4
(44) providing education and information for women	44.4	44.4	0.0	11.1	36.7	56.7	6.7	0.0	35.2	53.3	6.7	4.8	31.4	56.2	10.3	2.1	39.4	46.8	7.4	6.4	35.1	48.6	10.8
(48) providing education and information for urban/suburban constituents	55.6	37.0	0.0	7.4	43.3	53.3	3.3	0.0	35.2	57.1	4.8	2.9	33.0	53.6	10.3	3.1	44.7	42.6	6.4	6.4	64.9	27.0	2.7
(43) Education and outreach to schools	70.4	22.2	0.0	7.4	63.3	33.3	3.3	0.0	68.6	28.6	1.0	1.9	56.2	39.2	4.1	0.5	64.9	28.7	2.1	4.3	75.7	16.2	5.4
(52) providing education and information for youth	70.4	22.2	0.0	7.4	60.0	36.7	3.3	0.0	70.5	25.7	1.0	2.9	60.8	36.1	2.1	1.0	73.4	21.3	2.1	3.2	70.3	21.6	2.7

Appendix I. Employee response (%) to survey questions organized into recreation functions. Employees were asked whether VDGIF should spend more, about the same or less time and money on these recreation-related programs and functions.

	Administration mean = 2.65 (n=27)				Boating mean = 2.45 (n=30)				Fisheries mean = 2.56 (n=105)				Law Enforcement mean = 2.48 (n=194)				Wildlife mean = 2.52 (n=92)				Wildlife Diversity mean = 2.72 (n=37)			
	More	Same	Less	DK ¹	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK
Law Enforcement																								
(11) increasing visible presence of existing enforcement personnel to external constituents	25.9	44.4	18.5	11.1	53.3	36.7	6.7	3.3	24.8	42.9	30.5	1.9	62.4	30.9	4.6	2.1	37.0	45.7	13.0	4.3	13.5	29.7	51.4	5.4
(7) enforcing boating laws and regulations	22.2	55.6	11.1	2.8	50.0	43.3	6.7	0.0	18.1	59.0	21.9	1.0	62.4	30.9	5.2	1.5	22.8	52.2	21.7	3.3	16.2	54.1	21.6	8.1
(1) enforcing fishing and hunting regulations	11.1	55.6	22.2	11.1	40.0	46.7	10.0	3.3	29.5	54.3	16.2	0.0	80.4	19.1	0.0	0.5	29.3	46.7	20.7	3.3	16.2	51.4	27.0	5.4
(3) enforcing safety in fish, wildlife and boating related recreation	40.7	48.1	3.7	1.9	56.7	33.3	10.0	0.0	29.5	60.0	10.5	0.0	75.8	21.1	2.6	0.5	35.9	47.8	14.1	2.2	29.7	54.1	10.8	5.4
(29) enforcing laws that protect fish and wildlife habitat	25.9	59.3	7.4	1.9	36.7	50.0	10.0	3.3	55.2	34.3	9.5	1.0	75.3	22.2	1.0	1.5	44.7	42.6	9.6	3.2	59.5	32.4	5.4	2.7
Traditional Uses																								
(10) providing hunting opportunities	25.9	59.3	3.7	2.8	53.3	40.0	3.3	0.8	49.5	36.2	6.7	1.9	63.9	30.9	3.6	0.4	66.3	27.2	3.3	0.8	27.0	43.2	24.3	1.4
(19) providing fishing opportunities	29.6	63.0	0.0	1.9	53.3	43.3	3.3	0.0	59.0	36.2	1.9	0.7	47.4	49.5	2.1	0.3	34.8	57.6	3.3	1.1	27.0	48.6	16.2	2.0
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	22.2	44.4	22.2	11.1	50.0	46.7	3.3	0.0	44.8	46.7	7.6	1.0	37.6	52.6	8.8	1.0	71.7	23.9	3.3	1.1	18.9	48.6	27.0	5.4
(13) managing game fish such as trout and bass	18.5	55.6	11.1	3.7	33.3	56.7	3.3	1.7	52.4	41.9	4.8	0.2	18.6	68.6	12.4	0.1	29.3	57.6	8.7	1.1	24.3	43.2	29.7	0.7

¹ DK = Don't know/no opinion

Appendix I. Continued....

	Adminstration (n=27)				Boating (n=30)				Fisheries (n=105)				Law Enforcement (n=194)				Wildlife (n=92)				Wildlife Diversity (n=37)			
	More	Same	Less	DK ¹	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK	More	Same	Less	DK
Wildlife Viewing & Nongame																								
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	70.4	14.8	3.7	11.1	50.0	30.0	20.0	0.0	53.3	35.2	6.7	4.8	33.0	41.8	21.6	3.6	59.8	19.6	16.3	4.3	67.6	16.2	10.8	5.4
(2) providing wildlife viewing opportunities	63.0	25.9	3.7	7.4	40.0	36.7	23.3	0.0	32.4	47.6	19.0	1.0	21.1	53.6	23.7	1.5	55.4	27.2	12.0	5.4	73.0	16.2	5.4	5.4
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	51.9	33.3	3.7	11.1	30.0	36.7	26.7	6.7	35.2	39.0	21.0	4.8	17.5	47.4	32.0	3.1	46.7	30.4	18.5	4.3	91.9	2.7	2.7	2.7
Boating																								
(6) providing boat access to significant hunting and fishing resources	11.1	51.9	14.8	22.2	50.0	40.0	3.3	6.7	44.8	42.9	10.5	1.9	60.3	33.5	4.1	2.1	44.6	43.5	8.7	3.3	40.5	29.7	21.6	8.1
(9) providing more primitive access to river sections where outboard motors are not generally used	33.3	33.3	14.8	18.5	40.0	50.0	6.7	3.3	49.5	33.3	13.3	3.8	40.2	43.8	13.4	2.6	40.2	44.6	10.9	4.3	59.5	21.6	13.5	5.4
(14) providing boating access for recreational boating	11.1	63.0	11.1	14.8	53.3	46.7	0.0	0.0	26.7	51.4	18.1	3.8	43.3	44.8	11.3	0.5	20.7	54.3	20.7	4.3	27.0	40.5	27.0	5.4
Private Land Access																								
(15) encouraging private landowners to open their lands for more hunting access	25.9	44.4	7.4	22.2	46.7	33.3	16.7	3.3	60.0	25.7	9.5	4.8	59.3	27.8	10.8	2.1	63.0	23.9	7.6	5.4	43.2	21.6	27.0	8.1
(20) encouraging private landowners to open access to their waters for more fishing use	33.3	40.7	11.1	14.8	60.0	16.7	23.3	0.0	64.8	23.8	7.6	3.8	52.6	34.0	10.3	3.1	52.2	32.6	9.8	5.4	37.8	29.7	21.6	10.8

¹ DK = Don't know/no opinion

Appendix J. Mean scores¹ by division to questions asking whether VDGF was doing an excellent, good, fair or poor job performing its various programs and functions.

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(85) providing hunter education	1.80	0.01	1.92	0.03	1.69	0.02	1.92	0.02	1.65	0.01	1.98	0.02	1.83	0.02
(81) enforcing the boating laws of Virginia	1.90	0.01	2.16	0.03	2.00	0.03	2.19	0.01	1.57	0.01	2.18	0.02	1.93	0.03
(76) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	1.98	0.01	1.96	0.03	1.85	0.03	2.06	0.02	1.97	0.01	1.99	0.02	1.86	0.02
(87) providing safety training for hunters	2.03	0.01	1.96	0.03	1.90	0.02	2.10	0.01	1.95	0.01	2.21	0.02	1.97	0.02
(83) enforcing the fish and wildlife laws of Virginia	2.05	0.01	2.08	0.02	1.93	0.03	2.33	0.02	1.74	0.01	2.41	0.02	2.06	0.03
(102) enforcing safety in fish, wildlife and boating related recreation	2.09	0.01	2.24	0.03	2.20	0.02	2.33	0.01	1.81	0.01	2.35	0.02	2.13	0.03
(84) managing game fish such as trout and bass	2.13	0.01	1.95	0.02	1.96	0.03	2.03	0.02	2.23	0.01	2.19	0.01	1.94	0.02
(98) providing fishing opportunities	2.17	0.01	2.17	0.02	1.97	0.02	2.24	0.02	2.21	0.01	2.10	0.01	2.07	0.03
(103) providing boating opportunities	2.20	0.01	2.08	0.02	1.97	0.02	2.33	0.01	2.17	0.01	2.25	0.01	2.13	0.03
(73) enforcing laws that protect fish and wildlife habitat	2.22	0.01	2.13	0.03	2.00	0.02	2.52	0.02	1.96	0.01	2.46	0.02	2.44	0.04
(106) incorporating hunters' and anglers' wants and needs into the management of the state's fish and wildlife	2.30	0.01	2.35	0.04	2.25	0.03	2.54	0.02	2.24	0.01	2.36	0.02	1.79	0.03
(100) providing safety education for boaters	2.30	0.01	2.20	0.03	2.23	0.03	2.28	0.01	2.35	0.01	2.37	0.02	2.12	0.02
(90) providing education and information to women	2.36	0.01	2.52	0.03	2.19	0.02	2.51	0.01	2.26	0.01	2.40	0.02	2.39	0.03
(80) providing hunting opportunities	2.39	0.01	2.13	0.02	2.34	0.03	2.33	0.02	2.47	0.01	2.45	0.02	2.21	0.03
(95) providing boat access for hunting, fishing and recreational boating	2.40	0.01	2.26	0.02	2.04	0.03	2.49	0.01	2.41	0.01	2.51	0.02	2.13	0.02
(93) conducting general biological research	2.45	0.01	2.26	0.03	2.21	0.03	2.52	0.02	2.30	0.01	2.53	0.01	2.94	0.03
(88) managing fish and wildlife to sustain maximum diversity of native species	2.45	0.01	2.42	0.04	2.29	0.03	2.59	0.02	2.24	0.01	2.58	0.02	3.03	0.04
(77) providing general fish and wildlife education	2.49	0.01	2.50	0.03	2.18	0.03	2.61	0.02	2.45	0.01	2.48	0.02	2.63	0.03
(96) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.50	0.01	2.54	0.03	2.43	0.03	2.70	0.02	2.45	0.01	2.41	0.02	2.43	0.03
(105) protecting threatened and endangered species	2.50	0.01	2.64	0.03	2.12	0.03	2.80	0.02	2.32	0.01	2.48	0.02	2.91	0.03
(104) coordinating technical assistance to rural landowners regarding management of wildlife on their properties	2.56	0.01	2.68	0.03	2.30	0.03	2.65	0.02	2.60	0.01	2.37	0.02	2.68	0.04
(79) managing nongame fish and wildlife (i.e., not hunted or fished)	2.60	0.01	2.84	0.03	2.20	0.03	2.76	0.02	2.45	0.01	2.65	0.02	2.88	0.04
(75) providing aquatic resource education	2.62	0.01	2.58	0.03	2.56	0.03	2.64	0.01	2.69	0.01	2.49	0.02	2.57	0.03
(94) providing education on skills needed to pursue wildlife-related outdoor recreation	2.65	0.01	2.70	0.03	2.46	0.03	2.67	0.01	2.55	0.01	2.75	0.02	2.97	0.03
(101) providing education and outreach to schools	2.65	0.01	2.43	0.03	2.44	0.03	2.73	0.02	2.63	0.01	2.79	0.02	2.53	0.03
(78) incorporating wildlife viewers' wants and needs into the management of the state's fish and wildlife	2.67	0.01	3.14	0.04	2.36	0.03	2.73	0.02	2.50	0.01	2.67	0.02	3.27	0.03

¹Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

Appendix J. (Continued)

Survey Questions	Overall		Admin- istration		Boating		Fisheries		Law Enforcement		Wildlife		Wildlife Diversity	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
(74) coordinating technical assistance to urban/suburban residents on how to manage wildlife on their properties	2.67	0.01	2.72	0.04	2.55	0.04	2.69	0.01	2.72	0.01	2.56	0.02	2.73	0.04
(91) educating and informing citizens, in general, about fish, wildlife and boating related issues	2.71	0.01	2.88	0.03	2.50	0.03	2.71	0.02	2.68	0.01	2.77	0.02	2.76	0.03
(97) providing resource conservation training for enforcement personnel	2.73	0.01	2.72	0.03	2.25	0.04	2.76	0.02	2.69	0.01	2.86	0.02	2.94	0.04
(99) reviewing and commenting on proposed developments to minimize their effects on fish and wildlife habitat	2.74	0.01	2.81	0.04	2.32	0.04	2.82	0.02	2.72	0.01	2.75	0.02	2.81	0.03
(89) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.82	0.01	3.21	0.04	2.57	0.04	2.74	0.02	2.70	0.01	2.95	0.02	3.24	0.03
(82) providing recreational shooting range opportunities	2.96	0.01	3.11	0.04	2.55	0.04	2.97	0.02	3.10	0.01	2.79	0.02	2.76	0.03
(92) acquiring additional land and water for wildlife conservation	3.19	0.01	2.85	0.03	2.45	0.04	3.21	0.02	3.08	0.01	3.57	0.02	3.38	0.03
Overall Mean	2.42	0.01	2.43	0.04	2.21	0.03	2.52	0.02	2.35	0.01	2.50	0.02	2.49	0.03

1Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

Appendix K. Mean scores of the priority employees placed on allocating new resources to VDGIF functions and programs and the ratings they placed on the current performance of these functions.

	Mean ¹	Mean ²
Recreation	Resource Priority	Performance
(10) providing hunting opportunities	2.22	2.39
(13) managing game fish such as trout and bass	2.72	2.13
(18) providing boating opportunities	2.82	2.20
(19) providing fishing opportunities	2.44	2.17
(21) managing nongame fish and wildlife (i.e., not hunted or fished)	2.83	2.60
(4) providing recreational shooting range opportunities	2.66	2.96
(5) providing recreation-oriented capital investments on WMAs (e.g., camping areas, hiking trails, interpretive facilities, observation platforms)	2.57	2.82
(6) providing boat access to significant hunting and fishing resources	2.44	2.40
(8) managing game (hunted) animals such as deer, bear, turkey, rabbit, squirrel, quail and waterfowl	2.51	1.98
Enforcement		
(29) enforcing laws that protect fish and wildlife habitat	2.18	2.22
(3) enforcing safety in fish, wildlife and boating related recreation	2.33	2.09
(1) enforcing fishing and hunting regulations	2.39	2.05
(7) enforcing boating laws and regulations	2.58	1.90
Environmental Diversity and Conservation		
(25) acquiring additional land and water for wildlife conservation	1.99	3.19
(34) protecting rare and endangered habitats	2.21	2.50
(30) managing fish and wildlife to maintain maximum diversity of native species	2.28	2.45
(33) reviewing and commenting on proposed developments to minimize their effects on fish	2.33	2.74
(46) Including more resource conservation training for enforcement personnel	2.45	2.73
(23) conducting general biological research	2.74	2.45

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

²Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor,

Appendix K. Continued...

Education	Mean ¹	Mean ²
	Resource Priority	Performance
(38) educating and informing citizens, in general, about fish, wildlife and boating related issues	1.92	2.71
(43) Education and outreach to schools	2.18	2.65
(42) providing information for fish and wildlife associated recreation (for example - maps, description of facilities)	2.39	2.50
(54) Boating safety education	2.45	2.30
(40) providing education on skills needed to pursue wildlife-related outdoor recreation	2.51	2.65
(39) Hunter education	2.52	1.80
(47) providing general aquatic and wildlife education	2.54	2.49
(45) providing safety training for hunters	2.55	2.03
(44) providing education and information for women	2.65	2.36
(50) Aquatic resources education	2.75	2.62

¹Responses were coded 1 = Much more, 2 = Slightly more, 3 = About the same, 4 = Slightly less, 5 = Much less. The response '6 = Don't know/No opinion' was omitted from mean calculations.

²Responses were coded 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know/No opinion. The response '5 = Don't know/No opinion' was omitted from mean calculations.

VITA

James Watkins was born in Ottawa, Illinois and raised in Rochester, Minnesota. He attended the University of Kansas in Lawrence, Kansas and received a Bachelor of Arts degree in Spanish in 1976. He spent many years abroad working as a translator, primarily for the film industry.

Motivated by his life-long interest in natural resource conservation and stewardship, he enrolled in graduate school at Virginia Polytechnic Institute and State University, and received a Master of Forestry degree in 1998. While completing this degree, he helped conduct an urban ecological analysis of the City of Roanoke, Virginia. He remained at Virginia Tech where he completed the Master of Science degree in Fisheries and Wildlife Sciences in May, 2000.