ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

PRODUCTION NOTE

University of Illinois at
Urbana-Champaign Library
Large-scale Digitization Project, 2007.

ILLINOIS NATURAL HISTORY SURVEY

Waterfowl of Illinois: Status and Management

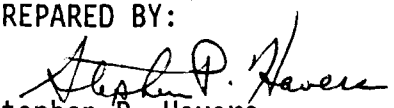
W-110-R-2

Final Report
1 July 1991 through 30 June 1992

by
Stephen P. Havera
Illinois Natural History Survey, Havana

15 September 1992

PREPARED BY:



Stephen P. Havera
Professional Scientist
Illinois Natural History Survey

DATE: 15 September 1992

Illinois Natural History Survey A Division of the Department of Energy and Natural Resources

Forbes Biological Station, Waterfowl Research Laboratory, Box 599, Havana, Illinois 62644, (309) 543-3950

15 September 1992

Mr. Mike Sweet
Illinois Department of Conservation
Lincoln Tower Plaza
524 S. Second Street
Springfield, IL 62701-1787

RE: Final Report for W-110-R-2. Waterfowl of Illinois: Status and Management

Dear Mike:

Enclosed please find the remaining eight chapters (Introduction, Populations, Harvest, Habitat, Banding, Food Habits, Management, and Future) for the completion report of W-110-R-2. Four chapters (Nesting, Hunting Tradition, Canada Geese, and Lead Poisoning) were submitted in September 1991 for the annual report of W-110-R-1.

Thank you for your support of this project. I hope the product meets with your approval.

Sincerely,

Stephen P. Havera
Director
Forbes Biological Station

SPH/kr

c: Richard E. Warner

INTRODUCTION

The State of Illinois has a rich history of waterfowl tradition, lore, and bounty. Few states, if any, have hosted such a varied history of waterfowl for over a century. Private duck clubs, some grandiose and some humble, appeared in the 1880s. Market hunting was a style of life for many attuned to the ways of waterfowl and the rivers, -- market hunters were river rats to some and providers to others. The harvest of Canada geese traditionally wintering in southern Illinois lead to the establishment of Horseshoe Lake Refuge in 1927, the first refuge in the state (Gabrielson 1943).

The Illinois River, the state's namesake and the most productive river in North America at the turn of the twentieth century with respect to numbers of fish and wildlife, attracted legions of ducks, including many of the mallards wintering in the Mississippi Flyway (Fig. 1). Consequently, the Illinois Valley inspired some of the world's finest decoy carvers, call makers, and private club owners, caretakers, and members. As the fame of mallard hunting in the Illinois Valley spread through the marshes, bottoms, and rivers of the country, a member of the United States Bureau of Biological Survey (Heilner 1943:88) remarked "When all the other ducks are gone, there will still be mallards on the Illinois River." When legal baiting abounded, Beardstown was dubbed "the baiting capital of America" (Leopold 1931:207). In Mason County and adjoining Tazewell County, Uhler counted 250 field pens used for baiting, and an estimated 225,000 ducks were shot at dry land pens throughout the Illinois Valley in 1933 (Bellrose 1944). The private clubs in the Valley were among the first to initiate "rest areas" to hold ducks for insuring hunting success.

Figure 1. Mallards wintering in the Mississippi Flyway in the early 1900s. (Photo provided by the Arkansas Game and Fish Commission.)

This rich history of duck lore and the importance of Illinois to waterfowl as a major migratory area, strategically located in the Mississippi Flyway between the breeding grounds to the north and the winter grounds to the south, attracted the attention of early biologists. Subsequently, for over a half-century Illinois was blessed with, arguably, the finest waterfowl biologists in any single state from the very inception of the profession of wildlife biology in the 1930s. These dedicated and insightful biologists have provided a wealth of information regarding waterfowl, wetlands, and their management in Illinois, the Mississippi Flyway, and in many instances, North America. Information gathered by these professionals, who are introduced in this chapter, and additional data, both past and recent, are the basis for the various chapters that follow.

Documented biological information on waterfowl populations was meager in the early 1900s. Although banding of birds was becoming more commonplace, the marking of waterfowl had not been done in large numbers until the renowned Frederick C. Lincoln traveled to Browning, Illinois, to band ducks in 1922. His successful banding of 1,667 ducks, mainly mallards, in the Sangamon Bottoms in 1922 was the first large-scale trapping of waterfowl in the United States (Bellrose 1984). Shortly thereafter, the legendary Aldo Leopold initiated his benchmark game survey of the north central states in 1928. He later traveled to the Illinois River valley where he recognized the "phenomenal success of resting grounds or refuges" owned and maintained by private duck clubs (Leopold 1931:201). In the early 1930s, Francis M. Uhler of the U.S. Bureau of Biological Survey, the forerunner of the U.S. Fish and Wildlife Service (FWS), ventured to the Illinois Valley to investigate the effects of baiting on the harvest of ducks. Uhler's findings were central to

the eventual prohibition of the use of bait for the taking of waterfowl (Mendoza 1984, Bellrose 1984).

The severe drought in the early 1930s was devastating to waterfowl populations and was instrumental to many changes, including the implementation of more restrictive hunting regulations, new organizations, and new programs. Bag limits were reduced, the three-shell limit was imposed, and baiting and the use of live decoys were prohibited in 1935. More Game Birds in America, founded in 1931, was the predecessor of Ducks Unlimited, Inc., which was organized in the United States in 1936 (Nelson 1989). Ducks Unlimited Canada was organized in 1938 (Nelson 1989). J.N. "Ding" Darling, Chief of the U.S. Biological Survey, began crusading for wetlands and waterfowl. He was instrumental in the enactment of the Migratory Bird Conservation Stamp Act of 1934, which implemented the federal duck stamp program. The 1930s also witnessed the expansion of the National Wildlife Refuge System and the collection of waterfowl information with the initiation of international duck censuses and banding programs (Nelson 1989). The Federal Aid in Wildlife Restoration Act (Pittman-Robertson) enacted in 1937 also provided financial aid to states for significant wildlife restoration projects (Gabrielson 1943).

As the drought relinquished its grip on the prairies of the United States and Canada in 1938 and 1939, Illinois inaugurated biological studies of waterfowl with the employment of Arthur S. Hawkins and Frank C. Bellrose by the Natural History Survey (INHS). Hawkins and Bellrose were eventually located in a newly constructed office on Chautauqua National Wildlife Refuge near Havana. This building was the first permanent structure at the INHS Stephen A. Forbes Biological Station, which was established in 1894 and is the oldest inland aquatic biological station in the country (Havera and Roat 1989)

(Fig. 2). Additionally, the special use permit issued by the Bureau of Biological Survey allowing INHS to occupy a site at Chautauqua Refuge was the first ever issued to a nonfederal agency on a federal refuge. Hawkins and Bellrose soon implemented several important benchmark, long-term studies, including the nesting biology of wood ducks in boxes and natural cavities, experimental plantings of aquatic plants, documenting the populations and harvest of waterfowl in the Illinois Valley, evaluating the effects of harvest regulations on waterfowl populations, the study of aquatic plants, the food habits of waterfowl, and the migration of waterfowl.

John M. (Frosty) Anderson joined Hawkins and Bellrose in the fall of 1939 and soon initiated the INHS banding program in which 75,000 ducks, mostly mallards, were marked at four locations in the state from 1939 to 1952 (Bellrose 1984) (Fig. 3). Hawkins and Anderson began addressing problems associated with the population and harvest of Canada geese at the Horseshoe Lake Game Refuge in southern Illinois during the winter of 1940-1941 when they banded 315 Canada geese, the first ever banded in Illinois. Jessop B. Low joined the Havana INHS staff in 1941 and, in addition to participating in ongoing studies, initiated studies on the seed and vegetative yield of waterfowl food plants and of waterfowl nesting in northeastern Illinois.

Unfortunately, Hawkins and Anderson were called to serve in the armed forces in 1941 and their careers were temporarily preempted. William H. Elder of INHS oversaw the research of Canada geese at Horseshoe Lake from December 1941 until March 1943. Harold C. Hanson, also of INHS, directed the research on Canada geese at Horseshoe Lake from fall 1943 until spring 1947. His studies provided comprehensive data on geese in the Mississippi Flyway and pioneered techniques on trapping, handling, sexing, and aging of geese.

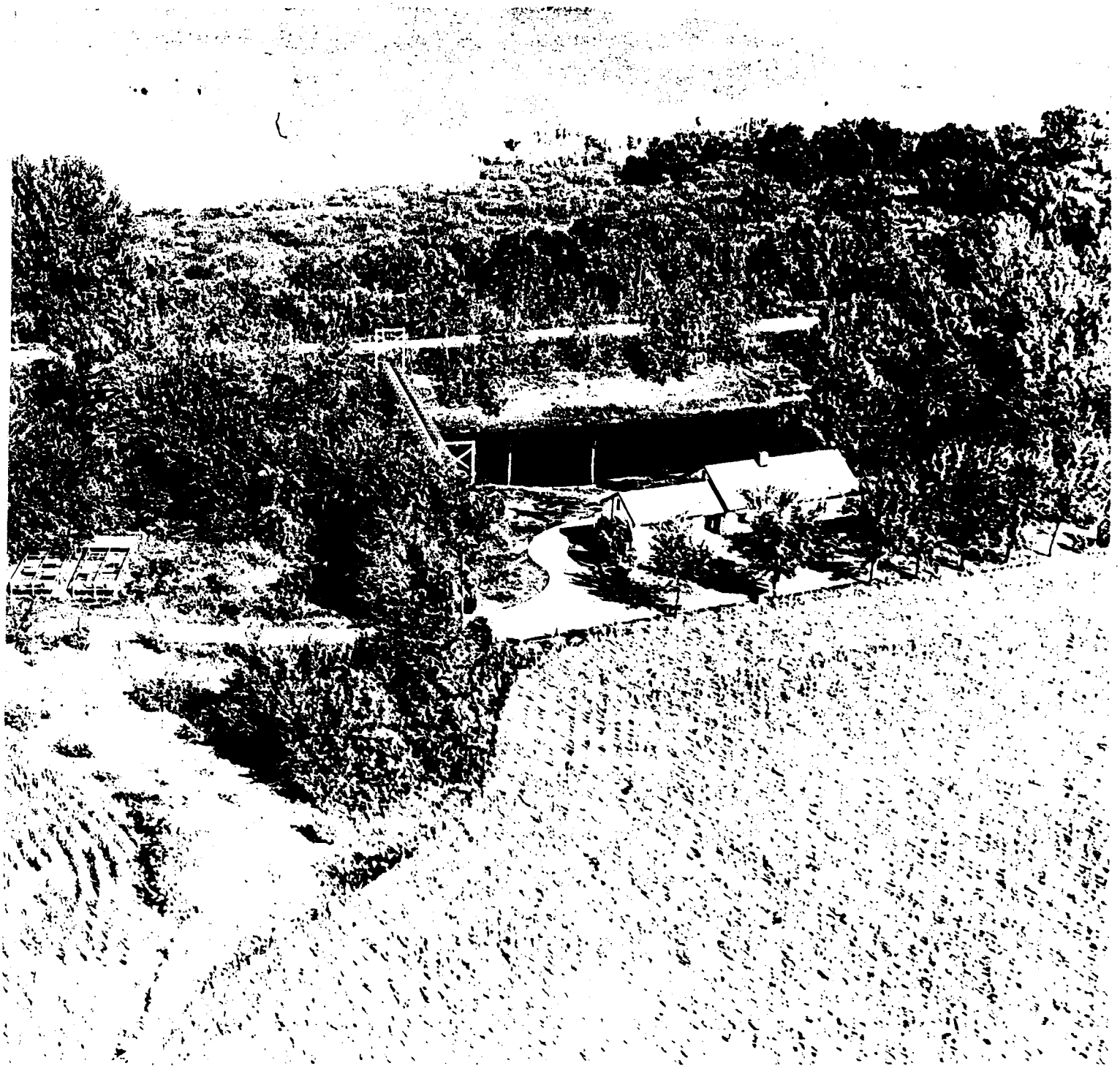


Figure 2. The Illinois Natural History Survey Forbes Biological Station on Chautauqua National Wildlife Refuge in the 1940s. The Biological Station was established in 1894 and is the oldest inland field station in the United States. The Illinois Natural History Survey waterfowl research program was based at the station in 1939.

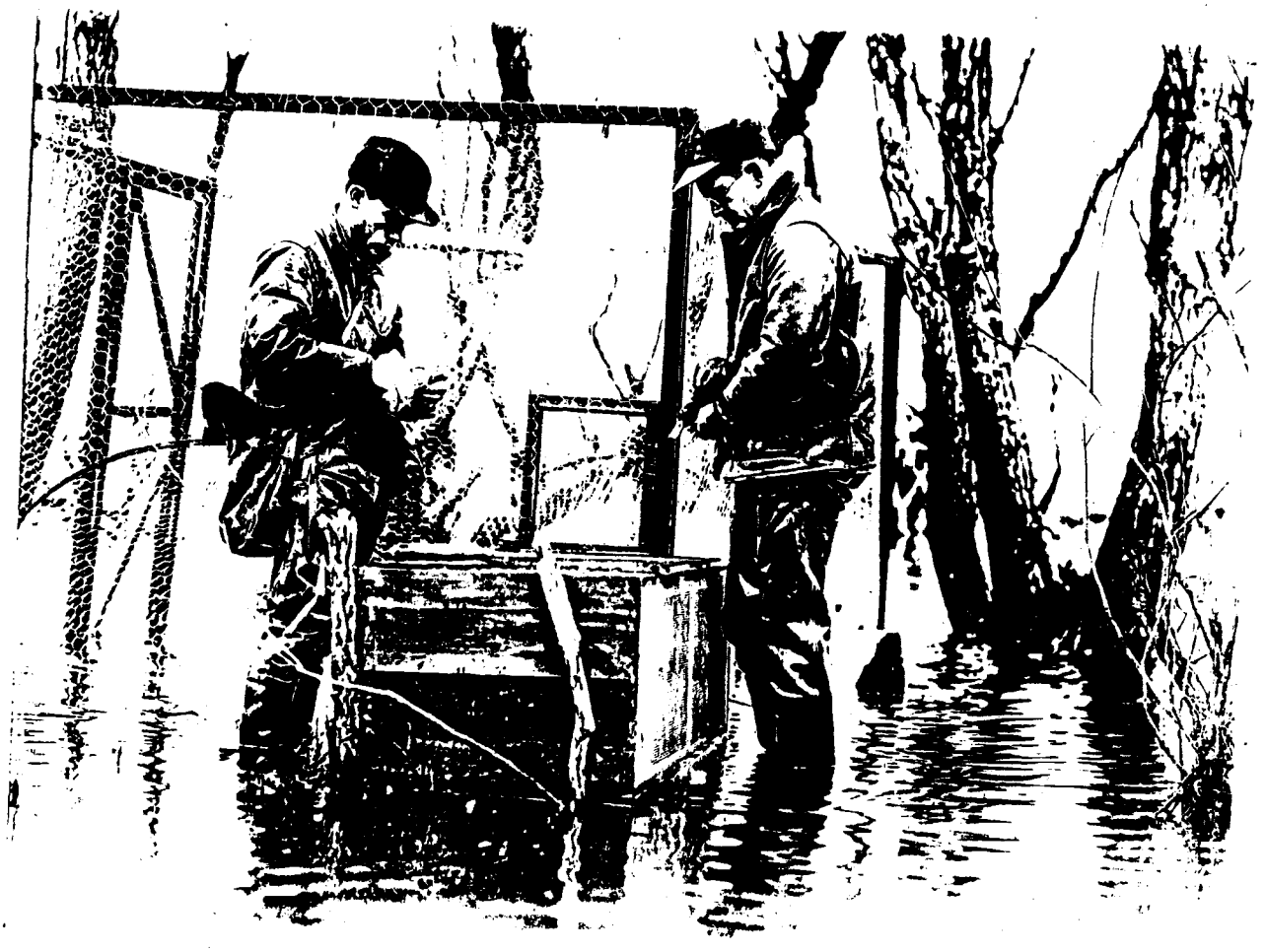


Figure 3. Waterfowl banding studies were initiated by John M. "Frosty" Anderson (left) of the Illinois Natural History Survey in 1939. More than 75,000 ducks were banded at four localities in Illinois by Anderson, Arthur S. Hawkins (right), and others.

With the end of World War II, returning servicemen renewed their interests in hunting waterfowl. As intensive agriculture plowed its way through wildlife habitat and freshly drained wetlands, Aldo Leopold, "The Father of Wildlife Management," was elucidating the need for a "land ethic" (Nelson 1989). Leopold (1949:243) at that time defined conservation as "a state of harmony between man and land." The Illinois Natural History Survey employed George C. Arthur as a waterfowl biologist. Arthur later joined the Illinois Department of Conservation (IDOC) and began several important waterfowl management programs, including an intensive banding program of thousands of ducks and geese in southern Illinois and diving ducks on the Mississippi River.

Flyway Councils were formed in the early 1950s and state-federal cooperative waterfowl management programs emerged (Nelson 1989). In the mid-1950s, populations of ducks were at the highest levels recorded by biologists. Correspondingly, in the 1950s and subsequent decades, waterfowl management, research, and other programs in Illinois expanded under the auspices of INHS and IDOC.

Glen C. Sanderson and William L. Anderson began active waterfowl research programs at INHS in the 1970s. Many of their studies focused on lead poisoning of waterfowl and were performed in conjunction with, and in addition to, studies by Bellrose. George C. Arthur continued his varied management programs with IDOC. He was later joined by David D. Kennedy. Upon Arthur's retirement, Dennis D. Thornburg eventually became the head waterfowl biologist for IDOC in 1979. William L. Anderson transferred from the INHS to the IDOC waterfowl program in 1977. Selected highlights are presented from the professional careers of these biologists important in the development and

execution of the waterfowl program in Illinois.

Arthur S. Hawkins

Arthur S. Hawkins (Fig. 4) completed his undergraduate studies in field biology at Cornell in 1934. He then became one of the first full-time graduate students of Aldo Leopold. "It was largely due to his encouragement that I pursued waterfowl management as a career. After World War II, as a flyway biologist with the FWS, I shared office space with Leopold" (Hawkins 1984:106).

In recognition of the importance of waterfowl to Illinois, INHS employed Hawkins as a game technician and Frank C. Bellrose as an assistant to initiate a waterfowl research program in 1938. Several important baseline waterfowl research studies were implemented. The high use of natural cavities and some unusual nest sites prompted Hawkins and Bellrose to develop the first practical artificial nesting house -- made of rough-cut cypress with a 4-inch (10.2 cm) entrance hole. In 1940, Arthur S. Hawkins initiated the INHS research program on Canada geese. Initial efforts were directed toward the development of efficient trapping and handling methods, and colored bands were tested on geese for the first time (Scott 1958).

After his stint in the Army, Hawkins joined Robert H. Smith in 1946 as a Mississippi Flyway biologist for the FWS (Saunders 1984). Much of his waterfowl research was done in Canada. G.W. Malaher (1984:312-313), Director of the Manitoba Game Branch, observed, "One did not have to rely on the honking of wild geese overhead to know that spring had arrived in Manitoba, for each year at this time Art would arrive to talk over the year's program. Sometimes I wondered if he hitched a ride with the geese and, with a 'thanks for the lift,' stopped off in Winnipeg for these discussions."

Figure 4. Arthur S. Hawkins was instrumental in initiating many waterfowl research programs with the Illinois Natural History Survey in 1938.

Working with aircraft, as well as by car and canoe, around the pothole region, Hawkins and his fellow researchers concluded that censusing a breeding population of waterfowl from low-flying aircraft was possible. The ducks were visible as lone drakes or pairs and could be counted and identified by sex and species (Smith 1984). They introduced the method of flying cross-county transects, counting the ducks on a strip one-eighth mile (206 m) wide on each side of the aircraft (Smith 1984). Until the aerial method was perfected, counts were made from the ground along the same transects each year.

Hawkins was tireless in his pursuit of waterfowl information. One employee tells of arriving for his first day of work and being greeted at the train by Hawkins, his wife Betty, and Grace and Lyle Sowls. Mrs. Sowls handed him a box of 24 chocolate bars and said, "You'll need them working for Art. He never stops for lunch" (Cooch 1984:304). Hawkins's method to insure the counting of all ducks in a pothole was to wade into it when necessary. Often the day's work lasted until nearly 8 P.M. and started again at 7 A.M. (Cooch 1984). Hawkins also spent time working on waterfowl surveys in the Arctic. He also played an important role in developing nationwide collections of wings used by FWS to determine the duck harvest each year (Carney 1984).

Hawkins served for nearly two decades as the FWS Mississippi Flyway Representative and prior to that as a Flyway biologist. He officially retired in 1972 and returned to become managing editor of the book *Flyways* until it was published in 1984. In addition to authoring several articles on wildlife, he served as a technical reviewer for *Waterfowl Tomorrow* and *Ducks, Geese and Swans of North America*. After retirement, he took on special assignments for the FWS and advised graduate students in wildlife studies for Texas A & M University. He wrote the Foreword for the book *Habitat Management for*

Migrating and Wintering Waterfowl in North America (1989), a book dedicated to two other former INHS technicians, Frank C. Bellrose and Jessop B. Low.

Frank C. Bellrose

Frank C. Bellrose (Fig. 5) received his Bachelor of Science degree in zoology from the University of Illinois and began working for INHS in 1938. Hawkins and Bellrose were given carte blanche authority to select projects and goals needed to clarify waterfowl problems and management in the state. Because wood ducks were the only important breeding duck in Illinois and were particularly abundant in the Illinois Valley, the first project was a nesting study of this species that began in the spring of 1938. Eventually, Bellrose developed predator-proof wood duck nest boxes. The breeding ecology, population dynamics of wood ducks, and evaluations of various types of nesting houses have been a career-long research project of Bellrose.

Bellrose began a study of the ecology of aquatic, marsh, and moist-soil plants in the bottomland lakes of the Illinois River valley in summer 1938 and continued it periodically for more than 40 years. During this study, the serious effect of sedimentation upon the lakes of the Illinois Valley became apparent.

Also beginning in 1938, waterfowl populations in the Illinois River valley were censused from the ground with binoculars or spotting scopes. Bellrose began using light aircraft to census waterfowl populations in 1946, and the time required for a comprehensive census was greatly reduced while the area covered was noticeably expanded. Waterfowl population data derived from ground and aerial census estimates have been incorporated into numerous studies. Bellrose (1944) compared the effect of population chronology and the setting of the hunting season. Optimum shooting dates, season lengths, and

Figure 5. Dr. Frank C. Bellrose, internationally renown research biologist, conducted a variety of studies on waterfowl and wetlands at the Illinois Natural History Survey's Forbes Biological Station from 1938 to 1991.

shooting hours were considered. Moreover, the effects of bag limit, laws for depleted species, three-shell regulation, and the prohibition of bait and live decoys on the duck harvest were evaluated. The aerial censusing of waterfowl continues to be an important part of the INHS research program.

Banding studies that yielded vital information about migrating waterfowl were first initiated by Hawkins and Bellrose and later continued by Bellrose and others. Most data were gathered in autumn during the migration of waterfowl through Illinois. Data from bandings were applied to sex and age ratios obtained from checking hunters' harvests to evaluate hunter selectivity (Bellrose et al. 1961). These data have also been used to analyze various waterfowl problems, such as population mortality in mallards, black ducks, and blue-winged teal (Bellrose and Chase 1950), and migration patterns of mallards and black ducks (Bellrose and Crompton 1970). In addition to banding data, radar surveillance and population and kill distribution were also factored into these analyses (Bellrose 1968, 1972, 1980).

The pioneering work on lead poisoning as a mortality factor among waterfowl was one of Bellrose's most important contributions. It was a major factor in the gradual replacement of lead by nontoxic shot. His well-known and acclaimed book, *Ducks, Geese and Swans of North America*, was published in 1976 and has sold more than 250,000 copies. He has completed another book entitled, *The Unique Wood Duck: Its Biology, Ecology, and Management* to be published in 1993. Bellrose has published more than 110 scientific and popular articles on waterfowl and wetlands. Most of his research and his publications relate to waterfowl and wetlands, with a strong flavor of "conservation" issues.

Bellrose's work has led to a better understanding of the importance of

wetland resources. In recognition of his long and productive career, Western Illinois University, Macomb, awarded Bellrose an honorary ScD degree in 1974. He received the prestigious Aldo Leopold Award from The Wildlife Society in 1985. He is recognized as one of the world's premier waterfowl biologists. The Alexander-Griswald Marsh, Manitoba, was dedicated to Bellrose by the Illinois Chapter of Ducks Unlimited in 1982. In 1992, IDOC dedicated its Cache River Wetlands Project which includes the Frank Bellrose Waterfowl Reserve. Upon retirement in 1991, he had contributed 53 years of service to INHS.

John M. "Frosty" Anderson

John M. Anderson (Fig. 6), a graduate of Ohio State University, joined the INHS staff at Havana in the fall of 1939 and initiated its banding program. The program expanded rapidly and continued through 1952. These bandings generated important information about migration behavior, the mortality of ducks, and the hunter reporting rates of banded ducks. In January of 1940, Hawkins, Bellrose, and Anderson moved into the newly completed building at Havana to begin what would become one of the most productive waterfowl research programs ever conducted at a field station.

In late 1945 after World War II, Anderson worked the following 20 years as manager of the prestigious Winous Point Shooting Club on Lake Erie near Port Clinton, Ohio. He spent his first summer in Canada studying the status of ducks on the breeding grounds. Working with Hawkins and others, he trapped and banded broods and developed drive-trapping techniques for flightless adults. He inspected every Ducks Unlimited project in Manitoba in 1946 (Anderson 1984).

When the Mississippi Flyway Waterfowl Research Committee was formed,

Figure 6. John M. "Frosty" Anderson began his waterfowl career at the Illinois Natural History Survey Forbes Biological Station from 1939 to 1941.

Anderson was the first chairman. This committee was the forerunner of the current Technical Section of the Mississippi Flyway Council consisting of biologists from each state, FWS, and Canadian Wildlife Service (CWS) who meet twice a year to address current biological, habitat, management and harvest issues regarding waterfowl.

Anderson has served as consultant for the FWS, the CWS, and various game departments. He was Director of the Wildlife Sanctuary Department, National Audubon Society from 1966 until 1987 when he retired. He continues to represent Audubon.

Jessop B. Low

Jessop B. Low (Fig. 7) received his Ph.D. degree from Iowa State University and joined Hawkins, Bellrose, and Anderson at the INHS field station in Havana in 1941, and studies of ducks in the Illinois Valley proliferated. In spite of World War II, a number of benchmark studies in the biology of waterfowl were produced, and their findings did much to advance the art of waterfowl management. Low remained with INHS until 1943. He participated in many studies and inaugurated an investigation of the seed and vegetative yield of waterfowl food plants in the Illinois River valley, as well as a study of aquatic and marsh plants and breeding waterfowl in the Glacial Lake district in northeastern Illinois (Bellrose 1984).

Low was leader of the Utah State University's Cooperative Wildlife Research Unit before he retired in 1974 after thirty years in this position. He directed the research of about seventy-five Master of Science and Ph.D. candidates in waterfowl biology and wetland ecology. He has authored many publications on waterfowl, upland game birds, and big game animals (Hawkins et al. 1984).

Figure 7. Dr. Jessop B. Low contributed to the waterfowl program at the Illinois Natural History Survey Forbes Biological Station from 1941 to 1943.

Harold C. Hanson

Harold C. Hanson (Fig. 8) was employed by INHS in 1943 and received his Ph.D. degree in zoology from the University of Illinois in 1958. He was in charge of Canada goose research at Horseshoe Lake, Illinois, from fall 1943 until spring 1947. Large concentrations of Canada geese at Horseshoe Lake created a unique opportunity for population research. Hanson developed techniques for aging Canada geese which permitted an advancement in the understanding of their population dynamics (Scott 1958). He collaborated with Robert H. Smith, flyway biologist for FWS, to produce the classic paper, *Canada geese of the Mississippi Flyway*.

Hanson and Smith's work discussed the breeding range, migration routes, winter grounds, and populations for various flyway populations of Canada geese. Their observations on the ratio of hunting losses to the age structure of the population wintering at the Horseshoe Lake Game Refuge were important. The high harvest of immature geese in the early 1940s changed the age composition of the flock and reduced the average longevity as indicated by life survival indices, the first constructed for a waterfowl species (Hanson and Smith 1950). Hanson also studied the behavior of Canada geese at Horseshoe Lake. The concept that small flocks of Canada geese were usually a family and that larger flocks were often multiples of families rather than a collage of individuals was conceived during these studies (Scott 1984).

As a research biologist with INHS, Hanson devoted nearly 50 years to the study of Canada geese. He discovered the giant race of Canada geese, which was thought to be extinct, in Minnesota in 1962. Hanson later concluded that there were numerous flocks of giant Canada geese in the prairie provinces of Canada and in some areas of the United States. He subsequently wrote the

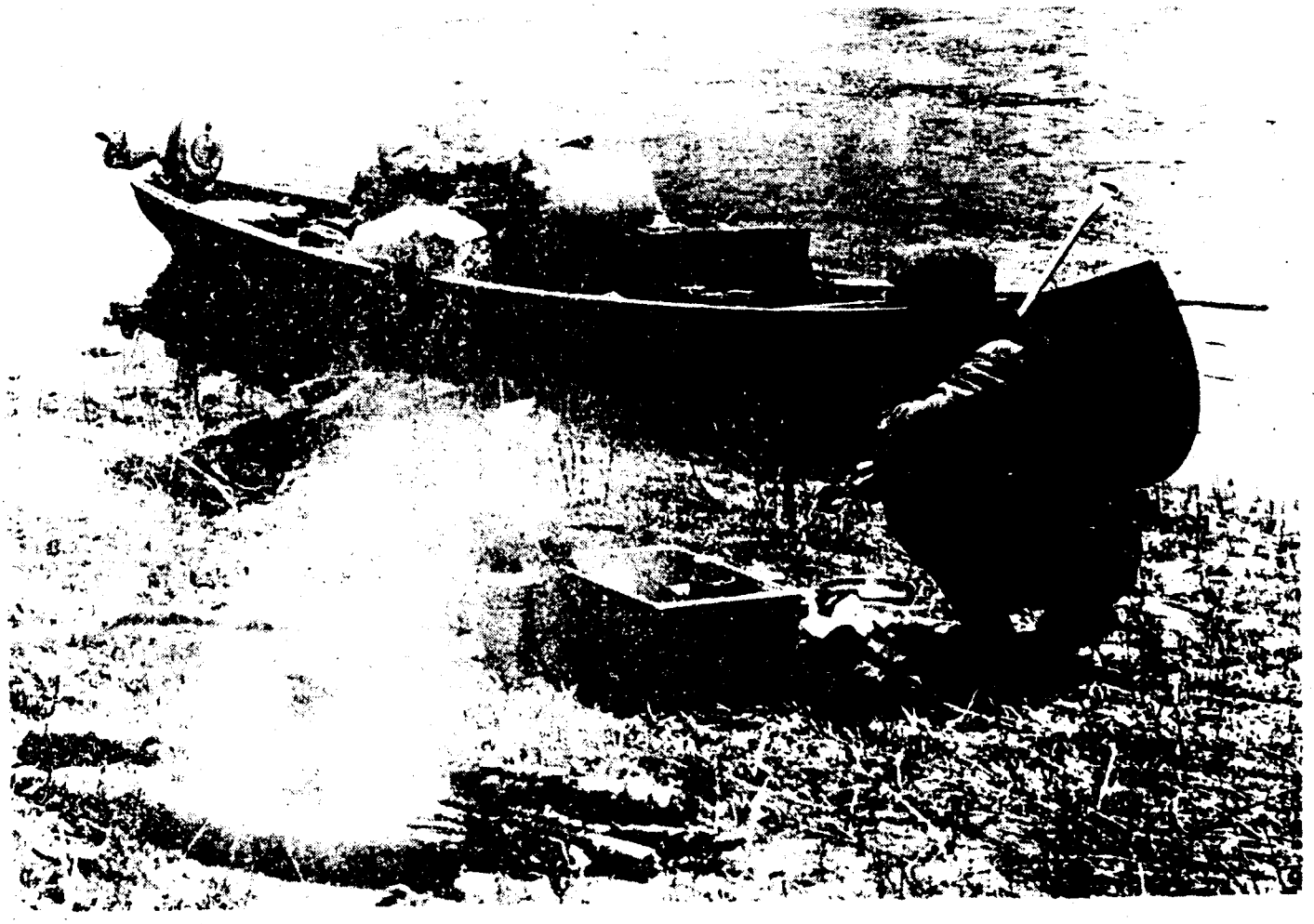


Figure 8. Dr. Harold C. Hanson studied Canada geese with the Illinois Natural History Survey from 1943 to 1992.

book, *The Giant Canada Goose*, which includes information on its ecology, population dynamics, and management. Today, the giant Canada goose is a tremendous success story for wildlife in North America. Hanson also evaluated the effect of stress on Canada geese, demonstrated that the occurrence of elements in the keratin of primary feathers of geese were useful in tracing the geographic origins of a population, and made contributions in documenting geographical variation in the species (Aldrich 1984). He summarized much of his lifetime work on the various populations of Canada geese in a book entitled *The White-cheeked Geese*. Hanson retired from INHS in 1992.

George C. Arthur

George C. Arthur (Fig. 9) received his B.S. degree and completed two years of graduate studies in wildlife management from the University of Missouri before starting his wildlife career by working on various waterfowl investigations with INHS in 1947. In the early 1950s, he transferred to IDOC where he became the Chief Waterfowl Biologist in 1956. His work in waterfowl included development of the Canada Goose Management Program in southern Illinois, a fledgling waterfowl program which he expanded into one of the best in the United States (Thomas 1977). Less than 80,000 Canada geese wintered in Illinois in 1947 and, under his management, that number rose to more than 400,000 when he retired in 1977, the highest ever recorded for Illinois at that time (Thomas 1977). Importantly, he developed the harvest quota and quota zone system for the Mississippi Valley Population (MVP) of Canada geese, which has been successfully used in southern Illinois for three decades. He also conducted breeding ground surveys of the MVP along the Hudson Bay Coast, and developed banding procedures for handling large numbers of Canada geese. Arthur pioneered the Giant Canada Goose Restoration Program on strip mined

Figure 9. George C. Arthur implemented many significant waterfowl management programs in his career which spanned from 1947 to 1977. He was named the Chief Waterfowl Biologist for the Illinois Department of Conservation in 1956.

lakes in Fulton County in west-central Illinois.

Arthur was a staunch supporter of acquiring and managing habitat for waterfowl in Illinois. He was instrumental in obtaining funds to acquire property on which he supervised the development and management of state refuges and public shooting areas, such as Union County, Sanganois, Rice Lake, Marshall County, Barkhausen Refuge, Anderson Lake, Sparland, Mermet Lake and Spring Lake. Because of Arthur's initiative, state-managed public goose hunting areas were established at Horseshoe Lake and later at Union County. He also obtained leases from the U.S. Corps of Engineers for thousands of acres along the Mississippi River. In conjunction with the U.S. Forest Service, he helped develop the Oakwood Bottoms Greentree Reservoir in Jackson County, the first walk-in public waterfowl hunting area of this type in Illinois (Thomas 1977).

Additionally, Arthur initiated the canvasback banding program on Keokuk Pool of the Mississippi River (Fig. 10) and established the wood duck nesting area and waterfowl refuge at Nauvoo. He increased the banding efforts of IDOC and marked an estimated 10,000 Canada geese and 35,000 mallards at Union County and Horseshoe Lake. Arthur also began farming management practices for geese on state areas and initiated the stake blind system for public hunting areas on the Mississippi and Illinois rivers.

Glen C. Sanderson

Glen C. Sanderson (Fig. 11) received Bachelor of Science and Master of Science degrees at the University of Missouri-Columbia. His career began with professional employment as a game biologist with the Iowa Conservation Commission where he specialized in mammalogy. His research on the raccoon, including that of his Ph.D. dissertation with the University of Illinois, led

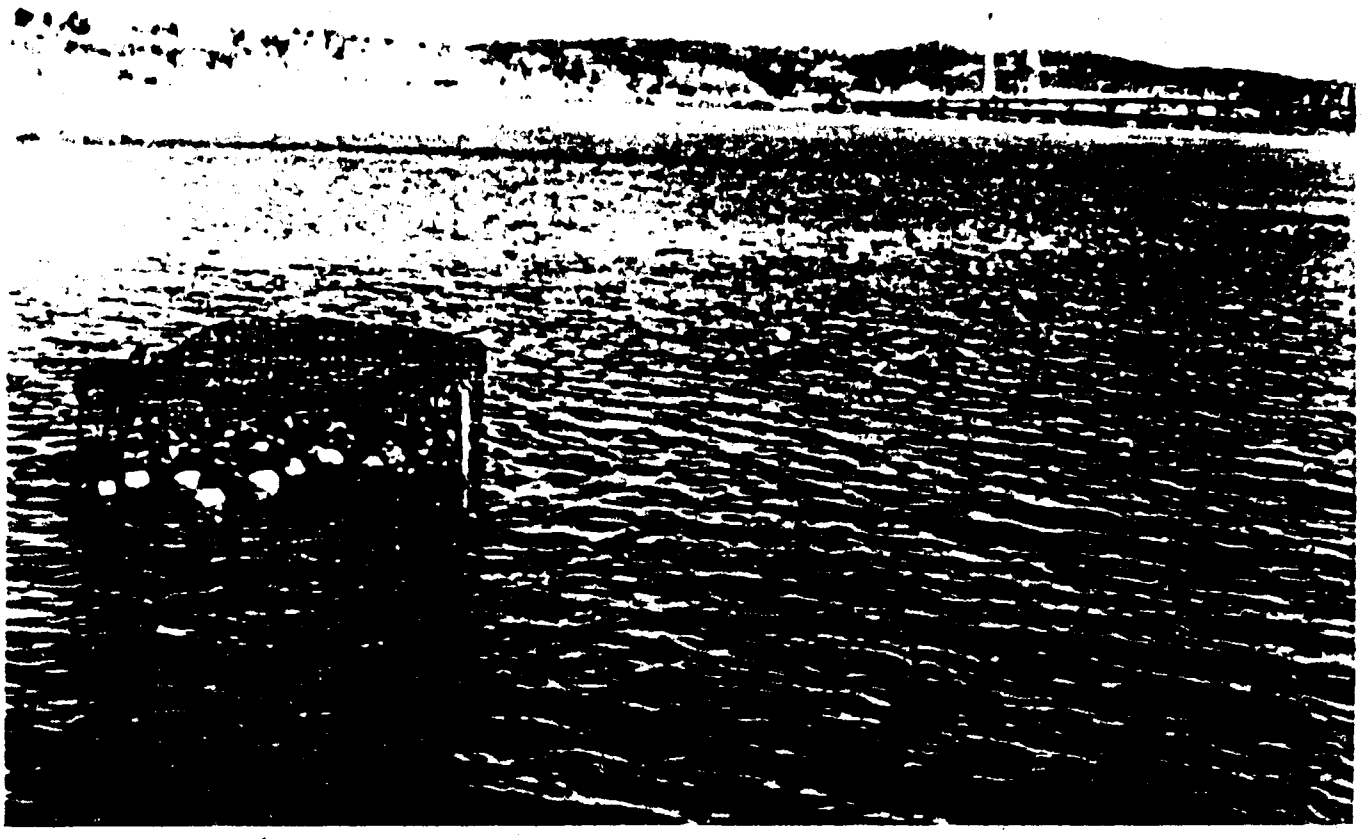


Figure 10. Diving duck traps on Keokuk Pool, Mississippi River.

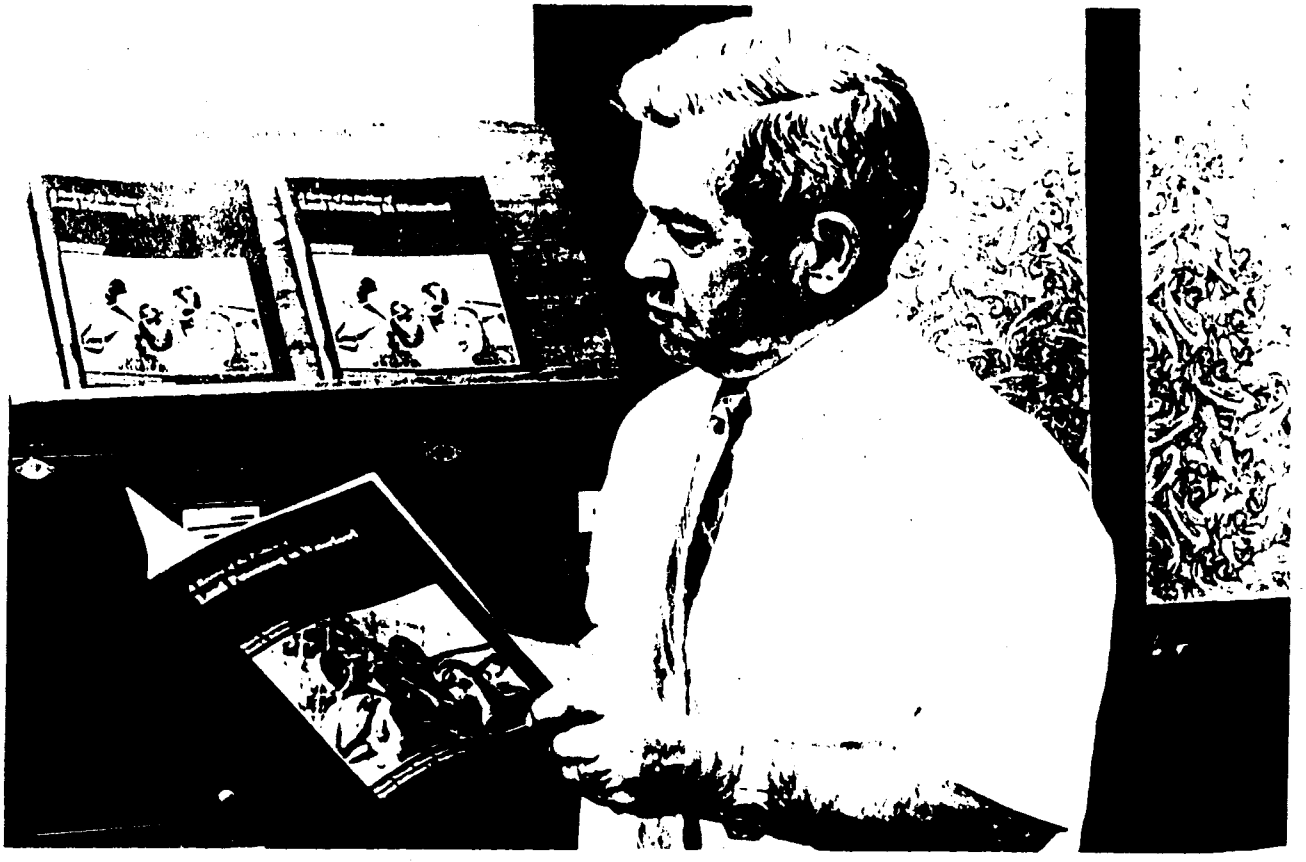


Figure 11. Dr. Glen C. Sanderson administered the Illinois Natural History Survey waterfowl research program from 1964 to 1990 and conducted important studies regarding lead poisoning in waterfowl.

to his recognition as leading authority on this mammal. He was employed by INHS in 1955 and made Director of INHS's Center for Wildlife Ecology in 1964. In 1989, he was promoted to the distinguished rank of Principal Scientist, a level that only four other scientists have held in the 135-year history of INHS. He retired in 1990. In recognition of his dedication to wildlife research he was presented the coveted Leopold Award in 1992.

Sanderson made significant contributions in research and evaluation of the problems of lead poisoning in waterfowl as well as to the movement for the elimination of the use of lead shot for waterfowl hunting. His laboratory research on the toxicity of ingested copper shot, lead shot, and lead:iron shot in waterfowl and field research on the use of steel shot for waterfowl hunting provided important information for the implementation of nontoxic shot regulations. The 1986 publication, *A Review of the Problem of Lead Poisoning in Waterfowl*, by Sanderson and Bellrose arrived at a critical time in the lead:steel controversy and was perhaps his most important contribution to waterfowl in Illinois. Because of his knowledge on the toxicity of lead shot, he was an expert witness for the National Wildlife Federation in Federal Court cases in California regarding the use of steel shot for waterfowl hunting.

As the Head of the Center of Wildlife Ecology, Sanderson was the impetus behind many of the accomplishments of INHS waterfowl programs. He enthusiastically supported the work of Frank C. Bellrose, Harold C. Hanson, William L. Anderson, and others. Sanderson was a major factor in the preparation and publication of Bellrose's *Ducks, Geese & Swans* and *The Unique Wood Duck: Its Biology, Ecology, and Management*, and Hanson's *The White-cheeked Geese*. He is considered a premier leader and spokesman for wildlife and other conservation issues by state agencies and government. Although he

retired in 1990, Sanderson was a major participant of the International Workshop on Lead Poisoning held in Brussels, Belgium, in 1991, and continued his research on nontoxic shot by conducting laboratory studies on the effects of bismuth shot on waterfowl.

David D. Kennedy

David D. Kennedy (Fig. 12) earned his Bachelor of Science degree in zoology in 1962 and his Master of Science degree in wildlife management in 1972 from Southern Illinois University-Carbondale. He became IDOC Wildlife Refuge Supervisor at Horseshoe Lake, Union County and Mermet Lake, in 1965 and remained in that position until 1971 when he became a Staff Waterfowl Biologist. He was Associate Director of Natural Resources with the IDOC rom 1975-1976 before joining Ducks Unlimited. During his tenure with IDOC, Kennedy worked with George C. Arthur on various Canada goose projects. Their work helped focus the management community on the hypothesis of core flocks, migrating units, and subflocks (cohorts) of Canada geese. They also studied how harvest rates of Canada geese are affected by refuge management, by earlier versus later hunting seasons, and by many other factors. Kennedy also helped to develop mass trapping techniques for Canada geese necessary to realize large banding quotas. Kennedy, along with Arthur, helped to create the valuable IDOC Periodic Report series which became a permanent record of miscellaneous waterfowl data and management philosophies in Illinois. In his book *In Search of the Canada Goose*, Kennedy documented the historical record of the management and hunting of Canada geese in Illinois during the 1960s and 1970s.

Dennis D. Thornburg

Dennis D. Thornburg (Fig. 13) received his Master of Science degree in 1970 from Iowa State University at Ames. He was Chief Waterfowl Biologist for

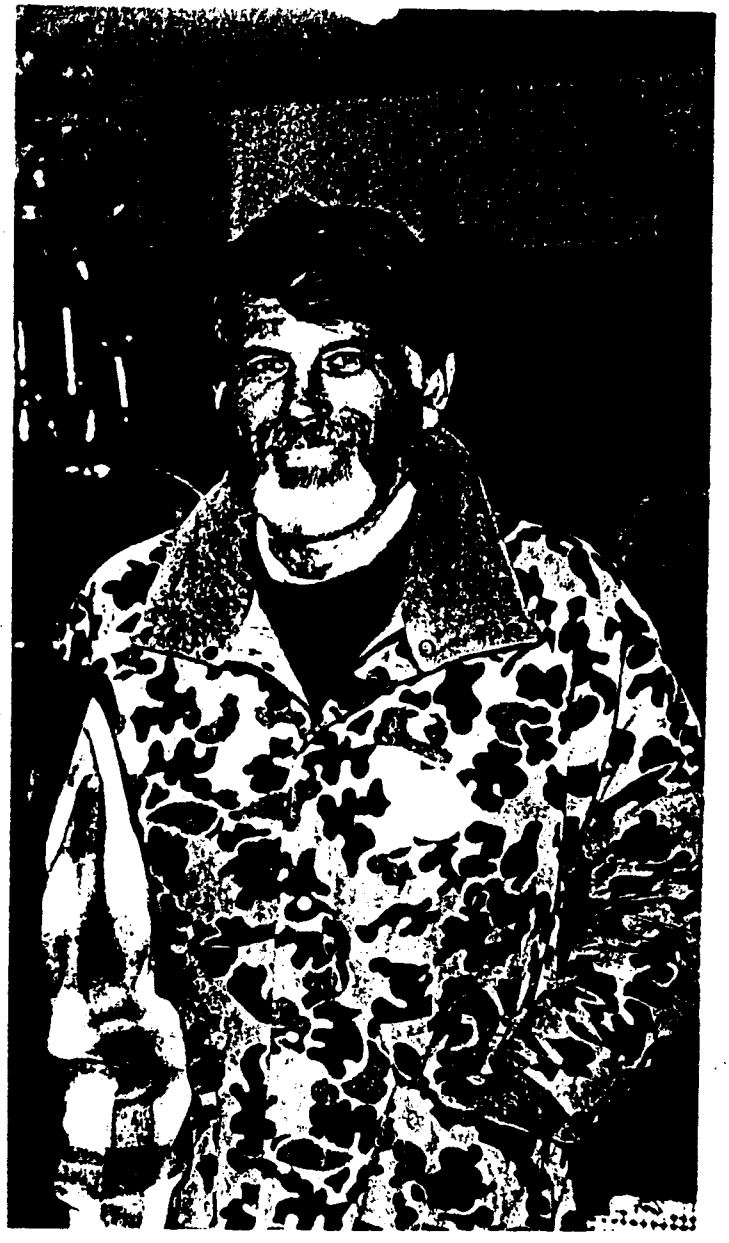


Figure 12. David D. Kennedy was an important component of the Illinois Department of Conservation waterfowl program from 1965 to 1976.

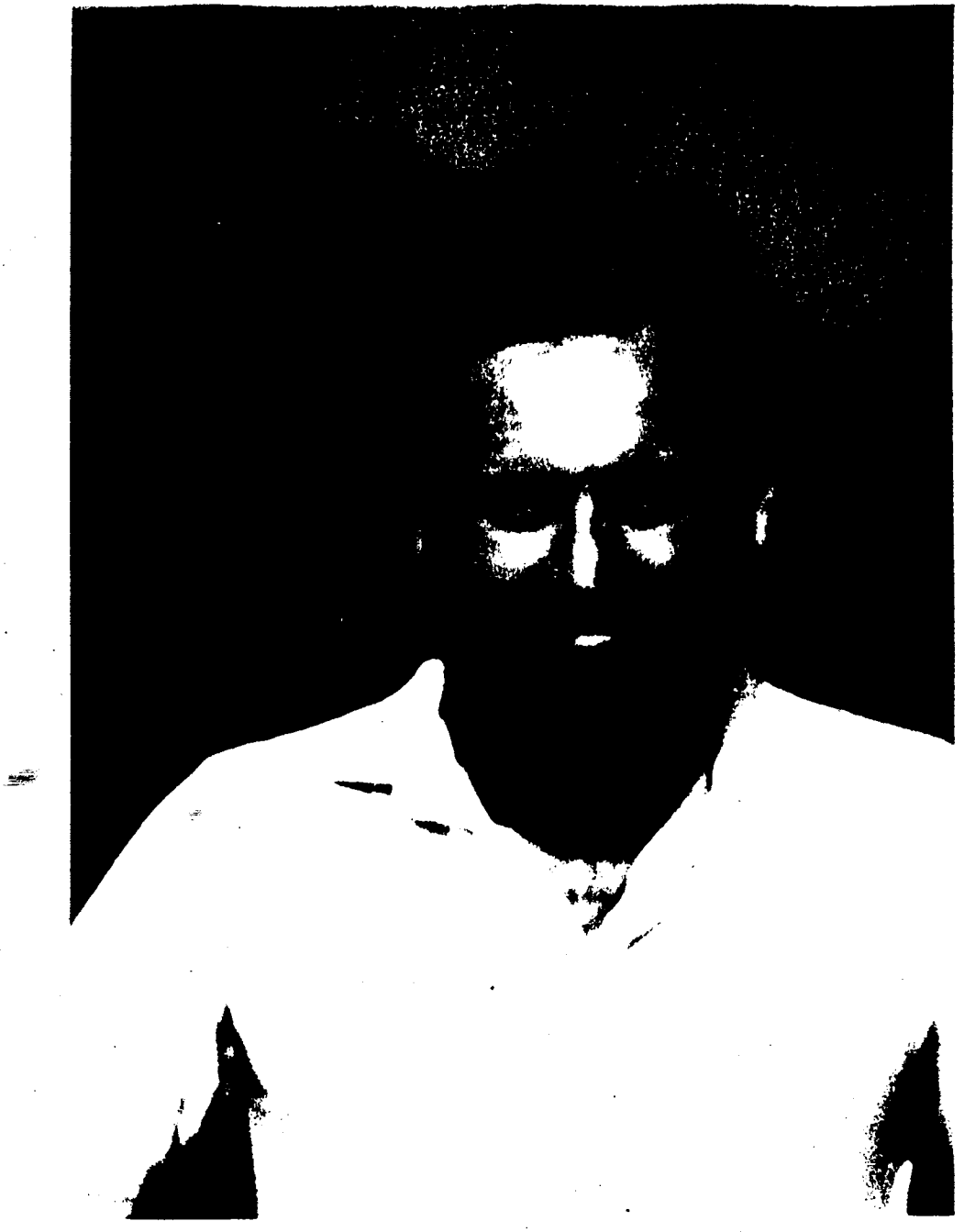


Figure 13. Dennis D. Thornburg was the Chief Waterfowl Biologist for the Illinois Department of Conservation from 1979 to 1992 during which the population of Canada geese in Illinois reached record levels.

IDOC from 1979 to 1992. His work included initiation and coordination of Canada goose research totaling more than 1 million dollars over a 10-year period, which resulted in a production survey of the Mississippi Valley Population (MVP) of Canada geese in northern Ontario. This research, along with harvest controls, contributed to a four-fold increase in the MVP of Canada geese during a 10-year period to a record high level of over 1 million birds in 1991. This large population resulted in the most liberal goose hunting regulations in recent history. Thornburg established the Rend Lake Quota Zone to monitor and secure control of goose harvest in this intensively hunted zone. He also contributed to the development of the IDOC Statewide Waterfowl Hunter Survey to verify Federal estimates of waterfowl harvest in Illinois.

Thornburg made a major contribution to the Illinois waterfowl program with his participation on the committee that drafted the initial New Madrid Project of the Lower Mississippi River Valley Joint Venture of the North American Waterfowl Management Plan. He identified project areas in southern Illinois and contributed information that helped secure a North American Wetland Conservation Act (NAWCA) matching grant of $450,000 for acquisition and development of the Cache River Wetlands. This was one of the first projects to be funded under the NAWCA.

Thornburg was a primary contributor to implementation of the State Migratory Waterfowl Stamp Program, which has resulted in the acquisition of nearly 3,000 acres (1,215 ha) of Illinois wetlands at an expenditure of 1.87 million dollars and 20 habitat development projects totaling nearly $3.0 million over the last 17 years. He continued the implementation of the Giant Canada Goose Restoration Program initiated by Arthur in west-central Illinois,

opened this zone to hunting in 1982 (10-day season), and continued to liberalize the hunting regulations in this zone until a 14,000 bird harvest level was established in 1991. Thornburg has also authored several scientific papers.

William L. Anderson

William L. Anderson (Fig. 14) joined INHS in 1958 as a population/physiological ecologist and worked extensively on pheasants and waterfowl, among other species. He received his Masters of Science Degree from Southern Illinois University in 1964. Anderson joined the waterfowl staff of IDOC in 1977.

In his INHS and IDOC positions, Anderson became a leading expert on various aspects of lead poisoning in waterfowl and the effectiveess of steel shot for the sport hunting of waterfowl. His research endeavors provided information on the efficiency of various techniques for studying lead poisoning in waterfowl, on the distribution and severity of lead poisoning in Illinois and the Mississippi Flyway, and on the use of steel shot for hunting waterfowl. Anderson also was a major contributor to important workshops on lead poisoning in waterfowl in Wichita, Kansas, in 1984, and in Brussels, Belgium, in 1991.

Anderson applied his ingenuity to develop an important IDOC waterfowl hunter survey used to solicit opinions and information from hunters of waterfowl and other species in Illinois. Responses to his surveys have provided baseline information for evaluating zoning for duck hunting in Illinois, regulating the harvest of Canada geese, establishing policy for numerous decisions regarding management and hunting regulations, and other critical issues. Anderson has also assisted in the IDOC administration of

Figure 14. William L. Anderson contributed significantly to the waterfowl programs of the Illinois Natural History Survey (1958-1977) and the Illinois Department of Conservation (1977-present).

Pittman-Robertson Federal Aid projects in Illinois and authored numerous scientific publications.

We will never know how many ducks or how many geese have been shot in Illinois over the past two centuries, nor will we know how many stories have been told or yarns spun about such experiences. Perhaps we are better off not knowing the answers to all of these mysteries, if for no other reason than to allow us the anticipation of hearing and telling more colorful stories in blinds and pits which have yet to be built. Those of us blessed, or cursed, with the insidious disease of duck hunting long for a bright future as we do for the glorious past. But we can still enjoy the present, do what we can to preserve the past, d work together to insure the future of quality waterfowl hunting in Illinois and the Mississippi Flyway. As Bernard Van Norman (1991) aptly wrote "Sitting in my room this day, March 19, 1991, I look back over my life as a waterfowl hunter from the mid-1930s until the present. It seems an incredible length of time that I have been allowed by my Maker to spend my autumns in the marshes and on the water observing and hunting America's great variety of colorful ducks and geese."

Illinois has changed much over the decades. She has lost many of her wetlands and, consequently, large numbers of waterfowl that once filled her horizons. Nevertheless, she has gained some wetlands and recovered numbers of certain species, such as the giant Canada goose. She has a rich waterfowl tradition, many great stories to tell, and much information to share. The following chapters provide an opportunity to enlighten those of us appreciative of the importance, pleasure, and spectacle with which waterfowl brighten our lives and imaginations.

"There are some who can live without wild things, and some who cannot" (Leopold 1949:xvii).

Literature Cited

Aldrich, J.W. 1984. Taxonomy's contribution. Pages 252-255 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Anderson, J.M. 1984. Winous Point Club's contribution. Pages 329-334 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Bellrose, F.C. 1944. Duck populations and kill: an evaluation of some waterfowl regulations in Illinois. Ill. Nat. Hist. Surv. Bull 23:327-372.

_____. 1968. Waterfowl migration corridors east of the Rocky Mountains in the United States. Ill. Nat. Hist. Surv. Biol. Notes No. 61. 24 p.

_____. 1972. Mallard migration corridors as revealed by population distribution. Symposium on Population Ecology of Migratory Birds. U.S. fish and Wildlife Service, Wildlife Research Report 2. P. 3-26.

_____. 1980. Ducks, geese, and swans of North America. Stackpole Books, Harrisburg, PA. 544 p.

_____. 1984. One state's contribution. Pages 342-346 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

_____, and E.B. Chase. 1950. Population losses in the mallard, black duck, and blue-winged teal. Ill. Nat. Hist. Surv. Biol. Notes No. 22. 27 p.

_____, and R.D. Crompton. 1970. Migrational behavior of mallards and black ducks as determined from banding. Ill. Nat. Hist. Surv. Bull. 30:167-234.

_____, T.G. Scott, A.S. Hawkins, and J.B. Low. 1961. Sex ratios and age ratios in North American ducks. Ill. Nat. Hist. Surv. Bull. 27:391-474.

Carney, S.M. 1984. Estimating the harvest. Pages 256-259 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Cooch, F.G. 1984. Canadian connections. Pages 304-309 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Gabrielson, I.N. 1943. Wildlife refuges. The Macmillan Co., New York, NY.

257 p.

Hanson, H.C., and R.H. Smith. 1950. Canada geese of the Mississippi Flyway. Ill. Nat. Hist. Surv. Bull. 25:67-210.

Havera, S.P., and K.E. Roat. 1989. Forbes Biological Station: the past and the promise. Ill. Nat. Hist. Surv. Spec. Pub. 10. 24 p.

Hawkins, A.S. 1984. Aldo Leopold. Pages 103-106 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. 1984. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildl. Serv.

_____, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. 1984. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildl. Serv. 515 p.

Heilner, Van Campen. 1943. A book on duck shooting. Alfred A. Knopf, New York, NY. 540 p.

Leopold, A. 1931. Report on a game survey of the north central states. Sporting Arms and Ammunition Manufacturers' Institute, Washington, D.C. 299 p.

_____. 1949. A Sand County almanac. Oxford Univ. Press, Inc. 295 p.

Malaher, G.W. 1984. Manitoba joins the team. Pages 309-313 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Mendoza, J.G. 1984. The anti-baiting regulation: an agent's perspective from Illinois. Breaux Subcommittee Hearing, 28 March 1984. Unpublished manuscript. 3 p.

Nelson, H.K. 1989. Reflections on 40 years of waterfowl management. Pages 155-158 *in* J.V. Englund, ed. Restoring the trumpeter swan to the upper midwest. Proceedings and Papers of the Twelfth Trumpeter Swan Society Conference. Minneapolis, MN.

Sanderson, G.C., and F.C. Bellrose. 1986. A review of the problem of lead poisoning in waterfowl. Ill. Nat. Hist. Surv. Spec. Pub. 4. 34 p.

Saunders, G.B. 1984. The U.S. team. Pages 121-129 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Scott, T.G. 1958. Wildlife research. Ill. Nat. Hist. Surv. Bull. 27:179-201.

Smith, R. H. 1984. From tundra to tropics. Pages 177-184 *in* A.S. Hawkins, R.C. Hanson, H.K. Nelson, and H.M. Reeves, eds. Flyways: pioneering waterfowl management in North America. U.S. Fish and Wildlife Service.

Thomas, G. 1977. DOC biologist George Arthur retires. Outdoor Highlights 5:3.

Uhler, F.M. 1933. Waterfowl baiting, abundance, and natural feeding grounds in the region extending from Illinois and Missouri to Arkansas and northern Mississippi during the autumn and early winter of 1933. Unpublished manuscript. 40 p.

Van Norman, B.H. 1991. The autumns in my life: Aug. 1, 1936-1950. Personal diary.