

THE SOCIO-ECONOMIC IMPACT OF FIREARMS IN THE FIELD OF CONSERVATION AND NATURAL RESOURCES MANAGEMENT

Presented at the Nineteenth Annual Conference of the Southeastern
Association of Game and Fish Commissioners
Tulsa, Oklahoma, 11 October 1965

By ALAN S. KRUG

School of Forest Resources
The Pennsylvania State University
University Park, Pennsylvania

Paper No. 118 of the Pennsylvania Cooperative Wildlife Research Unit.

ABSTRACT

One outgrowth of American history is the large demand and matching supply of firearms on the American scene. Projected demands for the future indicate that the firearms industry will continue to be an important sector of our economy. In addition, firearms play a significant sociological role in modern society. These socio-economic aspects of firearms in America bear heavily on the field of conservation and natural resources management. Much proposed firearms legislation stands to have an adverse effect on the conservation movement, and for this reason warrants careful consideration by professional workers interested in the future of our natural resources.

INTRODUCTION

Socio-economic aspects of natural resources management are becoming increasingly more important as the pace of our society increases. It has, in fact, been said that in many parts of the country, wildlife management endeavors entail more management of people than game. Many educational institutions are now recognizing this situation and are including more liberal arts electives in their resource management curricula. The goal is to produce a well-rounded resource manager who can handle not only the technical problems of the day, but also those which are sociological, economic, or political in nature.

Firearms have an important socio-economic impact in the field of conservation and natural resources management. Because of this, legislation affecting the ownership and availability of firearms is of interest to all conservationists, not just to those who own and use firearms themselves.

The socio-economics of firearms can, perhaps, best be examined within the traditional "supply and demand" concept of economics, with consequent attention being given to the various socio-political ramifications of the use of firearms by society.

THE DEMAND FOR FIREARMS

The right of the people of the United States to keep and bear arms is guaranteed not only by the Federal Constitution but by the constitution of 35 states (2). Although, in recent years, there have been some attempts to downgrade the Second Amendment to the Constitution through implication that it refers only to the maintenance of a militia, historical considerations leave no doubt that the guarantee was meant to extend to the keeping and bearing of arms for private purposes not connected with a militia (30). Many Americans consider the Constitutional Right to Keep and Bear Arms one of our greatest heritages (8, 17).

In the past, demand for firearms stemmed from a concrete need of tools for survival. Firearms were utilized for the acquisition of meat for food and hides for clothing, for protection of life and property, for the maintenance of militias, and for recreation.

Today, firearms are still demanded for the same reasons, but the use of firearms for recreational pursuits now exceeds by far their use

for protection and survival. However, all of these factors are still important.

Hunting is the most important of the shooting sports. In 1964, the number of Americans taking to fields and forests in quest of game and relaxation approached the 20-million mark. Of these, nearly one million were women (3). On the average, about two man-days of hunting took place for every person in the United States over 12 years of age (28).

Approximately 17 percent of all adult Americans participate in the sport of hunting and an additional five percent would like to participate in the future. In rural areas, 28 percent of the population hunts; in cities, 10 percent. This suggests that up to an additional 18 percent of the population in cities might like to hunt, but have no opportunity to do so (24)!

Projections for the future indicate that, between now and 1975, there will be a 30 percent increase in the number of individuals hunting; between now and the year 2000, there will be an 83 percent increase (28).

Despite our rapidly growing population, it is estimated that, in many states, there may be more lands open to hunting in 1975 than are open at the present time. This is mainly because of a substantial decrease in the acreage needed for agricultural purposes (20) and a consequent emigration of rural people to the cities (9). However, there will continue to be a shortage of hunting lands adjacent to urban areas, and in many instances this shortage will be acute (10). In this connection, acreage available for small game hunting will be hardest hit (27). But whatever shifts in land use the future may bring, hunting will remain one of the most important American sports for years to come.

Firearms are also used extensively in target shooting. In 1964, some 150,000 of the National Rifle Association's 675,000 members held classification cards for competitive shooting. These shooters participated in more than 2,300 NRA registered and approved tournaments. More than 500,000 individuals participated in NRA marksmanship qualification courses, and since the year 1926, over six million qualification awards have been issued by the NRA. At the present time, NRA membership exceeds 700,000, and there are more than 12,000 shooting clubs all over the nation which are affiliated with the NRA.

The shotgun sports are formally represented by the National Trapshooting Association, with 23,000 members, and the National Skeetshooting Association, with 12,000 members (15). However, it is estimated that the total number of trapshooters in the United States today is approximately 100,000; the total number of skeetshooters, 200,000.

Another present-day use for firearms is in the civilian small arms marksmanship training program of the U. S. Army (1, 4). In this program, which is coordinated with the National Rifle Association and administered by the Director of Civilian Marksmanship of the United States Army, civilians who would be subject to military duty in time of war are trained in the use and safe handling of military-type small arms (11). In the past, this training has proved a very valuable asset to those individuals who obtain only the standard amount of basic training before going into actual combat (21). In addition, the armed forces have obtained many of their wartime firearms instructors from this program. In accepting a Life Membership in the National Rifle Association, the late President John F. Kennedy said, "Through competitive matches and sports in coordination with the National Board for the Promotion of Rifle Practice, the Association fills an important role in our national defense effort . . ." (18). The Congress continues to regard the DCM Program as an important part of this country's efforts in national defense.

Millions of firearms are used for informal shooting fun in activities which range from turkey shoots to plinking at tin cans. The number of hours of recreation which Americans obtain in this manner each year has not been measured quantitatively, but it is undoubtedly of large magnitude. Informal shooting activities are probably exceeded in man-hours of participation only by hunting. Several million non-hunters are included in the informal recreation shooting group.

Collecting firearms has become a form of recreation and relaxation

enjoyed by many Americans. There are 75 gun collectors' associations, with a membership of some 20,000 individuals, which are affiliated with the National Rifle Association (15). However, there are perhaps as many as 150,000 individuals who can be classed as serious gun collectors, i.e., have substantial investments in their collections.

Another demand for firearms is derived from individuals who remodel and repair guns as a hobby. These amateur gunsmiths have utilized many of the surplus firearms now on the market in their hobby activities, thereby accounting for much of the demand for these types of firearms. Although it has not been measured, the amount of recreation which Americans obtain from this pastime is certainly considerable.

Protection of life and property creates a substantial demand for firearms. Millions of guns are kept by homeowners as protection from the criminal element. Millions more are kept in business establishments for the same purpose. Each month, incidents in which armed citizens have successfully frustrated activities of criminals are detailed in the *American Rifleman*, journal of the National Rifle Association. A six-year study of justifiable homicides in the Greater Cleveland Area (1947-1953) revealed that 66.4 percent of those individuals who had to take another's life to save their own had used firearms to defend themselves (6).

Law-enforcement officers, bank guards, and security personnel require still another million firearms (5).

Firearms in the United States are considered by many to be a powerful deterrent to crime.

THE SUPPLY OF FIREARMS

Although it is not known exactly how many privately owned firearms there are in the United States (16), estimates obtained by the Committee on Commerce of the United States Senate indicate that there are possibly 200 million (23).

The number of individuals owning firearms is variously estimated at between 20 million and 40 million. On an average basis, however, there would be slightly more than one firearm for every American citizen. In 1959, the American Institute of Public Opinion ("Gallup Poll") conducted a survey which indicated that guns were possessed in 49 percent of all American homes (14). This figure could conceivably be low, as many people might be hesitant to reveal to an interviewer information relating to firearms which they owned.

Estimates by the firearms industry indicate that approximately 50 million of these firearms are modern sporting rifles and shotguns produced by the industry. The remainder are antiques, handguns, sporting firearms imported from abroad, and surplus arms imported from abroad.

The American firearms industry is presently manufacturing and selling in this country about one million sporting rifles and shotguns annually. Americans purchase an additional one million firearms each year in the other categories as mentioned above (12). Thus, at current rates, a total of two million firearms are purchased by the U. S. shooting public yearly. This figure does not include any purchases by the military.

THE ECONOMICS

The firearms industry and the shooting sports have a significant impact on the American economy. In 1964, purchases of American-made firearms and ammunition (exclusive of purchases by the military) totaled \$282.5 million. Sales of guns and ammunition generated 20,000 jobs and a \$100 million payroll in the firearms industry. In addition, there are currently more than 100,000 retail outlets for guns and ammunition. There are more than 1,600 firms manufacturing hunting and shooting accessories, exclusive of the firearms industry itself (29).

The sport of hunting, when taken alone, has a significant impact on the general economy. In 1963, hunters drove their automobiles 4.8 billion miles just to go hunting. According to calculations made by economist Richard E. Snyder of the National Sporting Goods Associa-

tion, this means that hunters "wore out," in one year, 47,880 new automobiles at a cost of \$143 million; wore out 215,000 new tires at a cost of \$5.5 million; burned up 300 million gallons of gasoline costing \$101 million; used four million quarts of oil costing \$2 million; and accounted for \$9.4 million in vehicle repairs and automobile insurance, pro-rated for hunting use of the vehicle only. This represents a total expenditure for transportation of \$261 million (29).

In 1963, hunters also spent a total of \$675 million on food, lodging, camping equipment, duck boats, hunting apparel and other miscellaneous gear (29).

Additional expenditures by hunters that have been reported are: \$50 million to develop private land for wildlife; \$10 million for bus, rail and air travel; \$7.1 million for insurance (liability, fire and theft); \$10 million for privilege fees (for hunting and shooting); \$35 million for guide fees and other trip expenses; and \$158 million for hunting dogs (26).

Thus, in the year 1963, hunters poured \$1.2 billion into the nation's economy, not counting expenditures on firearms and ammunition. Including the latter would raise the total to \$1.5 billion.

It is not known how much is spent annually for expenses connected with shooting sports other than hunting. The investment is certainly substantial. It is known that individuals who handload their own ammunition as a hobby spend upwards of \$25 million each year on tools and components.

The economic effects of hunting and the other shooting sports on the field of conservation and natural resources management are extremely important. In 1964, sales of hunting licenses and duck stamps provided state and Federal wildlife conservation agencies with a working capital of \$71.5 million. Since their sale was initiated in 1934, duck stamps alone have added over \$84.5 million to the funds available for waterfowl conservation (13). These monies have been used by the various agencies involved to provide improved habitat and protection for a wide variety of wildlife species, both game and non-game. This means that hunters pay not only for the management of the game species which they hunt, but for the management and protection of all other wildlife as well. In fact, the entire spectrum of natural resources benefits from the hunting permit monies. Wildlife management enhances watershed values, increases the fertility of the land, prevents erosion, makes the landscape more attractive, and provides for various other benefits to the land and water resources. During the past sixty years, the contribution of the hunter to the conservation movement has been immeasurable.

From 1937 until the present time, more than \$300 million in Federal and State funds have been channeled into essential wildlife restoration activities through the implementation of the Pittman-Robertson Act. Apportionments of Federal Aid in Wildlife Restoration Funds in fiscal year 1963-64 totaled \$16,673,077 (7). Secretary of the Interior Steward L. Udall has termed the Pittman-Robertson Act "one of the most important pieces of conservation legislation that this, or any other country in the world has ever known (31)." When the Act was being considered by Congress, one of its chief supporters was the American Firearms Industry. This may be the only time in the history of the United States that an industry has asked to be taxed.

The shooting sports are truly the financial bulwark of the wildlife conservation movement. It is for this reason that many conservationists are deeply concerned about any proposed legislation which would discourage the private ownership of firearms and thereby depress the economic base of conservation and natural resources management.

THE SOCIOLOGY

Equally as important as the economics is the sociological and political support given to the conservation movement by the American Sportsmen. Since the time of Theodore Roosevelt, it has been the sportsmen who have formed the backbone of the conservation cause. The actions of sportsmen in this regard can perhaps best be characterized in the words of Mr. Roosevelt himself, who said that "Aggressive fighting for the right is the noblest sport the world affords." So it has been

with the sportsmen who have been the driving force behind resource conservation efforts in this country.

It has only been in the last few years that there has been any widespread interest in conservation among the general public. For over half a century, sportsmen across the nation had to fight the battles for wise resource management alone. Americans owe a debt of gratitude to the sportsmen for their past efforts in the conservation field.

Thus it is that the stories of American hunting, firearms and conservation have been almost one and the same. Both economically and sociologically, the relationship of firearms and the conservation movement is truly an intimate one. It is because of this that adverse firearms legislation poses such a threat to the conservation movement. No one really has any way of telling what the ultimate effects of such legislation might be, but the end result could conceivably be catastrophic. Firearms legislation is certainly one field that warrants careful consideration by all conservationists.

FIREARMS LEGISLATION

It is clear that any firearms legislation which would place unnecessary and undesirable burdens upon the law-abiding gun owner who uses his firearms for sport and recreation would tend to be detrimental to the conservation movement. Any legislation which would make it difficult or unpleasant for the sportsman to own and bear arms for lawful use in recreational activities would depress the economic, sociological, and political forces supporting the conservation and wise use of our natural resources.

The most important immediate effects of a depression in recreational shooting activities would be economic: a decrease in the Federal funds available for waterfowl management; a decrease in funds available to state game agencies for wildlife conservation and management; and a decrease in the funds available to privately sponsored wildlife conservation organizations. In addition, there could be a depressing effect on the growth of the general economy.

Most important of all, however, would be the long-run depression of the sociological and political forces behind the conservation movement. Ultimately, the effects could be all-pervasive, with few areas of natural resources management left unscathed.

CURRENT LEGISLATIVE ACTIVITY

Interest in the firearms legislation field is currently centered on the Federal level, where various changes in the Federal Firearms Act of 1938 have been proposed. To date, the proposal which has received the greatest amount of attention is S. 1592, a bill sponsored by Senator Thomas J. Dodd of Connecticut. This bill has been vigorously opposed by conservationists and game managers across the nation, as well as by shooter-sportsmen, as being legislation of the type which would be detrimental to the conservation movement.

Provisions of S. 1592 include: a complete prohibition of the sale of firearms by mail; increases in license fees for firearms dealers, manufacturers, and gunsmiths which are designed to eliminate the smaller concerns; and the granting of broad discretionary powers to the Secretary of the Treasury to prescribe regulations concerning the purchase, shipment, transport, and sale of firearms and ammunition.

Hearings on S. 1592 were recently held by the Subcommittee on Juvenile Delinquency of the Committee on the Judiciary of the United States Senate. In a statement to the Subcommittee, the writer listed eight socio-economic factors that should be considered when evaluating any proposed prohibition of the sale of firearms by mail order (19):

"1. Millions of Americans do not have convenient access to a firearms dealer. To prohibit mail-order sales of firearms to these individuals would indeed be placing severe and unreasonable restrictions upon them. This situation would become all the more acute when the appalling, exorbitant license fees proposed in this bill drive many legitimate firearms dealers and gunsmiths out of business.

"2. Dealers carry only certain lines of firearms. Often, a particu-

lar firearm that is wanted must be ordered by mail, as no local dealer is able to supply it.

"3. Many handguns used in competitive target shooting are custom built, are not available from local firearms dealers, and can be obtained only by mail-order from the gunsmith who manufactures them. The same situation exists with respect to many custom-built sporting rifles and shotguns.

"4. Prohibition of mail-order sales of firearms would give local dealers unfair bargaining advantage over customers in sales transactions. Fair competition would be eliminated, as would freedom of choice.

"5. Firearms manufacturers having the available resources to effect wide distribution of their products to local dealers would have unfair advantage over smaller firms with more limited resources.

"6. Prohibition of firearm sales by mail-order would result in an inefficient utilization of resources and a financial loss to many individual firearms owners and dealers. There are hundreds of different types of firearms, each suited to a particular use in a particular time and place. In many instances, efficient distribution of pre-owned firearms can only be obtained through the mails. Mail-order restrictions would immobilize these resources and cause a depreciation in value when a particular (specialized) firearm had to be sold in a geographic area where its potential use was limited in scope.

"7. The right to engage in interstate commerce can be considered a basic right of all American citizens; the arbitrary denial of this right to a select group, i.e., firearms owners, is not to be taken lightly. The same statement can be made in regard to use of the United States mails.

"8. Professional conservationists are in unanimous agreement that enactment of this legislation would have a highly detrimental effect on the conservation movement in this country. The ownership of firearms by legitimate persons would be discouraged, and this would be reflected in a substantial decrease in the monies available for conservation programs, as well as in a decrease in the sociological and political forces supporting the conservation movement. Any initial decrease in these categories would be increased through an induced multiplier effect much like that embodied in the Keynes induced multiplier concept. The ultimate effect on conservation could be catastrophic. The importance of sporting firearms and hunting in the field of conservation and natural resources management cannot be overestimated."

Thus, it can be seen that the socio-economic effects of legislation such as S. 1592 could be far reaching and of serious consequence to the conservation movement.

It is not the business at hand to argue the merits or demerits of S. 1592 as such, but to point out in concrete terms, the existence of firearms legislation which warrants the attention and concern of all conservationists. If wildlife management is to accomplish its purpose as "the art and science of making land produce annual, sustaining crops of wildlife for recreational use," the socio-economics of firearms will have to take its place in the professional resource manager's thinking right along with population dynamics, habitat management, and ecological succession. The strength of the conservation movement in the future will be no stronger than the weakest link in the chain which binds together, for effective action, all of the supporting forces in the natural resources field. The demand for firearms and the socio-economic results thereof are most certainly one of the more significant supporting forces.

CONCLUSION

Shooter-sportsmen do not oppose all proposed firearms legislation. They have recognized the problems created by the availability

of handguns to juveniles, criminals, and irresponsible persons through mail-order purchases. They have supported legislation to increase Federal control over the transportation of concealable firearms in interstate commerce. They do support properly drawn legislation to outlaw dangerous devices such as bazookas, bombs and anti-tank guns. They do support properly drawn legislation to curb the flood of cheap foreign firearms that are being dumped in America. They do support legislation to impose heavy penalties for crimes involving the misuse of firearms. They do support the strict enforcement of existing laws at all levels of government (22). They vigorously support training in the proper use of firearms for all who use them. However, they oppose firearms legislation which adversely affects the honest citizen and the conservation movement, while offering little hope of accomplishment in the way of reducing the crime rate. Such legislation is of particular concern to all conservationists because of the socio-economic effects that it would have on the conservation movement. In addition, management of wildlife implies the control of animal numbers consonant with the ability of the range to support the animals. Hunting with firearms is the chief means of managing game populations and obtaining the recreational benefits which accrue therefrom. Any legislation which would restrict the availability of firearms to law-abiding citizens would adversely affect the resource manager's ability to manage game supplies, and would result in untold economic loss in the way of damage to forests and farms. Further economic loss would result from increased repair costs for motor vehicles involved in accidents with game animals, and much inconvenience and lost earning power would result from personal injuries suffered in such mishaps. Wildlife could be transformed from an economic asset into a liability.

The National Rifle Association of America lists five criteria that can be used in evaluating any legislation that pertains to firearms (25). These are:

"1. Is it an enforceable law?

"2. For what purpose was the law intended, and will it actually achieve that purpose?

"3. Could the law be used by an unscrupulous person or party to extend or perpetuate its own power?

"4. Is the law really necessary or does it merely contribute to a network of technical restrictions which can trip a conscientious sportsman into being an unintentional violator?

"5. Is the law an attempt to accomplish by prohibition what can be accomplished only by education and training?"

An additional criterion can be added by the conservationist:

6. Would the law have adverse effects on the conservation movement and the wise management of natural resources?

If conservationists are to influence the course of firearms legislation in the future, they must inform themselves as to the legislation which is being proposed and what its effects are likely to be. They must convey their views on the subject to the public, and to their legislators. Only by doing so can they help to insure that future firearms legislation will be both reasonable and effective.

BIBLIOGRAPHY

- (1) Anonymous. 1962. Code of Federal regulations, 543.4: National Board for the Promotion of Rifle Practice and Office of the Director of Civilian Marksmanship. In Code of Federal Regulations, title 32, parts 400 to 589. Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D. C.
- (2) Anonymous. 1962. Constitutions of the United States, national and state. Legislative Drafting Research Fund, Columbia University, New York, N. Y.
- (3) Anonymous. 1964. Hunting captures new converts, pushes sales of firearms to record. Wall Street Journal, New York, N. Y. August 5.

- (4) Anonymous. 1965. Army regulations No. 920-20. In U. S. Army regulations. Department of the Army, Washington, D. C.
- (5) Applegate, R. 1964. In defense of the law. Pages 45-49. In E. B. Mann (Editor), The world of guns. Publishers' Development Corporation, Skokie, Illinois. 92 pp.
- (6) Bensing, R. C., and O. Schroeder. 1960. Homicide in an urban community. Charles C. Thompson, pub., Springfield, Illinois. 193 pp.
- (7) Bureau of Sport Fisheries and Wildlife, U. S. Department of the Interior. 1965. Federal aid in fish and wildlife restoration 1964. Wildlife Management Institute and Sport Fishing Institute, Washington, D. C. 89 pp.
- (8) Church, Hon. F. 1957. Statement on proposed changes in Federal firearms regulations. In Hearings on proposed changes in Federal firearms regulations. Department of the Treasury, Washington, D. C. August 27.
- (9) Clawson, M., and R. B. Held. 1963. Demand for rural resources in the context of long-range national needs. Resources for the Future, Inc., Washington, D. C.
- (10) Department of Conservation, School of Natural Resources, The University of Michigan. 1962. Hunting in the United States—its present and future role (Outdoor Recreation Resources Review Commission study report No. 6). U. S. Government Printing Office, Washington, D. C. 117 pp.
- (11) Director of Civilian Marksmanship. 1964. Courses of fire for civilian marksmanship training. Director of Civilian Marksmanship, Washington, D. C. November. 9 pp.
- (12) Dodd, Hon. T. J. 1963. Statement on S. 1975. Page 10. In Interstate shipment of firearms: hearings before the Committee on Commerce, United States Senate, on S. 1975 and S. 2346. U. S. Government Printing Office, Washington, D. C. 340 pp.
- (13) Fish and Wildlife Service, U. S. Department of the Interior. 1964. Duck stamp data. U. S. Government Printing Office, Washington, D. C. 42 pp.
- (14) Gallup, G. H. 1959. Public opinion poll on firearms. American Institute of Public Opinion. August 30 (Part I), September 2 (Part II), and September 4 (Part III).
- (15) Howe, W. J. 1965. Personal communication. Director, Editorial and Technical Division, National Rifle Association, Washington, D. C. March 3.
- (16) ———. 1965. Personal communication. Director, Editorial and Technical Division, National Rifle Association, Washington, D. C. March 28.
- (17) Humphrey, Hon. H. H. 1960. Statement on the Second Amendment to the U. S. Constitution. Guns Magazine, 6(2).
- (18) Kennedy, Hon. J. F. 1961. Personal communication to Mr. Franklin L. Orth, Executive Vice President, National Rifle Association. March 20. The American Rifleman, 109(5):27.
- (19) Krug, A. S. 1965. Statement on S. 1592. Paper presented to the Subcommittee on Juvenile Delinquency of the Committee on the Judiciary of the United States Senate, 89th Congress, 1st Session, Washington, D. C. June 30.
- (20) Landsberg, H. H., L. L. Fischman, and J. L. Fisher. 1963. Resources in America's future: patterns of requirements and availabilities, 1960-2000. The Johns Hopkins Press, Baltimore, Maryland. 1,056 pp.
- (21) Lemnitzer, Gen. L. L. 1960. The NRA and national defense. The American Rifleman, 109(10):16.
- (22) Lucas, L. F. 1965. United we stand. The American Rifleman, 113(1):16.
- (23) Magnuson, Hon. W. G. 1964. Personal communication. Chairman, Committee on Commerce, United States Senate, Washington, D. C. December 10.
- (24) Mueller, E., and G. Gurin. 1962. Participation in outdoor recreation: factors affecting demand among American adults (Outdoor

- Recreation Resources Review Commission study report No. 20). U. S. Government Printing Office, Washington, D. C. 100 pp.
- (25) National Rifle Association. 1965. "Be it enacted" may mean goodbye guns. National Rifle Association of America, Washington, D. C.
- (26) National Shooting Sports Foundation. 1965. Financial facts and figures. *Virginia Wildlife*, 26(9):27.
- (27) Nelson, L. K., R. W. Murray, R. E. Murry, and E. G. Sullivan. 1961. Report of Farm Game Committee, Southeastern Section, The Wildlife Society. Southeastern Section, The Wildlife Society. 8 pp. Mimeo.
- (28) Outdoor Recreation Resources Review Commission. 1962. National Recreation survey (Outdoor Recreation Resources Review Commission study report No. 19). U. S. Government Printing Office, Washington, D. C. 300 pp.
- (29) Snyder, R. E. 1964. Guns in today's economy. Pages 24-28. In E. B. Mann (Editor), *The world of guns*. Publishers' Development Corporation, Skokie, Illinois. 92 pp.
- (30) Sprecher, R. A. 1965. The lost amendment. *Journal of the American Bar Association*, 51(6) :554-557 (Part I), and 51(7) :665-669 (Part II).
- (31) Udall, Hon. S. L. 1964. Guns and our national resources. Pages 29-33. In E. B. Mann (Editor), *The world of guns*. Publishers' Development Corporation, Skokie, Illinois. 92 pp.

FACTORS INFLUENCING THE ESTABLISHMENT OF WIGEONGRASS STANDS IN LOUISIANA

BY TED JOANEN

Louisiana Wild Life and Fisheries Commission
Grand Chenier, Louisiana
and

LESLIE L. GLASGOW

School of Forestry and Wildlife Management
Louisiana State University
Baton Rouge, Louisiana

INTRODUCTION

Louisiana is fortunate in having one of the largest wintering areas for waterfowl in the United States. According to Hoffpauer (1965) the state's mid-winter waterfowl population was about five million birds. Most of these birds wintered in the southern portion of the state in the coastal marshes which comprise approximately 4,000,000 acres.

The Louisiana Wildlife and Fisheries Commission began an intensive waterfowl management program in the coastal area in 1954. As a part of this program, impoundments were constructed on certain marsh refuges. These impoundments were constructed with waterfowl management as the primary interest (Jemison, 1961). Management of these impoundments has been very successful. Chabreck (1960) found that 50% of the vegetation in the impounded areas on Rockefeller Refuge produced good duck food, and in adjacent coastal areas these same plants made up less than 5% of the vegetation. Aerial inventories in 1951-52 by Richard Yancey showed that Rockefeller Refuge wintered less than 75,000 ducks prior to the construction of the impoundments, but by 1958-59 the refuge was wintering 443,000 ducks, a 600% increase since the initiation of management. Of this number 80% were found in the impoundments.

Among the more important aquatic food-producing plants on the