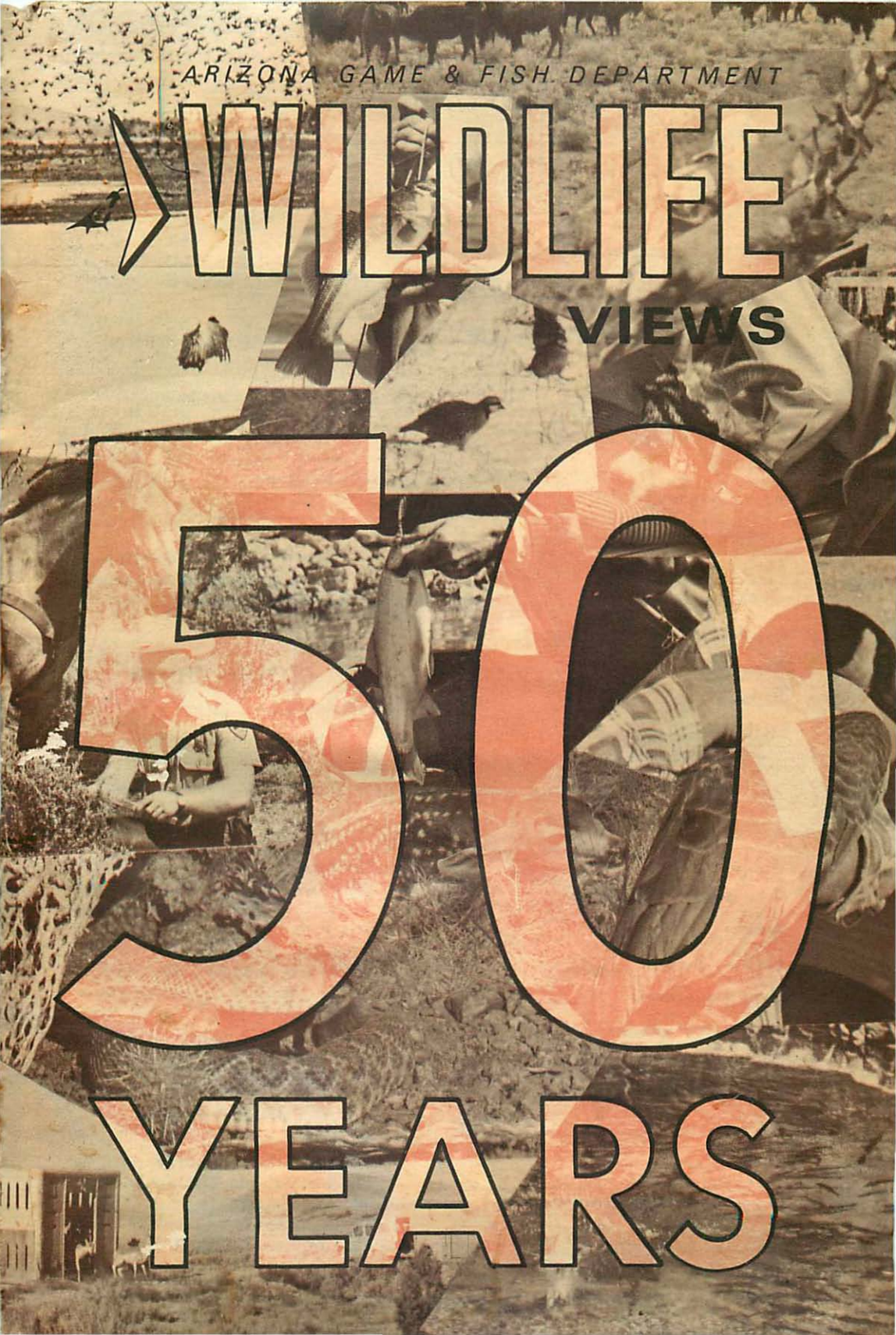
ARIZONA GAME & FISH DEPARTMENT
WILDLIFE
VIEWS
50
YEARS

ARIZONA GAME & FISH DEPARTMENT

WILDLIFE VIEWS

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ANNUAL REPORT ISSUE

fifty years

Written by Bill Sizer

HISTORY

annual report

Fiscal Year 1978-79

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Terry Jackson
Editor

January 1980

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Letter of Transmittal
January 1, 1980

The Honorable Bruce Babbitt
Governor of Arizona
Phoenix, Arizona

Dear Governor Babbitt:

The fiscal year which ended last July marked the fifty-year anniversary of the present Commission form of game and fish administration, and to commemorate this we have prepared this special report which traces the development of wildlife management in Arizona since the very first efforts were made back in the nineteenth century.

This booklet represents a half-century of progressive management, of which Arizona and Arizonans can, we believe, be justly proud.

We trust you will find it worthy of your attention.

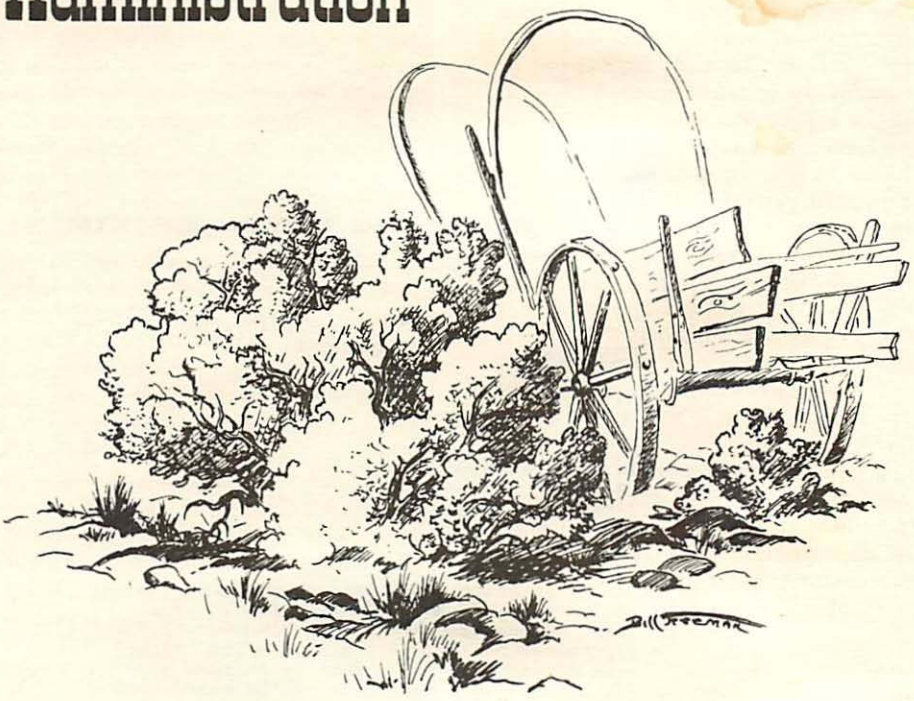
Sincerely,

Robert A. Jantzen
Director

Roger J. Gruenewald
Deputy Director

RAJ:BS:la

Administration



in the beginning . . .

SINCE THE FIRST TOUCHES of civilization began to penetrate the fringes of Arizona, countless changes have taken place in the wildlife scene. Some of these, it's true, have been changes for the worse, but viewed in the light of more than a hundred years of history, most of them have to be viewed as improvements. We say "more than a hundred years" because while early explorers entered this state long before the Pilgrims landed, Arizona's wildlife did not really begin to take notice until the latter half of the nineteenth century.

Although there is no denying that civilization has taken its toll from the wildlife world, any objective analysis of the situation would result in the rather startling realization that hunting and fishing are, in many cases, better than they were at the turn of the century. We catch bass and trout where once only dry washes existed, herds of buffalo roam where they never roamed before, elk are relatively abundant in formerly vacant habitat and other game species which were nearly extinct in 1900 are now available to hunters each year.

But the good hunting and fishing we enjoy today — these things we can see — are only outward signs of the subtle, organizational changes which took place through the years to make them possible.

As early as 1881, some people were beginning to show concern over the unrestricted drain on Arizona's wildlife resources, so to form some sort of control over the situation the "Arizona Fish Commission" was formed. Judging from an 1884 annual report, which is the oldest record to be found in the State Capitol's Library and Archives, these first three "commissioners" were prototypes of the early-day game wardens. They devoted most of their time to enforcing what few conservation laws were then in existence, and spent the rest of it trying to stock desirable wildlife species.

At least they thought they were stocking desirable wildlife species! One such effort was described in this same annual report, which was written by J. H. Taggart, business manager for the commission. In fact, most of the report was concerned with an expression of disappointment over his failure to get carp — that dandy new European game fish that was making such a big splash back East — established in Arizona waters. It seems the railroad car bringing carp from the East was so besieged by eager conservationists along the way that most of its supply of fish had been doled out before it ever crossed the Mississippi River. By the time it reached Arizona only a handful of fish remained, and many of those were dead. So great was this disappointment that Mr. Taggart suggested an appropriation of $5,000 be made to construct a hatchery for rearing carp, plus some shad for the Colorado River.

Although Mr. Taggart's efforts met largely with failure, his fellow commissioner from s o u t h e r n Arizona, Richard Rule, was more successful in his efforts along these same lines. Mr. Rule reported that he had successfully planted carp in quite a few southern Arizona waters. His chief worry, however, was over the fact that most of the well-intentioned people who had applied for carp to stock in their local ponds and streams were totally unfamiliar with the requirements of this delicate fish, and were planting them in unsuitable waters with little regard for nutritional requirements and other factors important to their well-being.

While this concern over the difficulties of carp culture strikes us as being exactly opposite from the fisheries management policies of today, it must be remembered that these men had no way of knowing their pirze fish would eventually become distributed all across the country and would reach population densities which threaten the very existence of the fish species they were intended to supplement. Wildlife management was — and still is, to some extent — an infant science, and as with any brand new endeavor it's apt to be hard to tell the right approach from the wrong one. These conservationists did the best job they knew how to do, though, and their mistakes provided valuable lessons to those of us who have followed them.

Getting ready to leave from Punkin Center — early 1900's.

other ideas were good ones

In spite of the fact, however, that Arizona's early efforts to improve hunting and fishing sometimes followed approaches contrary to what we know today, most of them were steps in the right direction. One such step was the recommendation to include in the powers of the Fish Commission the authority to regulate the game as well as the fish of Arizona. For, as Mr. Taggart put it in his report: "Such wild game as we have, must soon be protected or it will be annihilated; already our beautiful and gamey quail have been almost driven away from the more populous localities; the deer are yearly harder to find; and so through the list."

In 1887 this request was granted, and Mr. Taggart's dire predictions were averted. By 1897 the three-man Fish Commission had grown to the astounding proportions of 15 members; three fish and game commissioners and 12 "assistant commissioners. These assistants acted in the capacity of deputy wardens and for the most part worked without pay.

Licenses for hunting and fishing entered the picture in 1905, when the Territorial Legislature authorized a $10 fee for non-residents. Seven years later they established the first resident licenses, with a fifty-cent fee covering everything.

Thus were the modest beginnings of game and fish administration in Arizona. From those days until 1929, the setting of seasons, bag limits and other regulations was left to the Legislature, and although the hunting and fishing laws became more comprehensive as the years passed, it soon became apparent that if the state's wildlife resources were to receive any real management, some more specialized agency should have the authority to establish these regulations as they were needed.

By the mid-20's, some of Arizona's civic-minded sportsmen had decided it was time to do something about placing wildlife management on a more practical level, so they banded together and formed the nucleus of the Arizona Game Protective Association, which today is known as the Arizona Wildlife Federation. One of their prime motivations was the establishment of a game and fish commission with power to set regulations needed for proper wildlife management.

and then; the present system

Through the early AGPA efforts, the Department of Conservation (the name then in use) became the Arizona Game and Fish Commission in 1929, complete with power to regulate the hunting and fishing in Arizona.

This brand-new Commission, consisting of T. E. McCullough, A. F. Jones and L. B. Hart, held its first meeting on April 6, 1929 at the State Capitol Building in Phoenix. Its first actions included the election of A. F. Jones as chairman and the appointment of R. L. Bayless as "State Game Warden." Mr. Bayless was to act as secretary to the Commission, in addition to being number-one man of the Department.

This plan is still in effect today,

Frank Farnsworth and Jay Lebsch on a successful deer hunting trip at J. D. Dam, 1908.

Floyd Pyle, famous lion hunter, and others in camp, 1925. Pyle is the man in foreground.

with two exceptions. The title of the State Game Warden was changed to "Director" in 1945, and the number of commissioners was increased to five in 1951.

Since 1929, the function of the Commission has been to act as an advisory, policy-making group for the Department. Commissioners no longer plant fish (carp or otherwise), enforce laws or do the countless other jobs which have evolved as a part of game and fish manageemnt. The actual operations involved are carried out by the Department, following policies laid down by the Commission.

In 1949 the Legislature revised some of the game and fish laws, and this resulted in a new schedule of license fees. Ten years later, the license structure was again revised and remained in that form for over a decade in spite of tremendously increasing costs.

modern office machinery

Late in 1959 the Department began moving into the "computer age" with the installation of an IBM machine and the gradual conversion not only of license sales, but game survey and harvest data as well to computer programming. Today data processing techniques have become an integral part of the Department's overall administrative functions. They involve the use of extensive microfilming for recall, the use of microfische for instantaneous checks of permit records mailing lists and other data, and a multitude of other procedures. Perhaps the most dramatic change in the use of computers as far as the average sportsman is concerned, however, involved the computerized drawings for big game hunt permits. These came about in 1975 after a special citizen's committee appointed by the Department had delved into ways and means of improving the old permit drawing procedures.

a new way of doing the job

July 1, 1960 was a highly significant date as far as Department operations are concerned. It was then that we entered our present Wildlife Manager system of operation. Under this system all the routine field work, including law enforcement, game and

In 1963 the old Papago Park facilitites were replaced at the present "Deer Valley South" address. Papago was relinquished so Phoenix could have a zoo. Ponds being built were used for fisheries research for a few years.

fish management, and I&E are carried on by district wildlife managers, supported by a central staff of division personnel working out of the Phoenix office. Initially, there were five regions established, but these were expanded to seven in 1961.

In 1963 the Department's Administrative functions were transferred to the Deer Valley office, which had been constructed by the city of Phoenix. The city became involved when the Department relinquished its lease on the 108 acres it held at Papago Park, where the old Hunt Bass Hatchery ponds were still being used for fisheries research and the shop and warehouse facilities were housed, so that the Pohenix Zoo could be created there. Phoenix granted the Department comparable buildings on 10 acres of land at the Deer Valley site.

a new headquarters

By the late 1960's it was apparent that the Department needed more space than was available in the old Capitol Annex building at the corner of 17th Avenue and Adams Street. The obvious idea was to look toward the land now available in Deer Valley, with the possibility of locating a complete new facility there. The Commission, however, was reluctant to make a major expenditure on land which was only leased from the City of Phoenix. After considerable cogitation, the Department purchased ten acres directly across the road from the existing office and warehouse space, and proceeded to build the present offices there. The move into the new facility was made in January, 1970.

For many years Arizona hunters and fishermen had purchased licenses on a fiscal year basis, but on January 1, 1964 they began buying calendar year licenses. During the period of changeover, short-term licenses were issued at reduced rates. The remainder of the Department's operation, however, remained on the fiscal year basis of July 1 to June 30.

more alphabet soup, but more money

While the Department had been involved with the Pittman-Robertson

(PR) and Dingell-Johnson (DJ) programs for a number of years, the Land and Water Conservation Act (L&WC) passed by Congress in 1965 resulted in the formulation of the Arizona Outdoor Recreation Coordinator Commission (AORCC) with which the Department became intimately involved the following year. This source of funds, coupled with State Lake Improvement Fund (SLIF) monies derived from the registration and taxation of boats, increased the overall income base for certain types of expenditures, but increased the administrative chores and the areas of responsibility by a proportionate amount.

Boating registration and taxation officially became the job of the Department in June, 1968. Prior to then, personal property taxes on boats had been the responsibility of the county assessor's office, and little collection work had been accomplished. With a revised law establishing a lieu tax on boats (instead of the existing personal property tax) and giving the job of collecting it to the Department, added to a general expansion of overall game and fish management and developement programs, the personnel roster by the end of the '68-'69 fiscal year included 233 names.

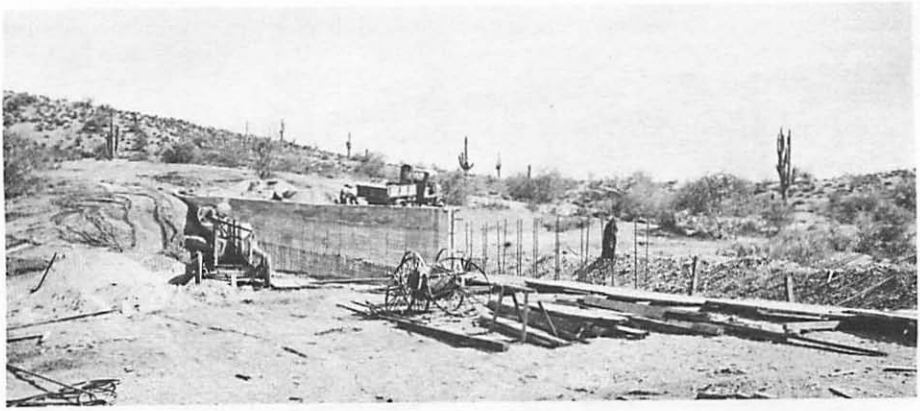
bad money problems

As mentioned above, the Department's financial situation had become critical in the early 1970's. A modest license increase was granted in '71, effective 1/1/72, but in the spring of 1972 a crisis occurred. Critical monitoring of revenues over recent months and projections of what could reasonably be expected in the immediate future showed unmistakably that the bottom of the money barrel had been reached.

The most dramatic belt-tightening exercise in Department history began in March of that year. All forms of expenditures were restricted to only the most vital. Mileage and travel were limited, old equipment previously scheduled for replacement was patched up somehow or other, and a number of standard functions were placed in suspension indefinitely. (The Department magazine *Wildlife Views* was one of these.) The director made the rather grim announcement that "people will be the last to go," and as it turned out no-one lost a job during the crisis. Employees who quit, though, or retired, were not replaced, and most divisions operated at short staff for quite a time.

In 1974 the Department modified its big game tag and permit applications, a move which simplified things for all concerned — the Department, its license dealers and the hunters. This was the adoption of a universal big game tag and permit application.

Constructing the old Hunt Bass Hatchery in Papago Park in 1931. Facility was used for three decades, then given to Phoenix for a zoo.



With the new formats, one form for each replaced a multitude of different tags and applications with which dealers and hunters had wrestled for years.

In 1978 the Legislature authorized the present license fee schedule, which went into effect January 1, 1979.

state and access

A couple of other developments occurred during the middle 1970's. One of these involved a determination by the Attorney General that the Department actually had some authority over access to state-owned public lands. After considerable deliberation, and extensive dialog between the Department and the State Land Commission, the Commission adopted a set of regulations designed to assure the public that state lands were available for hunting and fishing, and that lesees had no right to keep the public off state lands as far as these pursuits were concerned. These regulations remain in effect today.

Also acquired during the 1970's, in 1972 to be specific, was authority over the off-road use of vehicles. The Commission requested General Tax Fund monies to accomplish this new responsibility, on the grounds that this was not primarily a wildlife conservation measure, but the Legislature chose not to grant the request. Consequently, without funding, the Department has not been able to become aggressively involved in the regulation of off-road vehicular travel. Its personnel do become involved on an incidental basis, however. The situation today is that the Department tries to support regulations of land management agencies responisble for given areas where special restrictions have been imposed.

Still another significant shift in policy occurred in the late 1970's, when the Commission, in its 1978-79 budget request, asked for General Fund monies to help operate the Department. Heretofore, only game and fish funds had been asked for basic operations. The request, although specifically listing the improvements which would be financed by the new fund source, was denied. It has been repeated in concept each year since, but has yet to be granted.

It's obvious that the Department and its operations have grown tremendously during the years. Along with this expansion, however, have gone hand in hand the growth of Arizona's population, the leisure time of its citizens and the consequent pressure on our wildlife resources. We're not even a little bit ashamed of the job we've done to keep pace with this pressure, and as you read further in this report we're sure you'll understand why we feel as we do.

Arizona's first buffalo hunt — November, 1927. Photos courtesy of Don Chambers (note sign on truck).

Fisheries

ARIZONA MUST HAVE BEEN a pretty discouraging place for those among the first settlers who happened to be avid followers of Isaac Walton, for the fishing waters here were few and far between. As we've already mentioned, some of the very first wildlife conservation efforts were aimed at increasing the fishing potential of the territory, and long before the turn of the century the steady growth of human population was beginning to put a crimp in the available fishing resources. From then to the present, the problem of getting the "mostest out of the leastest" — of trying to squeeze the greatest possible amount of fishing out of our severly limited waters — has been the fisheries manager's chief aim in life. It's also been his greatest headache.

Of course, the fishing picture began to brighten early in the 1900's when Theodore Roosevelt Dam was completed and begun backing up the huge reservoir which has been synonymous with bass fishing ever since. Following Roosevelt, the present chain of Salt River lakes was created, along with Horseshoe and Bartlett on the Verde, and eventually, the huge dams which have turned the wild, rampaging Colorado River into a subdued but still exciting playground for outdoor enthusiasts.

While the construction of these dams has meant a tremendous boost to fishing, their benefits have not been gained without certain losses. That dry, sandy wash Phoenicians call the "Salt River" once flowed clear and bright through the Valley of the Sun, and other streams once flowed through other areas. All but a few of them have been lost in the trample of civilization; if their watersheds weren't overgrazed so badly they stopped flowing, they were dammed up or pumped dry on the spot to irrigate the thirsty desert.

this is how we started . . .

Fifty years ago the fishery management practiced by most game and fish departments was simple. In those days getting the most from the least meant planting plenty of fish to catch. Consequently, nearly all the early efforts of the Commission were aimed in this direction. The trout which were planted came from limited hatch-

Celebrating Arizona's first trout hatchery on South Fork of Little Colorado River. Construction started in 1922, but was slowed by problems with local Indians. The station was used until 1932.

ery facilities at Sterling Springs on Oak Creek, Indian Gardens near Payson and from Pinetop. Morman Lake, which at that time usually contained sufficient water to be maintained as a fishery, doubled as a hatchery site for both trout and warm-water species. Frequently trout would be reared there, then released into the lake when they reached catchable size. Bass, bluegills and catfish from there and the U.S. Fish and Wildlife Service hatchery in New Mexico were released in various warm-water areas around the state.

There was little, if any, distinction between trout and warm-water management practices in the early days of the Commission. The panacea of stocking covered everything. Most of the fish planted were fry or fingerlings, which according to theory would grow to creel size on the spot. To make sure they weren't caught before they had a chance to grow up, waters were usually closed for a time after being planted.

Early in 1932 the state's warm-water planting program received a tremendous shot in the arm with the establishment of the Hunt Bass Hatchery in Papago Park. The Department was able to build the hatchery at a nominal cost by using free labor available through the WPA and the Governor's Emergency Relief Fund. Seven small lakes were eventually constructed, and these were stocked with bluegills, bass and catfish. The warm-water facilities at Mormon Lake were transferred to Papago, and the Hunt Bass Hatchery became headquarters for warm-water fishery management in Arizona.

For a time the hatchery area of Papago Park was maintained as a public recreation area. Picnic tables and ramadas were built in several locations, and for quite a few years hatchery personnel added campground cleanup and repair to their fish-rearing duties. Before long, though, vandalism became such a problem that the men were spending nearly half their time cleaning up the mess left by picnickers or getting the area ready for the following weekend. In what might be termed "self defense" the Commission finally ordered the hatchery closed to the public, and the personnel went back to the full-time business of raising fish.

we began to learn

By the time the Commission had been in office for a few years the fishery managers had gathered enough data to learn that most of their trout-stream fry plants were not surviving. As early as 1932 the spring planting of seven to nine-inch trout was recommended for such streams as Oak Creek and Tonto Creek, but the basic idea of fall plants was retained. By the mid-30's, however, the size of the fish planted had been increased to four and six-inch classes in the hope of obtaining a better survival. After a year or two of trial, though, it became evident that even fish of this size were unable to live through the winter months.

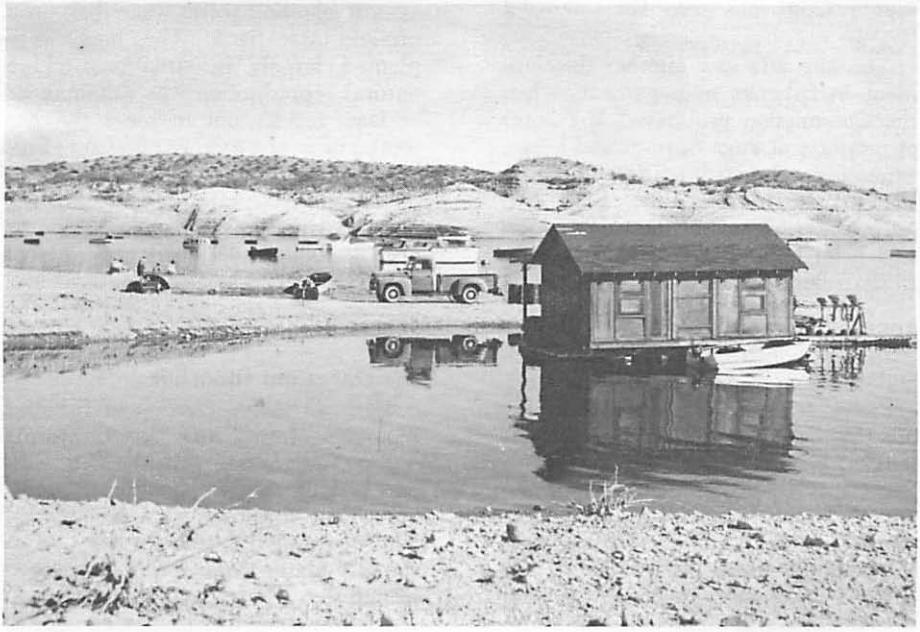
When enough records had been gathered to tell the story, fisheries managers found that only 10 to 15 percent of these fall planting were still in the streams when folks began to think about going fishing the following spring.

put-and-take fishing

This knowledge led to a decision, in 1941, to plant only creel-sized fish in trout streams from then on. In 1942 the policy of "put-and-take" trout fishery management was named and officially adopted by the Commission.

During the early 40's the emphasis on warm-water fish planting gradually lessened, as fishery managers learned that nature could do a better (and much less expensive) job of stocking these waters than the Game and Fish Department could ever hope to do. By 1947 the Hunt Bass Hatchery had been placed on a stand-by basis, to be called upon when a lake had been dry, had been renovated, or for some other reason needed a supply of warm-water brood stock. The hatchery facilities still had their place in fisheries management, but put-and-take stocking of bass, catfish and other warm-water species was at the end of its era. Thus, while trout and warm-water management had started out on approximately equal footing as far as stocking was concerned, they had gone in almost exactly opposite directions: trout to nearly total reliance an artifical plant-

Temple Bar Landing, Lake Mead, in 1952



Plucking dead trout eggs from trays at the old Pinetop Hatchery, about 1952. Man is Joe Butler, superintendent at the time. Property is now site of Region I Office.

ing and warm-water to practically none.

Meanwhile, back on the trout lakes, by the mid-40's fisheries managers had learned that they were on the right track all along, and that these lakes were well equipped with food supplies for growing their own fish. Trout planted as fry and fingerlings in the fall were turning up in goodly numbers, fat and sassy the following spring.

The late 40's saw another development in fisheries management, when the Commission purchased 157 acres of property at Page Springs and began expanding the fish-rearing facilities there. Prior to that time, Page had been under lease, and the Commission had been hesitant to develop the site to its fullest capacity.

anchovies vs. trout??

In 1973 something happened which had a major impact on hatchery operations. It seems the ocean currents off the coast of Peru somehow got tangled up, changing temperatures to the effect that the anchovy population declined drastically. Inasmuch as this was an important source of food for hatchery trout, the impact on the Peruvian fish industry shot fish food prices skyward. The situation remained that way for some time and, as could be expected, fish food prices never returned to their former level once that particular ecological situation resolved itself.

With the loss of the Department's Papago Park facility, as mentioned in the Administration section, all warm-water fish rearing facilities had been transferred to Page Springs. Catfish spawning efforts had always been a difficult propostion for fish culturalists, but thanks to tender, loving care provided at Page Springs, the hatchery developed procedures which successfully produced several thousand young channel catfish for establishing populations in new waters. This occured in the mid to late 1960's, and the planting of catfish fingerlings became an exception to the old rule against planting warm-water fish on a put-and-take basis. The cats were planted largely in situations where natural reproduction was minimal, or at least insufficient to meet the potential of a given body of water. Following the successful catfish rearing operations were efforts to successfully obtain striped bass spawn in a hatchery situation, and a modest supply of young stripers was also produced and planted in Lake Mead during the early 1970's.

the states get together

Early in 1950, a group of fisheries biologists from Arizona, California and Nevada, along with the U.S. Fish and Wildlife Service, conducted a survey along the lower Colorado River. This survey led to the formulation of the Tri-State Fisheries Managament Committee, an organization which has led to cooperative management of

the river and its lakes by the bordering states. With the eventual construction of Glen Canyon Dam, this organization welcomed the upper basin states to its ranks and became the Colorado River Wildlife Management Council.

with D-J, we really began to roll

In 1951 the door was opened to fishery management and development programs which had previously been far beyond the financial reach of the Department, when the Dingell-Johnson Federal Aid to Fisheries Act was passed by the U.S. Congress. This act made federal funds, collected through excise taxes on fishing equipment, available to the states for fisheries research and development projects. To Arizona it meant that at least one major program could emerge from the idea stage and begin to take its place in the state's fishing picture.

This was the Department's lake development program, which added to Arizona's recreational resources. For several years the Department had been eyeing Luna Lake and Big Lake as fishing holes which could be greatly improved by increasing their size, if a source of funds to do the job could be found. The D-J act provided the wherewithall, so in 1951 the program began to move ahead. Luna Lake's capacity was increased to 174 surface-acres, with ample dead storage to insure the perpetuation of a fishery resource there. This was followed by a similar operation at Big Lake. Then Crescent, Ashurst and Kinnikinick Lakes were developed during the next few years. All five of these waters have since turned out to be real topnotch fishing lakes, and have supplied Arizonans with countless hours of outdoor recreation plus thousands of dollars worth of food for their tables.

then we started creating lakes

The successful development of these lakes led to an even more ambitious project; the creation of brand-new lakes in several areas of the state. The first of these to be completed was Woods Canyon Lake on the Mogollon Rim. Woods Canyon was followed by Riggs Flat on Mount Graham, Fool's Hollow near Show Low, Rose Canyon on Mount Lemmon, and Pena Blanca near Nogales. All of these had been opened to fishing by early 1959. During the 1960's they were followed by Parker Canyon in southeastern Arizona, Lynx Lake near Prescott, and Knoll, Bear Canyon, Chevelon Canyon, Black Canyon and Willow Springs Lakes on the Mogollon Rim.

A conisderable amount of effort continued to provide fishing waters in southern Arizona, but none of these newer efforts ultimately bore fruit in the form of a fishing lake. One modest addition involved the purchase of of Arivaca Lake, located on the west side of the Tumacori Mountains. This was purchased by the Department at the end of the 60's decade and, as is frequently the case, considerable repairs had to be made on the dam forming the small impoundment once it went from private to state ownership. These were completed in July,

Studying the plans for Lynx Lake Dam, August, 1962. Engineer in photo is Jack Leavitt.

KEY FISHERIES PERSONNEL — MARCH, 1958

Kneeling, left to right: Minnie McFarland (now Stevens), Walter Drorbaugh, P. L. McNeil, A. W. (Dud) Yoder and Burrell Russell. Standing (l to r) are Terry Starner, Bill Melander, Roger Gruenewald, Hal Wenthe, Paul Miller, Dave Foster and Bud Bassett. Stevens, Starner, Gruenwald and Wenthe are still with the Department.

1970, and Araivaca Lake has provided a fair amount of warm-water fishing potential for southern Arizona since then.

The Department also brought Becker Lake, which had been privately owned, in September of 1973. The Department continued managing it as a trophy fishery and established special regulations which remained in effect for several years.

One other bright spot in the fisherman's picture ocurred in March, 1970, when Alamo Lake, created by the Army Corps of Engineers as a flood control effort, reached minimum pool. Alamo subsequently was stocked with bass and bluegills, along with channel catfish, and gradually developed into an excellent fishery for all three species.

the shad story

Although the lake development program was probably the Department's most easily noticed achievement during that time period there were other programs which might appear less impressive on the surface but which are perhaps even more important to Arizona's fishermen.

One of those began along the Colorado River in the mid-50's, after the Tri-State Committee, mentioned earlier, had been formed. A small fish called the "Threadfin Shad" was introduced to the waters of the Colorado in an attempt to provide a better food supply for the river's game fish populations. This little shad didn't know it (and probably wouldn't have cared if he had), but he was destined to change the fishing picture in Arizona's entire warm-water management program.

The shad proved to be very prolific, and in a comparatively short time had become one of the major items of diet for the game fishes which populate the river. More shad plantings were made, until the threadfin populated the entire Colorado River

system from Lake Mead to below the Mexican border. Fisheries studies conducted on Lake Mohave showed rather sudden improvements in the growth rates of game fish, and anglers noted similar happy situations where their stringers were concerned.

After studying the Colorado River shad story for a couple of years, the Department was convinced that the little fish could accomplish similar improvements in other warm-water lakes, so by late 1957 shad had been introduced to the rest of the state's bass and crappie waters.

It didn't take long for the effects of the shad to be noticed. By the spring of 1958 anglers were already talking about how quickly Bartlett Lake had been able to provide good fishing after it was drained, and how fat the bass were in Lake Pleasant. A year later they were bringing in strings of bragging-size crappies from Apache and Roosevelt Lakes, with catches of 100 crappies in a single day not uncommon during the growth surge once the shad became plentiful. The change was most noticeable on Rooseveit, where crappies for years had been so stunted from lack of food you could scracely find one large enough to keep. Now they were big and heavy, and fishermen were happy whether the finicky bass chose to hit or not.

An event occurred in 1959 which was to be of significance — but not for a number of years. White bass were planted in Lake Pleasant northwest of Phoenix. This plant was repeated over the next couple of years but the white bass disappeared until about 1965, when suddenly they began turning up in appreciable numbers. Since then, Lake Pleasant has produced fair to good white bass fishing each spring.

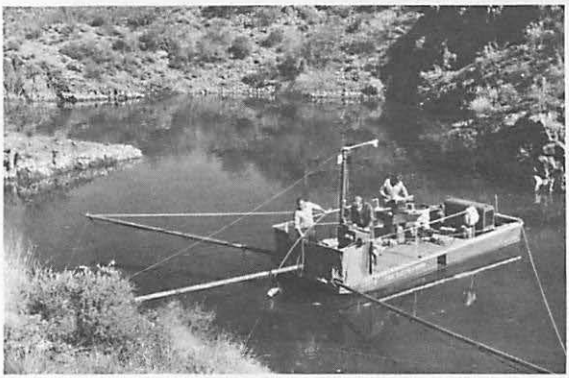
what the heck is a "gismatron?"

About the same time the shad introductions were taking place in central Arizona, the Fisheries Division was experimenting with a new gadget. This "gismatron," as it became known for the lack of a better name, was an electrical shocking device which enabled fisheries workers to sample populations without harming the fish. Developed first on a small scale, the shocker proved so effective and useful that the Department eventually acquired a king-sized version which operated for more than a decade. It was in time replaced, but the idea of shocking as a fish-sampling technique is still being used today.

The Department plane, with special tanks installed, helped plant the first fish in Lake Powell in 1963.

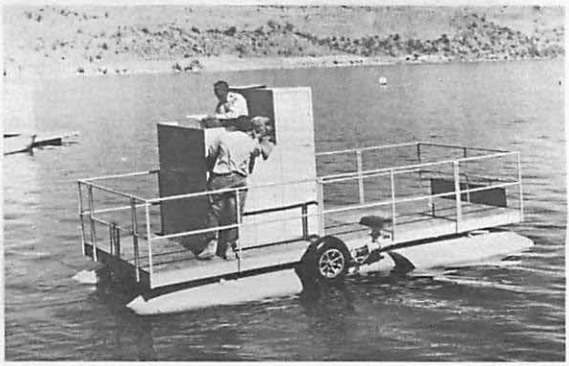
Electrofishing — then & now

The 1956 shocker boat, or "gismatron," consisted of a portable generator in a skiff. The outfit worked quite well in small waters, but left something to be desired on large lakes.



Myrl Fox developed the first large shocker on his own and the Department contracted for his services. The idea gained national attention and the shot shown here was used in *National Geographic*.

In the very early sixities, Fox's rig was replaced by this custom-built pontoon boat, shown here at its trial launching. Installation of the generator and holding tank aft solved the nose-heavy problem.



A third large shocker similar to the one shown here served for a while in the early 70's. It too was replaced by an improved model, shown here. Unlike the others, this one's outboard powered.

While the shad introductions during the '50's were important mainly to the state's warm-water fisheries, the trout program also shifted into a still higher gear. Page Springs was being developed further. By 1957 it had become one of the largest trout-rearing operations in the world, and was capable of producing a quarter of a million pounds of fish annually for Arizona's trout-hungry fishermen. Not only did the expansion of Page Springs provide more trout, the efficiency of the facility and the adoption of dry, commercially prepared fish food reduced the cost of rearing them.

In 1970 another step in the Department's hatchery development program occured when the construction of Canyon Creek hatchery, located below the Mogollon Rim above Young was begun. By November, 1971 the new hatchery facility was in operation. In the late 1970's the Department also acquired Silver Springs hatchery near Show Low. This had been privately owned for many years and had been a source of trout for White Mountain waters. When the facility was offered for sale, the Department acquired it in January, 1978.

The 1960's could well be called the decade of introduction. During the 1960-61 fiscal year the Tilapia, a subtropical panfish from Africa, was introduced into a number of small, warm ponds and canals in south-central and southwestern Arizona. The bluegill-like fish did best in the Yuma area canals, where they have continued to provide an excellent addition to the area's fishing picture. Flathead catfish were introduced into the Lower Colorado River in 1962, and this was followed in '62-'63 by striped bass there and in Lake Havasu. Both introductions have since proved to be highly successful.

The Willow Beach National Fish Hatchery was started in the early 60's, and soon began to supply trout for the Colorado River as well as other areas of the state.

The years 1968 and '69 began to show the fruits of the striped bass introduced in the Colorado River, when anglers began taking good catches of fish ranging upwards of 30 pounds from the areas around Bullhead City. Those Colorado River stripers continued to increase in size until, in May, 1977, a new world record of 59 pounds, 12 ounces was taken south of Bullhead City.

Florida bass entered the state and were tried in a couple of waters, Arivaca for one and Canyon Lake for another. While the Floridas made a small surge, they have not materially influenced the fisheries here. The problem with the Florida bass ultimately seemed to be that they hybridized with the existing regular strain largemouths to the point where a distinct strain of Florida bass no longer existed. Other introductions included during this general period involved silver salmon into Lake Mead in March, 1970. Silver salmon were again stocked in Lake Mead at Lee's Ferry. Cohos were put in Apache Lake, June 23, 1972, and Muskies tried in Mormon Lake in June, 1973. Neither of the two plants just mentioned seem to have contributed significantly to the fishing picture.

Walleyes were planted in *Canyon Lake* in 1965, and contributed to the fishing there and in Saguaro Lake just below. Fisheries chief Al Essbach holds one of the early arrivals.

native trout efforts

During the early '60's the Department began an intensive effort to locate pure strands of Arizona native trout so these could be captured, reared and established in isolated waters where they would not suffer from competition or cross-breeding with other trout species. Pure-strain natives were found and gathered from a few small streams and transported to Department hatcheries, where they were successfully spawned.

The native trout program received a severe setback in late 1974, though, when most of the native trout brood stock was stolen. Along about this same time the federal government had placed the Arizona native trout on the endangered list, which caused the Department some problems inasmuch as this status required a special permit from the Department of the Interior to in any way capture existing native trout from the wild. Another setback occured when the remaining native trout in the hatchery died off in February, 1975. By August of that year, however, the federal government had backed off on its status determination, and the Arizona trout was off the endangered list. This meant the Department was free to go ahead and reestablish its native trout program, which has continued successfully until the present.

The crappie boom on the Salt River lakes had subsided by 1963 to the point where the Department was becoming quite concerned, and a few years later a research program was initiated to find out what was limiting their production. Carp predation on eggs was found to be extensive, as SCUBA divers patrolled the spawning areas and observed what was happening. By 1968, however, the crappies had managed at least one successful spawn and Roosevelt was again providing excellent crappie fishing during the spring months.

By 1963-64 Lake Powell was taking shape behind the newly constructed Glen Canyon Dam, and the new lake was stocked with crappies, bass and trout. Walleye pike eventually entered the picture in Lake Powell, as did striped bass, and to date each species has made relatively small but worthwhile contributions to the fishery potential there. The stripers in Powell are still young, but the prospects for their reproduction in upstream waters appear to be good, and it's possible that Powell could someday exceed the other striper fisheries on the Colorado River.

The mid-60's saw Page Springs rearing station again expanded, and the introduction of northern pike into certain Arizona waters. Grayling were also introduced into newly created Bear Canyon Lake, and Lee Valley Lake which had been purchased by the Department. In 1965 walleye pike were introduced into Canyon Lake, and the following year they began producing a limited amount of fishing

March 1, 1959 — Lake Pleasant gets white bass. Gus Evers, former super of the Papago Hatchery, shows a few to the camera.

Al Henderson (left) and Phil Clemons, both well-known sportsmen then and now, found bow-hunting for buffalo great in upper Apache Lake one day in April, 1959.

there and in Saguaro Lake, immediately downstream.

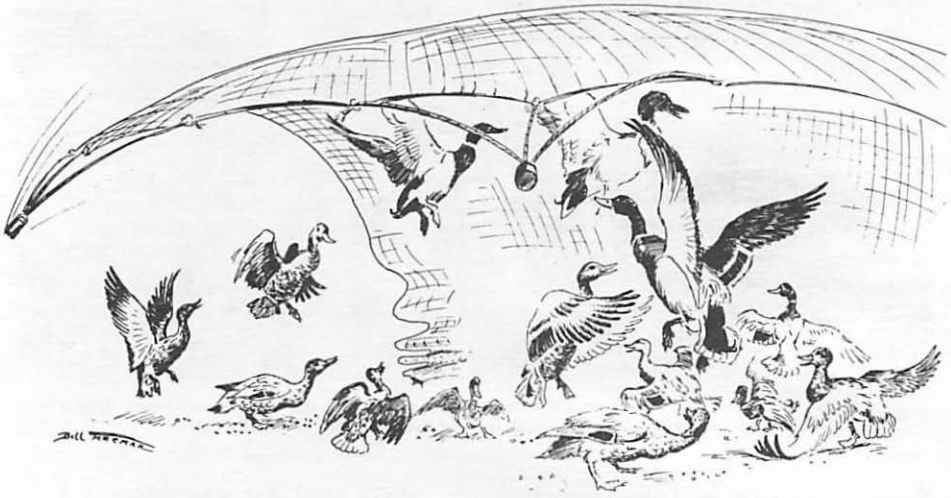
During this same time the streams on Mt. Graham in eastern Arizona were being renovated and cleared of all fish so they could be planted with the native trout being held by the Department. This program was gradually expanded to cover White Mountain streams, as well as Bear Canyon Lake, by 1968. That year also saw a successful grayling spawn in Lee Valley Lake, and the appearance of smallmouth bass in Roosevelt Lake. The smallmouths had been planted in the Black River on the Fort Apache Indian Reservation a year or so earlier, and had apparently worked their way downstream into Roosevelt Lake. At this time there is a fair population of smallmouths in Roosevelt, but they have not contributed to any considerable extent to the lake's fishing potential. They have, however, become an important part of the fishing picture in Apache Lake immediately downstream. Apparently Apache's deep bluffs and cooler water offered habitat more to the smallmouth's liking.

1972 went down in fishing history as "the year of the fish." During 1972 a staggering number of new fish records were established, nine of them by mid-April of that year plus several more by the early part of the summer. It was one of those situations where all conditions were go and the excellent fishing which resulted in the new record catches was the result.

There is still a tremendous amount of fishery development to be done, both of existing fisheries and potential lake sites, but we can say without blushing that fishing is good in Arizona. We don't have the waters of Minnesota or Wisconsin, but the lakes and streams we do have are making fishing one of our state's chief attractions.

In short, we feel that tremendous progress has been made toward better fishing in Arizona — and this we promise you: We'll continue to expand our programs and improve our management techniques to the fullest limit of human and financial capabilities so that Arizonans can look forward to even greater improvement in the fishing picture during the next 50 years.

Game Management



As we've mentioned, the establishment of seasons, bag limits and other game management efforts was left to the discretion of state legislatures prior to the inception of the Commission-Director form of game and fish administration. Under such a setup, it can easily be understood why management in those days was something of a hit-or-miss proposition, with personal opinions and local pressures often having as much or more bearing on regulations than the biological soundness of the principles involved.

The beginning of the Commission's administration, then, paved the way for the scientific, biologically sound game management sportsmen have learned to expect from the Game and Fish Department today.

In a sense, modern game management presents a good example of an evolutionary process. Ideas, methods and beliefs are tried, used and studied, then are either accepted — if the test of time proves them sound — or rejected, if they turn out to be otherwise.

Frequently, ideas which have run the gamut of time and trial eventually prove to be a little of both, and consequently end up being retained in an altered or curtailed form.

now, about refuges and predators

Two such concepts were refuges and predator control. Quite some time before the Commission accepted the job of of managing Arizona's wildlife, both these ideas had become well established as management procedures. As a result, many of the early efforts at game management were directed along these lines. Predator control was considered a vital function, and during their first year in office the Commission established 23 new state game refuges to bring Arizona's total to 29. By 1936 there were an even 80 refuges, including three federal ones.

Basically, the idea of refuges was two-fold. Where a specific population

of game needed protection beyond that afforded it by closed seasons, bag limits and the other standard management practices, refuges offered this additional protection by keeping hunters out entirely. The refuge concept had certain management implications, too; the idea being that a refuge would insure a supply of game to replenish surrounding areas after hunting had taken its toll.

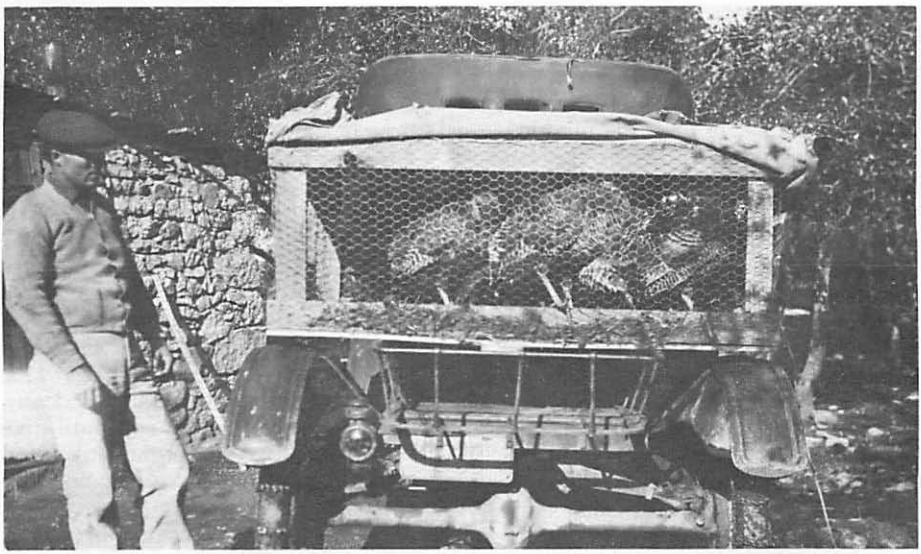
In some respects, refuges served their purposes and are still being used today, but game managers have since learned that they fell short when it came to providing some of the benefits attributed to them. With the probable exception of waterfowl, game "saved" from hunters stayed right where it was and did not form a "horn-of-plenty" to repopulate the nearby countrysides. In most cases, studies eventually showed that game populations on refuges were little, if any, greater than they were on areas which had been hunted regularly. In some instances, populations were even found to be lower on refuge areas.

Through their findings, wildlife managers were reminded that conservation is wise use, and conserving game does not mean trying to shelve it like so much canned goods until the day it might be needed. As a result the number of game refuges has dwindled from an average of 70 or 80 at any one time to a mere handful today.

The idea of predator control has followed a similar course. At one time it was believed that a reduction in predator numbers would bring about a proportionate increase in game population, and therefore "varmints" had to be wiped out before game could reach its maximum density. The first commission spent $1,045 to kill 58 predatory animals in 1929, and considered their money well spent. Their annual report stated that "the Commission believes control of predators contributes more than any one feature to the increase of game."

But this idea, too, has been greatly modified through the years, as game managers learned that predators were not always as black as they had been painted. In time the predator became recognized as a natural part of the wild scene, and wildlife men learned that given ample food and cover, overall game populations were not as a rule influenced very greatly by a

Turkey transplant, Ice House Canyon, 1918. Man could not be identified.



GAME MANAGEMENT PERSONNEL — MARCH, 1958

L. to R. Front row: Jerry Day, Warren Kelly, Dan Schadle, Steve Gallizioli, George Aasby. 2nd row: Roger Bumstead, Don Belknap, Bob White, John Reed, Norman Woolsey, Ed Webb, Ted Knipe. 3rd row: Phil Cosper, Bob Jantzen, Charlie Jordan, George Welsh. 4th row: John Russo, Larry Powell, Paul Webb, John Stair, Jack Arney. Day, Schadle, Gallizioli, Belknap, Woolsey, Cosper, Jantzen, Welsh, Russo and Webb are still with the Department.

modest amount of predation. In 1945 the Department joined forces with the State Livestock Sanitary Board and the U.S. Fish and Wildlife Service, and from that date until the presidential ban against poisons in the late 1960's, predator control work requested by the Department was accomplished by the FWS.

Within a few years after the ban on 1080 poison, Department field men began voicing rather strong opinions that predation, by coyotes in particular, was having serious adverse effects on antelope and deer fawn survival. During the ensuing years these opinions became stronger and stronger as antelope fawn crops failed to materialize and in some cases deer reproduction appeared to be much lower than could be accounted for by any other apparent reason. Today the Department's collective opinion tends to be that we are utilizing a large number of antelope and deer fawns to feed an over-abundant population of coyotes.

then came federal aid

In 1932 something happened in Washington, D.C., which was to eventually just about revolutionize game management in Arizona. Congress passed a bill levying an 11% excise tax on sporting guns and ammunition, but it was not until five years later that the funds collected could be put to work for game management.

In the meantime, though, many

important but subtle changes were taking place in Arizona's wildlife scene. Early day ranching activities had removed the grass covers from many areas of the state, and now browse plants had invaded the ranges to provide more food for game species. Development of waterholes for domestic stock also improved the situation for wildlife, lumbering activities changed the plant relationships in the forested areas, and roads which had been built for lumbering and ranching provided hunters with greater access to game areas. While wildlife is commonly associated with wilderness, access by hunters is highly important to good game management, so in this respect the construction of roads in remote areas was of considerable benefit to conservation.

In 1937 the Pittman-Robertson Act was passed by Congress, and money collected from the excise tax on sporting goods became available to the various states for use on wildlife research and development projects. Under the provisions of the act, the federal government, through the U.S. Fish and Wildlife Service, would finance three-fourths of the cost of projects carried out. The remaining 25-percent would be borne by the states.

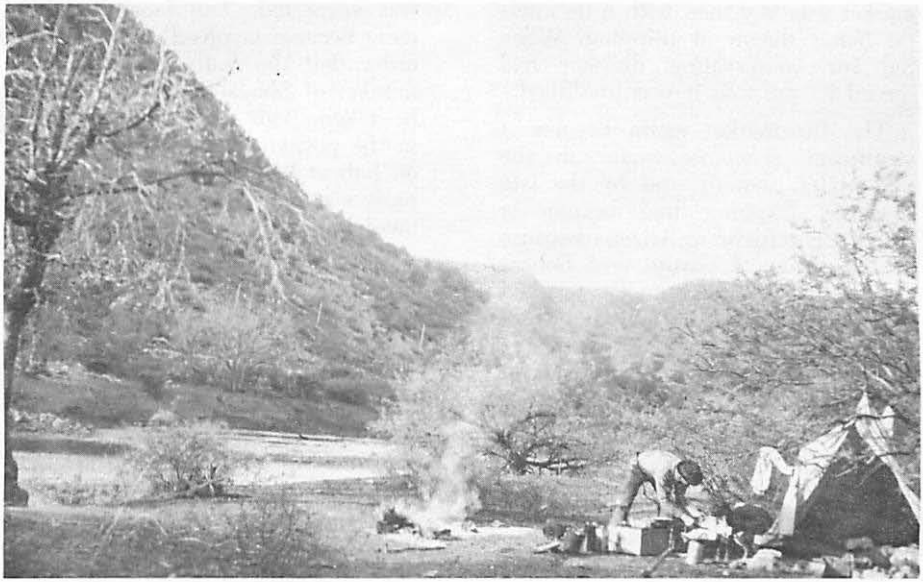
Before Arizona could take advantage of the "P-R" funds, as they soon came to be called, it was necessary for the Legislature to earmark all license money for game and fish purposes. This was one of the provisions of the act.

To plan for the use of P-R money, the Department proceeded to set up a Federal Aid Division in 1938. For a while the main federal aid office was in Tucson, but with the rest of the Department in Phoenix this led to considerable confusion, so the division was moved to Phoenix.

Arizona's first federal aid projects were concerned with turkey, quail, beaver, and antelope and got underway in 1939. Since then, federal aid funds have financed most of our important management and research projects.

The next major chapter in the history of game management here begun in 1944, when a division of fur conservation was established within the Department. Most of this division's

F. C. Iler doing camp chores during a 1914 hunt along the Verde River.



Back of this old photo is marked simply "Hunting 1912." Unidentified hunter apparently took his sport rather casually.

activities appear to have been concerned with trapping beaver in areas or selling their pelts to fur dealers, During most of this period no open season was held on beaver, and although the protection they then received led to year-round open seasons, the division was short-lived. The fur market was low then with little interest being shown in trapping. When the fur conservation division had served its purpose it was abolished.

The fur market again became a significant economic factor in the mid-1970's, though, and by the late seventies trapping had become a thriving enterprise in Arizona because of the value of coyote and bobcat furs. Much of this interest resulted from fashions dictated by the European fur market, which placed the previously low-value coyote hides in high demand, along with a corresponding surge in the economic value of bobcats and foxes.

As more and more interest was shown in furbearers in general and an accompanying upsurge in trapping effort resulted, the Department was faced with a need for specific trapping regulations. These were adopted in July, 1977, and have since become a significant part of the Department's overall regulatory responsibility. Hides in general and bobcat hides in particular became so high in value that a certain amount of illegal trafficking was suspected. The federal government became involved, and issued an order that the states must limit the number of bobcat hides which could be taken. This put the Department in the position of having to put tags on bobcat hides, and there were suspicions that because bobcats were so much more plentiful here than elsewhere, some individuals may have brought out-of-state hides into Arizona and claimed they got them here, then utilized the Arizona tags to legalize the furs for shipment out of the country.

tags for big game

Those big game tags hunters have become accustomed to using each year got their start in 1946 when tags were authorized for all big game animals. This step has enabled the De-

partment to keep a record of how many people have hunted each species of big game in Arizona. Using this information, game managers have been able to more accurately plan hunting regulations which would effect the proper harvest of particular game species.

Developments to provide water for wildlife also got their start in 1946 when the first experimental rainwater catchments were constructed in the Superstition Mountains. The idea was quick to catch on, and by the end of the forties, wildlife development had become an important part of the Department's game management program.

About that same time — 1949, to be exact — the game and fish code was revised and the bear, which had previously been classed as a predator, joined the ranks of game animals. Although actually a "big" game animal, he was denied the distinction of being classed as "big game" because of his occasional preference for a high-protein diet, with livestock providing a major course.

Another step in game management was made in 1951, when the Cooperative Wildlife Research Unit was formed at the University of Arizona. Under this setup, the Department presented the University with a grant of funds each year to be used in some wildlife study projects. During the first few years of its existence, the coop unit tackled study projects on quail, mule and whitetailed deer, javelina, cottontail rabbits, Abert squirrels and doves. University students working for advanced degrees supplied most of the field work, and some of these same students joined the ranks of the Department after earning their degrees. Thus the Department has doubly benefited from this arrangement by the additional knowledge resulting from research projects and by having a handy supply of well-trained biologists already familar with Arizona's problems.

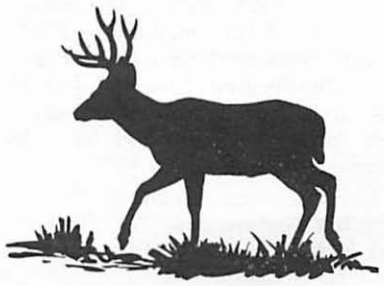
During the1950's a number of significant management developments occurred, but most of them dealt with specific animals and have not greatly influenced management in general. About the only exception to this was the decision, early in 1958, to place game management in a division by itself and carry the federal aid coordination under the Administration Division. Although game management and research work, along with some fisheries projects, are still carried out under federal aid, game management then reached full division status and its chief no longer carried the burden of coordinating all the federal aid projects.

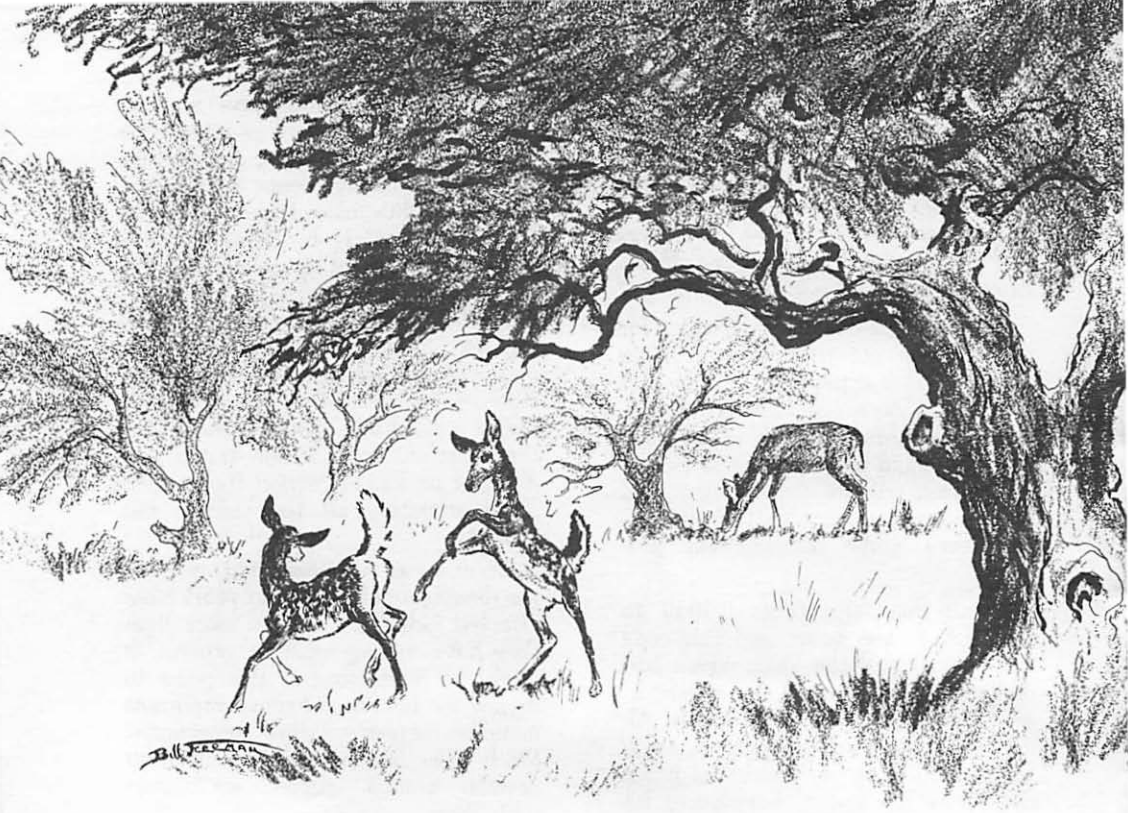
Because, as we mentioned, most of the developments in recent years have affected individual species more than they have management in general, it might be interesting at this point to review the histories of some important members of our wildlife community. Since deer are probably our most popular animal species, we'll start with them.

deer

Records showing the yearly deer harvests and the number of hunters it took to bring them about are pretty sketchy for the years prior to 1946. Since then, though, accurate records have been kept, and they show a steady increase in the annual harvest to a high point in 1961, followed by a gradual decline to a low in 1968. Buck-only harvest, which also topped out in 1961 at 26,627 animals, was destined to become the rule for most of the state.

During the late fifties and early sixties Arizona was experiencing a boom in its deer population. Range





conditions were critical and winter die-offs were common. The seasonal regulations during this period reflected the Department's concern through large numbers of any-deer permits and many areas where does were legal with no special permit.

By about 1963 the peak in populations had subsided, and while ranges were in still in poor condition the any-deer hunting again became more restricted. Overall deer harvest continued to dwindle slowly, reaching a low of 11,173 animals in 1971. After that it climbed for a few years, hitting 15,854 in 1975, then again began a decline which bottomed out in 1978 at 11,130 deer. Antlerless harvest gradually disappeared from all but the late archery hunts in the southern portions of the state, and hit a low of merely 30 animals in 1977.

The problem of declining deer numbers has continued to vex the Game and Fish Department. In many cases deer ranges throughout the state recovered nicely from the overuse of the late fifties and early sixties, but the deer numbers did not respond as dramatically as most people felt they would. Research programs were entered to investigate the causes of mortality, but no positive evidence has yet been obtained to precisely explain the reason deer numbers have failed to blossom in recent years.

During this period, of course, hunting regulations were continually tightened, and in 1971 all firearms deer hunting became a permit-only proposition. At that time the thought was expressed that strict numerical limitations were not necessary in every area, but wildlife managers feared that if certain areas were limited, hunters would move to other areas and thereby cause an overhunted situation in their second-choice spots. The decision, therefore, was to go permit-only for the entire state as far as firearms deer hunting was concerned. Exactly what has caused the deer decline is

not known, but other western states have experienced much the same problem found in Arizona.

archery hunting

By the early 1950's archery hunting had become quite popular in some parts of the country, and a small number of Arizona bowmen thought the idea of an archery-only big game hunt would be just dandy. The Commission was approached for a special archery deer hunt in 1953, but the idea failed to pass. Special archery hunts were again recommended during the next couple of years, but were repeatedly denied by the Commission.

By 1955, though, the Tucson Mountain area had developed very large populations of deer and javelinas. The area was dotted with homes and other developments to the point that a gun season was totally impractical there, and this tipped the scales in favor of archery hunting. In 1955 the Commission OK'd both an archery-only deer hunt and an archery-only javelina hunt.

The next big step for archery-only hunting occurred the following year, when the Moqui District just south of Grand Canyon was opened for an archery-only pre-season deer hunt, along with another special archery hunt in the Tucson Mountain area. During the next few years the idea of archery hunting grew on a grand scale, and within a couple of years it was legally possible for a hunter to take up to seven deer a year, provided he took six of them during the various archery-only hunts which were opened up during the late fifties.

Archers had been allowed to take big game during the general seasons for a long time, but the idea of archery-only hunting was expanded to include other species in 1972, when the first archery-only elk hunt was authorized for 750 any-elk permits. In 1976 antelope also became available on an archery-only basis in Units 6A&B, along with Unit 10. This idea of archery-only big game hunts has continued for both antelope and elk.

During the early days of archery-only deer hunting, any deer was the general rule, but in 1974 many of the areas in the northern part of the state were made buck-only even for archers.

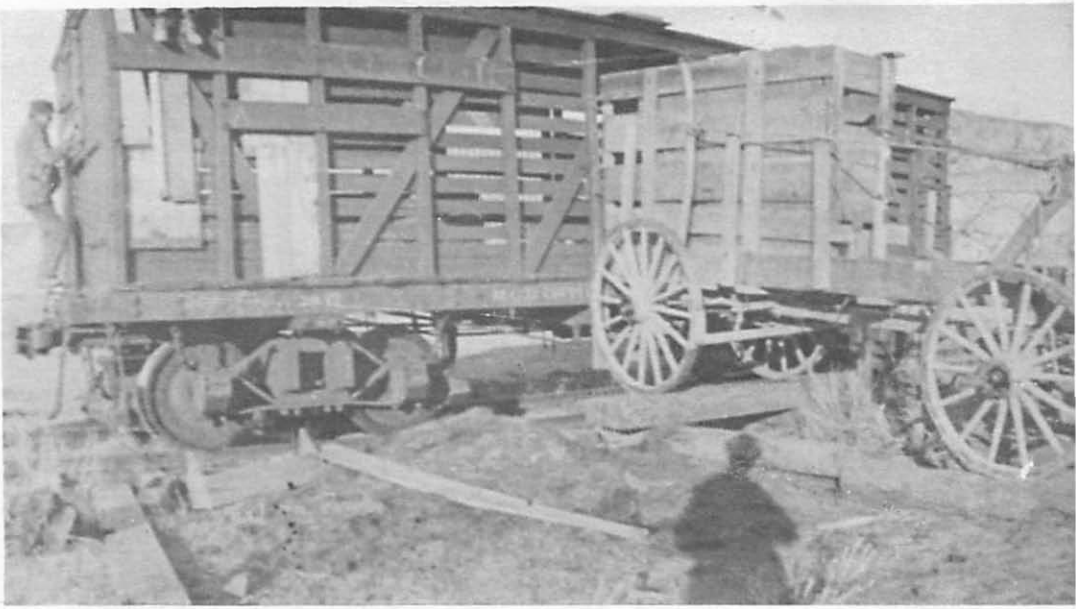
about doe hunting

Historically, one of the more significant steps forward in deer management was the advent of any-deer hunting, although the idea is not really new. In the very old days, before any kind of game management was practiced, deer were deer, and the pioneers simply killed one when they needed it. For the most part they weren't particular whether it was a doe or a buck. When people first became aware of the fact that wildlife was not a limitless resource, though, buck laws came into existence.

The idea behind the buck laws was that because does are actually the producers, they should be saved for reproduction. Once the ranges become fully stocked, however, does will keep on producing fawns to the point where a straight buck law would only make things worse. If and when our deer herds begin climbing to the saturation point they reached 20 years ago, our any-deer hunting program may be reinstated to avert the range depletion we suffered the last time.

Just before the new Commission took office in 1929, the first any-deer hunt had been scheduled in the Kaibab North, where any-deer hunting remained the rule unitl 1946. During that period the Kaibab was the state's only any-deer area.

During 1946, '47 and '48 buck-only hunting was the rule in Arizona, but in 1949 the Kaibab again became an any-deer area and the Bill Williams unit was opened to a post-season doe hunt on a special-permit basis. That was the first of the any-deer hunts which became so common during the late 50's and early 60's. At one point the famed Kaibab became so overcrowded that bonus deer permits were issued and hunters who filled their tags were allowed to buy another and go out after a second deer. That idea



Unloading elk from train into wagons for their trip to release site, in 1913. Eighty

was new to the hunters concerned, but a two-deer limit in that area was one of the earlier actions by the first Commission. In 1929 the Kaibab limit was two deer, but only one of them could be a buck.

elk

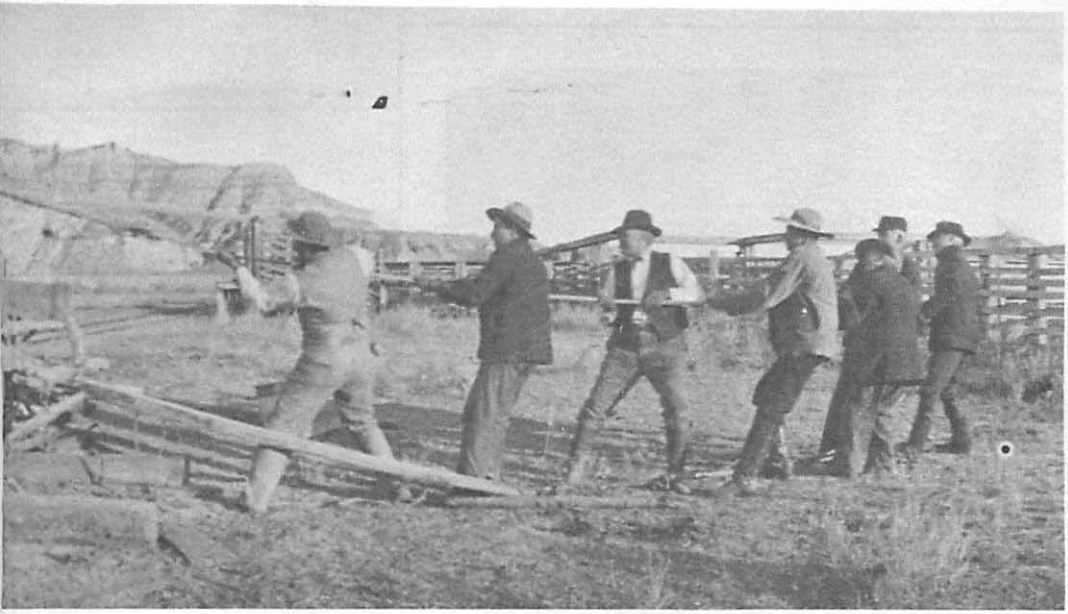
The history of Arizona's elk hunting as we know it today actually began just 16 years before the Commission stepped into office. Prior to the turn of the century, Merriam's elk had roamed the forests of the state, but livestock competition and perhaps several other factors which may never be precisely nailed down had caused this species to become extinct. (In recent years there has been some additional evidence to indicate that the Merriam's elk was not a distinct species and was, in fact, merely a variation of the Rocky Mountain elk we have here today.)

As a result, there were no elk in Arizona from the late 1890's to 1913, when the Winslow Elks Lodge succeeded in securing 86 Wyoming elk for transplanting in the Sitgreaves National Forest south of Winslow. Between then and 1928, 217 elk were released in various areas of Arizona, forming the nucleus of our present herds.

This was the background on the situation faced by the new Commission when it took office in 1929. Arizona's hunters were anxiously awaiting the day when these plants would produce enough elk to justify a hunting season.

By 1935 the happy occasion arrived. Elk populations had reached a huntable surplus in some areas. The Commission authorized 276 permits, and the lucky sportsmen could take to the woods in quest of trophies. One hundred and forty-five of them were successful that year. Bulls, including spikes, were the only legal game during those first few seasons, but in 1939 six females were harvested. Except for this one brief deviation, elk hunting was restricted to bulls until 1946.

No open seasons were held in 1944 or '45, but annual elk seasons were resumed in 1946. Each year some areas were opened to any-elk hunting, but spikes were outlawed in bull-only areas until 1959 when they were con-



six animals were released to form nucleus of present Arizona elk population.

sidered legal bulls. This regulation has remained in effect since then.

Elk hunting has been on a special permit basis all along, with the exception of 1953 when some areas were open to an unlimited number of hunters. That year, over 6,400 tags were sold and 1,500 elk were harvested. Following the liberal '53 season some concern was expressed by sportsmen that the elk had been overhunted, and the Department was inclined to agree they might have been correct. By 1966, though, the number of permits had again topped the 6,400 mark and hunters took 1,469 elk.

The Department felt at that time our elk ranges had become stocked to capacity, and repeatedly said so, adding that the good hunting could not last for long. Somehow, though, the elk herds have held up in spite of the dire predictions.

Elk seasons have customarily been held in the latter part of November. In 1948 the season was in October, but from then until 1958 late hunts were the rule. That year a September season for bulls only was held in certain parts of the Apache National Forest. It proved so successful that it was followed in 1959 by another September season there and in Unit 4. Since then the early elk hunt has become standard in certain units throughout our elk ranges. Which area will be opened at what time depends on the distribution and movement patterns of the elk involved, and while the traditional late hunt has its advocates, the early seasons are generally more popular among the bulk of the hunters.

It would be very nice if we could brag about the continuously improving elk hunting over the past 40 years and offer a promise of even greater achievements in the future. It would be nice, but we'd be stretching the truth if we did. Elk hunting did improve steadily for awhile, wavered a little, then again improved to its present level. And, as we've already mentioned, it's been holding very well indeed.

Unfortunately, the habitat requirements of elks are quite specific; they won't just live any place we happen to want them, and once the available elk range had become stocked to ca-

The 1913 elk plant was supplemented in 1927. While the first release was in the Rim area, the Campbell Blue drainage in the White Mountains was chosen fo the '27 release. Elk were hauled downhill below snow-line before being released.

pacity, that was it. The bag was full; the "no vacancy" sign was up, leaving range improvement and the development of more intensive management techniques or less efficient harvest methods, such as archery-only seasons, the only possible solutions to providing more hunting.

Even with these policies applied at every opportunity, though, we're still faced with the realization that for the most part our elk ranges are already at capacity. Somehow or other they've held there for several years, but it's not likely to last forever. To add to the problem, our available habitat is gradually being gobbled up by the advance of civilization in one form or another. Elk don't do well too close to man's activities and with the continual development of farms, roads, and the expansions of cities and summer homesites into their habitat, elk populations in some localities have already been forced to shift their ranges.

So . . . while we're very pleased with the progress that has been made since elk were first stocked here back in 1913, we prefer not to toot our own horn so loudly that we deafen ourselves to a realistic appraisal of the future. Maintaining good elk hunting through the years to come is going to be a difficult task.

OTHER BIG GAME

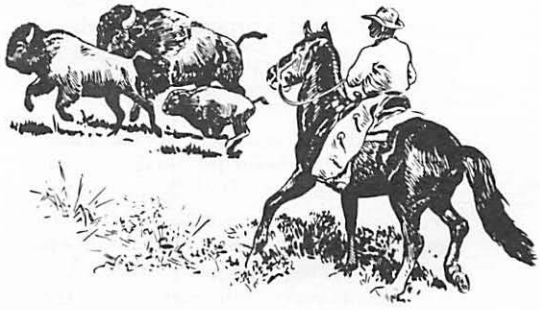
Of Arizona's ten big game species, only five were being hunted regularly when the Commission met for the first time. These were the native deer, turkey, bear, and javelina plus buffalo, which had been brought to Arizona at the turn of the century. In 1926 the Commission's predecessors had purchased the entire buffalo herd for the sum of $10,000, and a supervised hunt has been held every year since.

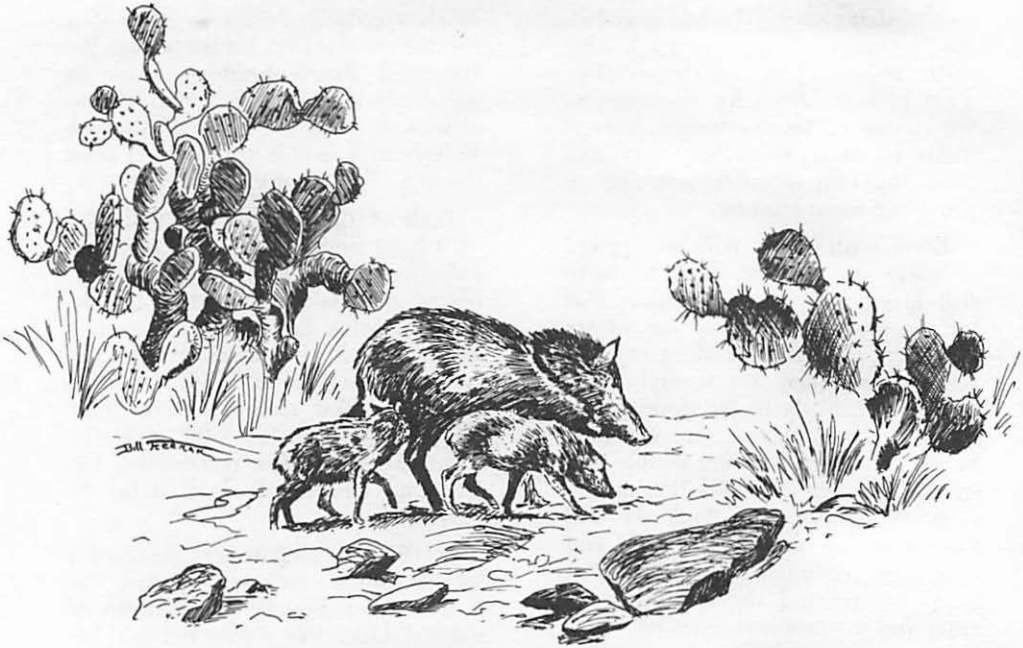
This first herd was maintained at the present buffalo ranch site in Houserock Valley. In 1945 a second herd was begun on Raymond Ranch between Flagstaff and Winslow, with stock from the Houserock herd and the Wichita Wildlife Refuge in Oklahoma. For a time the Department leased the Raymond Ranch property from its owner, but after a few years purchased it outright. The Houserock Valley range is still being leased from the U.S. Forest Service.

Both of these herds are managed on a basis similar to a cattle ranching enterprise. Each year a certain number of animals are harvested, but instead of being driven to market they are harvested by hunters on a permit basis. From 1949 to 1954, a buffalo herd was also maintained on Fort Huachuca but on the latter date the Army Signal Corps reactivated the post and the buffalo had to be removed.

In 1971 the Department received a lot of public sentiment against the buffalo hunt, largely as the result of a novel which told a gory fictional account of Arizona's annual buffalo removal program. The procedures of the hunt were subsequently changed in 1973, and within a few more years the buffalo hunt became a true hunt with hunters stalking the huge animals across seemingly miles of prairie.

Much of the sentiment which followed this novel resulted from an assumption on the part of many readers that the buffalo was nearly an extinct species. The fact that his numbers had been drastically reduced many, many years earlier, however, did not mean the species was in any danger of extinction. Arizona, in fact, maintains two of the finest specimen herds of the American bison to be found anywhere, and a removal program of





some sort is essential to the continued welfare of these animals.

Forty years ago antelope, elk, and bighorn sheep were under complete protection, and in 1931 the javelina joined their ranks. Turkey populations had supposedly felt the pressure of heavy hunting during the 1920's, so early regulations had limited turkey hunting to rifles only in the hopes of reducing wounding losses.

a spring hunt for javelina

Aside from the deer and elk hunting developments we've already mentioned, the 1930's saw little change in the big game hunting picture. In 1938 javelina season was again opened; however, this time it was to be in the spring to provide hunting at on off-season time. Department game men had learned that javelinas have no particular breeding season so a spring hunt did not interfere with their reproduction.

This idea of an early spring hunting season has been retained on javelina. In 1949 they officially joined the list of "big game" animals, with a tag required to hunt them. Their numbers have not increased to any extent during recent years, however, so in the mid-fifties the season was shortened to around two weeks. Execept for special archery-only hunts which have been held in January each year, javelina hunting seasons have been held to this shorter length since then.

Javelina hunting had to be tightened down some more in the early 1970's, however. The animal was still becoming increasingly popular with nonresidents, and because it is relatively simple to hunt, both archery and firearms were applying too much pressure in some areas. As a result, javelina hunting went permit-only for firearms in 1972, and while permits were required for the archery seasons they were on a no-limit basis. The archery permits were merely a manner of gaining information about the numbers of archery hunters.

Javelina hunting restrictions then went a step further in 1978. This was the advent of the so-called either-or hunting season regulation, under which hunters could no longer go afield during the archery season, then try it again during the general season if they were unsuccessful during the bow hunt. Under the new regulation, hunters could obtain a permit for one

hunt or the other, but could no longer participate in both.

One other method of controlling harvest was the advent of handgun-only hunts on the Three Bar Wildlife Area. The first of these was held in March, 1977, and during the ensuing years the idea was expanded to include some other areas.

In 1978, still another method of distributing hunter pressure and making javelina hunting a more enjoyable experience for all was initiated. This was the stratified hunts, which had worked well on deer in the fall of 1977. Basically, all this meant was that an area would be open at two different times, thus reducing the number of hunters afield at any one time.

antelope

ANTELOPE STEPPED DAINTILY into the picture in 1941, when a limited hunting season was declared. About 400 permits were authorized for that first modern-day hunt, and hunters were restricted to buck antelope. The following year the number of permits was increased to 750, and antelope hunting as we know it today had been launched. There were a few years when no open seasons were held, but in a couple of cases populations were high and does were also legal game in certain areas. For a number of years, any antelope on the last day of the three-day season was the general rule in the eastern parts of the antelope range.

The snow storm of December, 1967 has already gone down in history as one of the larger natural disasters ever to hit big game in Arizona. While some other species were harmed by the heavy snows which laid for weeks before they melted, the antelope were hit the hardest. Some herds were virtually wiped out in spite of the Department's valiant efforts to haul hay and other feed to them, and the regulations the following year reflected a reduced herd.

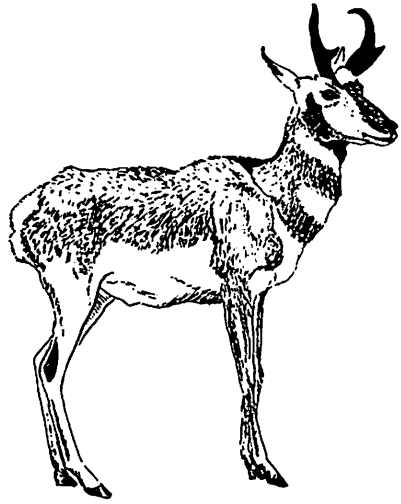
During the late 1950's antelope research showed that sometimes what appeared to be heavy hunting pressure actually had little effect on herd composition. Studies immediately fol-

In 1959 the Department trapped 34 antelope and gave them to the Fort Apache Indians for release on the reservation. Indian and state personnel are shown here loading some of them into a truck for the trip. The next year, 37 more were supplied. The efforts were successful, and in a few years the tribe authorized limited hunts.

lowing hunting seasons frequently showed about the same number of bucks to does as the areas had before the hunts began. This information indicated quite strongly that heavier hunting pressure would not jeopardize the antelope populations, so the number of permits climbed gradually to around 1400 annually until the storm mentioned above. The number then declined from 1416 to 835 in 1968. After that it gradually climbed back up to 1300 but since then has averaged at or slightly over 1000 permits each year.

Antelope populations had their ranges extended a little bit in 1971, when a number of the animals were released in the Arizona Strip country west of the Kaibab North in November of that year. The Strip, historically, was important antelope habitat. The operation paid off in 1977, when the first modern-day antelope hunt was held there.

The traditional three-year waiting period between antelope permits was changed in 1973, when a number of sportsmen expressed dissatisfaction over being unlucky in the drawings and having "to wait forever" for an antelope permit. A sympathetic commission reacted to the problem and extended the waiting period for antelope permits from three to five years. The idea was relatively short-lived, however, and in the spring of 1976 another group of hunters approached the commission and said they liked the old way better. The commission, ever-responsive to the sportsmen's desires, returned to the former three-year wait in time for the 1976 drawings.



turkey

TURKEY HUNTING regulations have changed some in the past 50 years. One major deviation was the decision, in 1955, to reinstate the shotgun as a legal turkey weapon. Many sportsmen had complained that their big game rifles did too much damage to the birds, so the Commission granted their request for permission to use shotguns.

The shotgun was put on a trial basis, however, to be used for three consecutive seasons during which extensive investigations would strive to determine if the loss of wounded birds was prohibited. A large amount of educational material was published, encouraging hunters not to shoot indiscriminately at flocks, but rather to pick out individual birds to avoid unnecessary wounding. After the three-year period, .22 rimfire rifles using hollow points were authorized in place of shotguns, but this only lasted one season. Hunters found the big birds too tough for the little .22, and shotguns were re-instated. Later, .22 magnum rifles were authorized, and, eventually, centerfire pistols.

Turkey hunting had been on a permit-only basis for many years, but in 1963 the permit requirement was dropped from the regulations.

Probably the biggest change in turkey regulations, though, was the advent of spring gobbler hunts in 1966. Fall hunters were bagging mostly hens and young birds, but game managers felt the mature gobblers in the population could stand more hunting pressure. The upshot was a spring hunt for bearded turkeys; a time when gobblers were more readily available. Permits were (and still are) required for the spring hunt, but not the fall season.

The Department trapped a number of bighorns in the early sixties, and used them to establish a herd in Aravaipa Canyon.

bighorns enter the picture

THE MAJESTIC BIGHORN sheep, which was once one of Arizona's most important game animals, suffered so severely from the encroachments of civilization during the very early territorial days that it was believed to be nearly extinct when the Commission took office. When the first mountain men arrived here Rocky Mountain bighorns were supposedly found on the San Francisco Peaks and in certain other high ranges. This species is reported to have become extinct long before the turn of the century, though, for reasons which have been lost through the passing years.

As a result, the remaining desert bighorn sheep were placed under complete protection very early in Arizona's history, with large areas set aside as refuges where no hunting of any kind was allowed.

This situation remained largely unchanged until the early 1950's, when the Department initiated a three-year study program in the sheep ranges of western Arizona. Near the end of this study in 1953, a special hunt with 20 permits was authorized to evaluate the effects of hunting on this species. The hunt continued on a yearly, experimental basis, with 20 permits each year until 1958, when the number was increased to forty. Only rams with a three-quarter curl or better were considered legal game, and the hunts were rigidly controlled with all hunters required to check into and out of the hunting area. The sheep taken were examined by Department personnel, and records were made of their measurements. In 1959 the hunt was again expanded, this time to 65 permits. After that, the number ranged between 80 and 90 each year until the early 1970's, when it began a gradual decline to around 60.

Rocky Mountain bighorn sheep supposedly occurred in Arizona many years ago, but in modern times they have not been considered a part of our natural fauna. In the early summer of 1977, however, game and fish personnel noted a small number of Rocky Mountain sheep in the Blue River country at the eastern edge of the state. They are believed to have been wanderers who moved into Arizona from neighboring New Mexico, where they had been planted a number of years earlier. This Rocky Mountain sheep population, such as it was, received a boost in May, 1979, how-

ever, when two rams and six pregnant ewes were planted in a selected area near the Blue River.

increased stature for bear & lion

THE STATUS OF THE BEAR was advanced another step in 1958, when for the first time tags were required before a bear could be legally killed. In view of the fact that many hunters encountered bear while seeking some other big game animal, this regulation was amended in 1959 to allow a big game hunter to take a bear without a tag up to the time he made his big game kill. Hunters who went out specifically after bear were required to have the bear tag. Finally, in 1969, the bear became a big game animal, with a tag required under any circumstance. In 1971 the mountain lion joined the ranks of big game species, largely because of an upsurge of interest in lions which, like that of the buffalo, was brought on largely by misleading but widespread publicity and a resulting public fear that lions were endangered.

small game

ONE OF THE EARLIEST game management efforts recorded in Arizona was concerned with small game. Back in 1914, the State Game Warden received a shipment of ringnecked pheasants from an eastern supplier, and what was to eventually become a persistant game management failure was launched.

In its early stages, the idea behind the pheasant program was to raise some birds, then turn them loose in the wild to see if they could fend for themselves and eventually become established as an important game bird. This in itself was a good idea. The pheasant had come to this country from China and had become a top game bird in many areas, so it was feasible they might take hold in Arizona as well.

But they didn't take. Just how long it took the Department to realize this is not clearly shown by early records, but by the time the Commission took over the reins of management, the idea of raising game for release just ahead of the hunters had become so popular with sportsmen that game and fish departments all over the country were stuck with the idea, whether they liked it or not. It's interesting to note, however, that mention of these bird-raising efforts is conspicuously absent from most of the Commission's early reports, indicating that perhaps they felt little enthusiasm for the plan.

The sportsmen didn't feel that way, though, and kept insisting the Commission raise more birds even after it had become apparent that Arizona was not stated to become good pheasant country. Raising pheasants continued. Finally, in 1946, the Commission went on record as being opposed to the idea, and put the following statement in their annual report: "Contrary to their better judgment . . . the Commission entered into game bird propogation in response to sportsmen's request when land became available for the purpose through offices of the U.S. Fish and Wildlife Service."

Thus the Cluff Ranch Game Bird Farm near Pima was established. For the next three years the Commission poured money into the enterpirse, but records showed that 80 to 90 percent of the birds just "disappeared without a trace." By 1949 the Commission and Department had "had it," and the

Releasing white-winged pheasants near Pima, 1967.

bird farm was closed in spite of numerous protests.

Although the ring-necked pheasant refused to become a part of Arizona's fauna, at least two other game birds showed some promise of gaining a foothold here. One was the chukar partridge, which had also been raised at the bird farm. Chukars had not become established as well as people had hoped they would, but they had not been a complete flop, either. As a result, the Department continued planting them. Instead of releasing pen-raised birds, though, live-trapped wild chukars from other states were released in areas that appeared to be good chukar habitat and which were not occupied by any native game bird.

For a time, the Afghan white-winged pheasant appeared to become at least somewhat established in areas around Arlington and Safford. Plants were made for three years in each release area, and in 1968 a limited hunt was held near Arlington. This was repeated in 1969, there and in Graham County. The pheasant hunt continued for a few years after that, but it soon became apparent the birds simply did not take hold and become established to a satisfactory extent in any of their new habitats. The last pheasant hunt (other than falconry only hunts which have been authorized in recent years) was held in 1971.

but we did other things, too

As early as 1932 the State Game Warden recognized the importance of the cottontail rabbit as a game animal, and was urging sportsmen to support its inclusion in the list of game animals at a future session of the Legislature. This, of course, was done, but the exact date is a bit obscure.

The plight of doves, both mourning and whitewing, was causing some concern in the late 1930's. Seasons then were held throughout most of the summer, with the result that the birds were being hunted while some of their young were still on the nest. Because doves, being migratory birds, are under the jurisdiction of the Federal government, it was necessary to work through channels to Washington before the season could be changed to the later dates with which we're now familiar.

The abundant white-winged dove populations enjoyed by Arizonans through the middle portions of the century began in the mid-1970's to show serious declines as a result of

Ducks over the Robbins Butte Wildlife Area.

habitat changes and different agricultural practices. As more and more nesting habitat was gobbled up by the mushrooming human population of central Arizona, a change in agricultural practices was occurring at the same time. Fields which had formerly been used for maize and other grain crops ideal for whitewings were put in cotton, and adjacent nesting habitat disappeared. The result was a great decline in whitewing numbers in what had been key nesting areas in central Arizona. Accordingly, the bag limits were modified downward for a few years, and by summer, 1979, the Department was considering a noon opening in central Arizona.

With the exception of the game farm activities, the period from about 1940 to 1950 apparently produced no significant developments where small game was concerned. It is important to point out, though, that while a given period of time might not produce any startling achievements, a great amount of time and effort are nevertheless being expended to gather information which will eventually result in better game management. Although the changes from these continuing studies sometimes take the form of a major accomplishment, they are more often so gradual in nature that they're hardly noticed. Such was the case with the small game work done during the 1940's.

The next decade had just begun, though, when some of the ideas gathered through the previous years were put into operation.

waterfowl needed water

One of these was concerned with waterfowl, and the fact that Arizona offered only limited feeding and resting areas. The net result in many cases was that waterfowl were driven right on through the state as soon as hunters had fired a few shots at them. With no place to "hole up," the ducks and geese headed on south and ended up in Mexico, leaving Arizona with duckless duck hunters.

As a step toward alleviating this problem, the Department launched the Gila River waterfowl development program in 1951. Two areas were set aside and used as controlled hunting areas. Since their beginnings, the Robbins Butte and the Arlington waterfowl areas have been developed to provide ideal winter waterfowl habitat, and have proved a highly important factor in preventing the birds from practically ignoring the lower Gila River portion of Arizona.

During the late fifties, a similar program was carried out along the Colorado River near Cibola. A sizeable parcel of land was acquired by the Department there, and developed for waterfowl. These were to be followed by additional waterfowl devel-

opments at Chevelon Creek south of Winslow, at Painted Rock Dam near Gila Bend and several smaller areas.

The 1950's also saw some changes in the quail hunting situation in Arizona. A special quail study conducted near Oracle Junction showed that hunting did not affect the bird populations nearly as much as everyone assumed it did. It also showed that birds alive and healthy in the early fall were often lost to natural causes before the quail season ever opened. This information led to the split quail seasons of 1958 and 1959, and eventually to the four-month seasons of recent years.

The idea of bag limits saw some liberalization in the mid-1970's. After sportsmen had requested it, the commission granted a double daily possession limit on squirrels in 1976. This meant a hunter could take his usual five squirrels on Saturday, then take five more before heading home on Sunday with ten squirrels in possession. This was to be followed by the same type of regulation for quail in the fall of 1979.

The 1970's saw a number of efforts to further enhance the state's small game population. In March, 1970 some masked bobwhites were released in selected areas of southern Arizona with the idea of reestablishing this native game bird there. The masked bobwhites had disappeared in the early part of the century when their native grasslands had been overgrazed to the point where they could no longer provide the type of habitat the birds required. These releases were followed by subsequent plants, but to date the masked bobwhite has not been reestablished in appreciable numbers.

Efforts to establish a breeding population of Canada geese in the White Mountains back in the middle and late 1960's saw some encouraging signs in 1973, when honkers were observed in some of the areas where they had been reared earlier.

Also going on during the middle 1970's was a blue grouse trapping operation in the White Mountains. For several years a number of grouse trapped in the Whites were transplanted to the San Francisco Peaks area north of Flagstaff. Some encouraging signs have been noted, but to date there is no solid evidence that grouse have indeed taken hold in their new habitat. In the spring of 1978, though, there was news that a blue grouse, probably planted in 1975 or '76, was found near the peaks area. One of the factors believed to be inhibiting production, was the fact that the birds seemed to disperse over a very wide area instead of sticking together and getting on with the job of establishing a new population.

Not all the small game transplants in the 1970's were birds. In the summer of 1972 a number of Kaibab squirrels were transplanted to the Mount Logan area of the Strip in the hope of establishing a population there.

And so as we look over the years since the first efforts were made to manage Arizona's game populations, we realize what a very young field of endeavor we're engaged in. We've learned a lot, but we still have a lot more to learn. It's doubtful, however, whether any future lessons will prove more important than two of the basic tenets we've acquired through our years of study. One of these is that wildlife is a crop; a crop which is going to be harvested by nature if we don't do the job. The second — closely related to the first — is that we aren't really managing the wildlife, we're managing the habitat it calls home by manipulating populations and the factors which influence them. The only other aspect we can hope to manage is the degree of effect human activities have on wildlife populations. The Department is not always able to control this, but it does use its influence whenever possible to keep the impact these activities have on wildlife to minimum.

When Granite Basin Lake was opened in 1942, I&E was on hand. Man in uniform is Glenn Hunter; behind movie camera is Charlie Neihuis.

Information & Education

By 1942 the job of managing hunting and fishing in Arizona had become so complicated that the Commission felt in was necessary to make a more direct apporach to the problem of keeping the state's sportsmen informed. To accomplish this, the Commission authorized the formation of an Information and Education Division, and a man was hired full-time to carry out the functions implied by its title.

The earliest I&E efforts included the establishment of a periodic newsletter. This was issued every other week and was sent to various news sources around the state. Also included in the early efforts were articles on game and fish, which were distributed to magazine and newspapers for publication. Other informational material, such as the hunting and fishing regulations and the publication of the Department's annual report, were taken over by I&E. In addition to writing news releases and magazine articles, the first I&E Division spent a great deal of time making movies of wildlife and Department operations. These films were shown around the state at schools, civic clubs and sportsmen's groups, by a member of the Department who narrated the films and answered questions from the floor.

Through the years since then the functions of the I&E Division have changed only in the scope of the activities and in the methods used to accomplish them. Basically, though, I&E meant "inform and educate" then, and it still means the same thing today.

After the first few years, the Division was increased by the addition of another full-time employee. By the mid-40's the circulation of the biweekly news release had increased to around 300, and the movie library had been expanded to include several complete, silent films on game and fish activities.

The first Department magazine was initiated in 1947, on a quarterly basis. To help with the ever-increasing amount of printing to be done, the

Division purchased an offset press which took over most of these chores. The first radio efforts also took place around 1947, when a weekly program was begun.

From about 1947 to 1950 the emphasis swung toward educational efforts, and a considerable amount of I&E time went into the compilation of a conservation education guide book for use in Arizona's school systems. This was completed, with the cooperation of other educational institutions, and was very well accepted. During this period the other I&E functions which had by then become standard were, of course, continued.

a regular news service

The next big step in the division's progress was not until 1953, when the bi-weekly news release became the *Weekly News Bulletin.* For many years the weekly bulletin continued to be produced with little change in style or distribution policy. In 1967, however, it was decided to make the weekly news available to the many people who kept requesting it, so the *Newsletter* was initiated. This was a boiled-down version of the bulletin, but because of its simpler format and smaller size, distribution did not need to be limited. The regular bulletin, in its multiple-page form, is now sent only to actual news media, by first-class mail each week.

The quarterly magazine begun in 1947 had been discontinued after a short time, but in 1953 it was reinstated as the official voice of the Department. During its early years, the *Wildlife News,* as it was then known, consisted of eight pages in a half-newspaper, half-magazine format. In 1956 a regular magazine style was adopted, and in 1958 it was changed to a six by nine-inch size. The name was changed from *Wildlife News* to *Wildlife Views* in 1959. While the style remained basically the same, the winter issue became the Dapartment's annual report in 1959, and in 1962 publication became bi-monthly instead of quarterly.

Circulation and the number of pages continued to grow until each issue was reaching over 26,000 subscribers, including several thousand in other states. Many out-of-state subscriptions were going to school children who had been told by their teachers to write in and ask for free publications, and it was felt this was not the reason we were publishing *Wildlife Views.* Consequently, in 1967 we began charging a dollar a year for nonresident subscriptions, and the circulation dropped to around 16,000 when this was combined with a purge of the mailing list. All subscribers who failed to respond to a free renewal request were dropped.

During the next few years *Wildlife Views* continued on that basis, but the money crunch in early 1972 coincided almost exactly with the resignation of the editor. It was therefore decided to drop the magazine for a while, and leave the editor's position vacant. For the next five years the division had no editor, so the only publications produced were the necessary regulations.

In November, 1976, though, an editor was again authorized, with the idea of reviving *Wildlife Views* in a newspaper fomat. The first issue came out in January, 1977 as an eight-page tabloid. By the end of the year 12 pages had become the normal size and circulation was climbing steadily. This situation remained unchanged until July, 1979, when WLV moved into a paid-subscription basis at a rate of $3.00 per year. At the time of conversion, subscriptions totalled more than 60,000.

as for other activities . . .

The year 1953 also saw the beginning of a long series of I&E publications dealing with specific aspects of game and fish management. Since then the list of specialized publications has grown to include most of the topics commonly requested by teachers, sportsmen and other conservationists.

Television became a part of the

Many of the early firearms safety classes were taught by Department personnel. Game Ranger Bob Hernbrode (in uniform) was very active in the late fifties, later joined I&E and headed Education Branch until he left the Department in summer of '79.

I&E activities during 1953. Three appearances were made by the division, in addition to a 15-minute weekly radio show which was broadcast over several stations around the state.

During the early 1950's little motion picture work was done, but the film-lending library reached 10 films by 1955. Slides and black and white photos continued to be an important I&E function, however, and have remained so until the present.

The advent of the new *Wildlife Views* in early 1977 caused a considerable stepping up of the black and white photo requirements, and a corresponding increase in darkroom work. As for the film library, it has continued to grow each year and now includes 225 copies of 37 different titles, plus a number of slide shows and film strips. Maintaining this library now requires an average of 20 hours per week; more during the busy periods when firearms safety classes are in full swing.

firearms safety involvement

The year 1955 saw the beginning of the present Arizona Firearms Safety Training Program, and in September of that year a third I&E man was hired to get the program underway. The division prepared booklets and other materials to be used in the course, and firearms safety training became a major I&E function.

By the end of 1956 about 400 students had completed the firearms course. As outlined in the law which authorized it, the Department's function was to administer the program by certifying instructors in all communities of the state so that eventually it would be able to carry itself through these volunteers.

As it turned out, though, the division has continued to support the program with at least one full-time man assigned to it. By July, 1969, about 35,000 students had been graduated. By 1973, over 50,000 students had completed the course, and in De-

cember, 1976, the 75,000th student had been graduated.

The program received a considerable boost in 1971, with the advent of federal aid funding for this purpose. The Department quickly picked up on this opportunity, and FA Project W-93 was launched. The elements of the program have remained unchanged, but federal financing has been part of the picture since then. A subtle shift of the law added a bit more incentive in 1974, and effective January 1, 1975 any youngster under age 14 had to complete the course before hunting big game. Prior to then, anyone age 12 or over could hunt big game with no training required, and ten-year-olds could hunt big game if they passed the course.

The program has never snowballed as originally hoped, in spite of the time and money invested in it by the Department. Some individual instructors have graduated literally hundreds of students, but these dedicated sportsmen and women are in the minority. Some of the instructors certified never taught a course, however, and during the mid-70's the Department began regularly purging the instructor rolls of non-productive individuals. The program is still successful, thanks to the dedicated efforts of those individuals who have hung in there and provided the training when it was needed.

look, we're in the movies . . .

In 1957 the division's film-lending library was increased by the first homegrown motion picture. Titled "Water for Wildlife," the film depicted the development of rainwater catchments in arid areas of the state, and soon became one of the most popular films in the library.

During the ensuing years other full-scale motion pictures produced included "From the Bottom Up," a 1961 film dealing with warm-water fish management, followed the next year by "How to Dress (it) for Dinner," covering field care of game, and in early '63 by "To Have and to Harvest," which dealt with deer management. "The Wrong Kind of Varmint" was also produced in 1963, and covered the subject of vandalism and general outdoor manners. This film won interantional honors as the best conservation film of the year from the American Association for Conservation Information.

In 1963 the Department's "Front Counter" operation was turned over to I&E. Behind counter are Dave Roe, rear, Joan Harner and Phil Cosper. All three are still with the Department. Dark-haired woman is unidentified, but man in sports coat is Bob Hirsch, well-known outsdoorman.

The I&E Division operated with a reduced staff from early '72 until FY 1976-77, when it once again reached its full former strength of 13 people. During that period the demands for personalized service continued to grow, however, as people found out more about the multitude of informational services available. Meeting these and other demands, and keeping up with other standard requirements with a reduced staff, had its effects on audio-visual production as well as publications. Two full-scale films were produced during that time, though, the first dealing with hunter image and the other firearms safety.

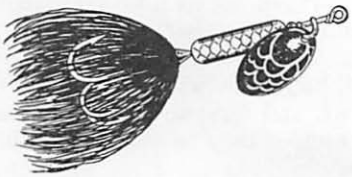
About 1973 the International Association of Fish and Wildlife Agencies decided its member agencies should get hot and heavy on the subject of improved hunter image. With all the anti-hunting sentiment galloping about the country, hunters in general were taking a beating image-wise. Arizona's answer to this charge was a film showing a typical day of deer hunting the way it really is — not the way the anti-hunters think it is or even the way most hunters think it ought to be. Titled "A Day on a 'Mountain," the film was billed as "a hunting film for people who don't like hunting films," and was widely acclaimed around the country. In June, 1975 it won first-place international honors from the Association for Conservation Information. Later it won a coveted second-place "Teddy" award from the Michigan Outdoor Writers' annual film competition, being nosed out of first place by a segment from ABC's "American Sportsman" television series.

The other major film effort had the distinct advantage of being assisted by actor John Wayne. The Duke introduced the film, called "This Little Bullet," then set the stage for each of the various segments contained. This film, too, was widely acclaimed when released in late 1976, and over 100 copies have been sold for use in firearms safety courses in various states.

the "sketch" idea emerges

The time, effort and money involved in producing full-scale motion pictures prompted the I&E Division to look into other ways of providing informative films for general distribution, and in the fall of 1976 the "outdoor sketch" series was born. Based on the premise that a film could be a bit rough around the edges and still have both entertainment and informational value without all the fine touches that have to be added in a lab, the first sketch covered the subject of deer in Arizona. It was soon followed by another on javelinas. The idea caught on very quickly with sportsmen's clubs, who wanted to see films about various kinds of wildlife, especially just before the respective hunting seasons. Somewhat surprisingly, the sketches also proved very popular with schools, and records showed that 70% of their use was by school classes.

Encouraged by this, the division followed these first two films with sketches on birds and warm-water fishing, finally finishing the fifth sketch, "Elk in Arizona," in 1979.



radio & TV

Radio and television efforts slowed down after 1953, while the division tackled other chores. Numerous guest spots on both media continued, sometimes on a regular and sometimes on a sporadic basis, but no concerted efforts materialized until the spring of 1966. It was then that the Department's weekly, five-minute radio show was initiated, and since then it has been carried regularly by an average of 20 stations in various parts of the state.

The major breakthrough in broadcasting, though, came early in 1967 when a regular television program was begun over KAET Channel 8, the educational channel at Arizona State University. Starting with a simple, 15-minute format, it was soon expanded to a half-hour show. As the weekly show gained popularity it was soon picked up by other stations and carried more or less regularly over four different channels – two in the Phoenix area, one in Tucson and one in Yuma. In June, 1969, the show received third-place international honors among conservation television shows produced in the United States and Canada from the Association for Conservation Information.

Former AV Specialist Russ Boshart (Rt), interviews Project Assistant Howard McDonald during one of the early "Wildlife Views" TV shows, in 1967. The show ran over five years.

Wildlife Views TV enjoyed a five-year run. In the fall of 1972, though, the administration of Channel 8 changed their attitude about financing the production of "outside" shows such as Wildlife Views, and stated we would have to pay production costs or drop the show. With the money picture as it was in '72, I&E had no choice but to give up TV until better times. So far those times have not materialized.

stepped-up educational efforts

During FY '68-69 an education officer was added to the I&E staff, and educational efforts began moving beyond the firearms safety stage. A teachers' guide to environmental education was the first major project, and this was followed by the development of a program which provided teachers' seminars and workshops. Gradually the division began serving in a consultant capacity for schools which wanted to know how to effectively teach conservation and wildlife-related subject matter.

In July, 1976, a second education officer was added to the division, and this allowed the development of the Wildlife Docent Program, under which specially trained volunteers go into the classrooms and conduct sessions in wildlife ecology and basic understandings. This program was underway by the end of that year, and quickly gained nationwide recognition and acclaim. By the summer of 1979 plans were being made to add another education officer to the staff, so the program could be developed and administered in the Tucson area.

other I&E efforts

In 1963 several new areas of endeavor were included in the scope of I&E activities. The "SAVE" Program (Sportsmen Against Vandalism

The Department's first sound film production was "Water for Wildlife," made in 1957. Four years later a much more ambitious project was undertaken. Titled "From The Bottom Up," the film covered warm-water fisheries management, with much of the footage shot underwater. Bill Sizer, information officer at that time, checks his movie camera before going back down for more fish pix.

Everywhere) spearheaded by the Arizona Varmint Callers Association got underway with considerable help from the Department, which served in an advisory capacity and supplied many of the materials, although remaining out of the spotlight.

That same year — 1963 — also saw the transfer of the Department's front counter operation from Administration to I&E. This was part of geographic move designed to give I&E more working room by transferring the administrative functions of the Department to Deer Valley.

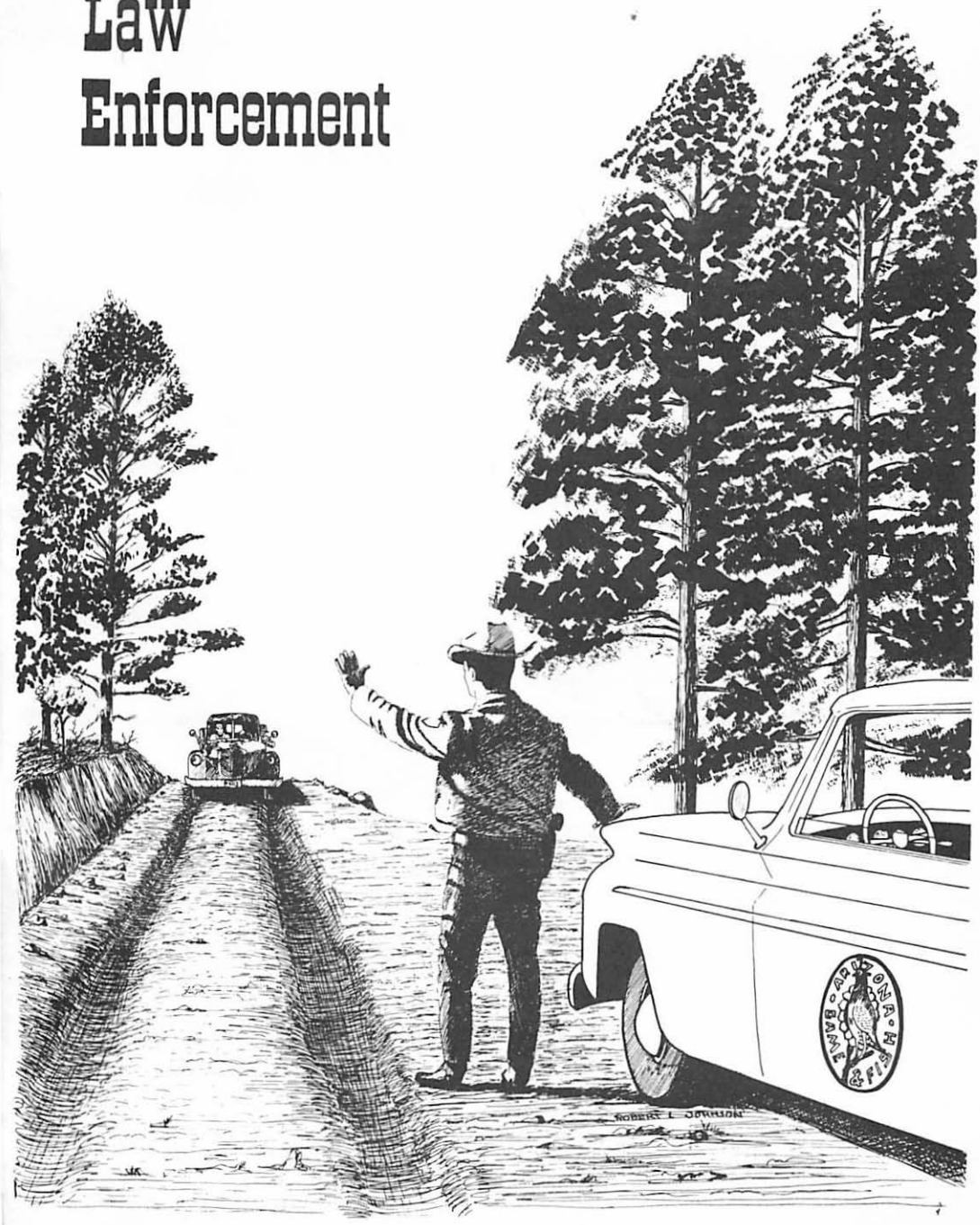
When the Department moved its remaining Phoenix Office to the new Deer Valley building in January, 1970, the I&E Division was given the job of operating the Department's telephone switchboard in addition to its front counter license and tag *sale* function. This effectively reduced the existing staff by one full-time person. During the past decade the license sale function has grown from some $23,000 annually to over $110,000 last fiscal year, with no increase in personnel to handle the growing load.

In 1964 the State Fair Commission presented the Department with a new steel building which, for over a decade, housed the annual fair exhibit. This continued to be a popular show with the Fair Commission and the visitors who viewed it, but in time it became painfully apparent to I&E that the exhibit was not doing *the* job we had in mind. Educationally oriented exhibits were ignored en-masse by visitors who were interested primarily in looking at captive animals or asking personnel present where the best deer hunting was being found. (The State Fair always coincided with the first week of general deer season.

The advent of the Phoenix Zoo, combined with our inability to house captive wildlife in the new Deer Valley facilities, eventually brought about the gradual demise of the fair exhibit. Finally the Fair Commission, disenchanted with exhibits devoid of live critters, turned the building over to other uses.

Most of the accomplishments of the I&E Division do not take a form that can be held up and admired, but the public appearances, the countless articles and news releases, the TV shows, the publications and even the telephone conversation have all contributed to a better understanding of the Department's management efforts by Arizona's citizens. This understanding has in turn led to acceptance of modern management techniques, and has enabled the Department to move ahead with new ideas and programs knowing it has the trust of Arizona's hunters, fishermen and other conservationists.

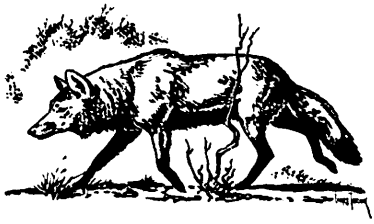
Law Enforcement



In 1929 the Department's law enforcement staff included 16 deputy game wardens plus several special deputies and eleven hundred special, non-salaried "deputy game wardens." This idea of special deputies was popular for quite some time in Arizona, and each year many of these special

commissions were issued. Many of the individuals who carried such cards, however, failed to live up to the authority entrusted to them, and soon it became apparent that only qualified, well-trained officers should enforce the increasingly complex game and fish laws. The issuance of special deputy commissions was, as a result, limited to bonafide enforcement officers.

During the mid-40's the term "ranger" was adopted for the Department's officers, and four ranger supervisor positions were created. The total number of rangers and supervisors grew from 18 in 1943 to 33 in 1947. By 1949 the total had increased to 39, and for the next ten years remained near that figure. The name "captain" was adopted in place of the ranger supervisor title in the early 1950's.



better communications

During the 1940's the ranger force was able to increase its effectiveness by the addition of several two-way radios, which were operated in cooperation with several other agencies. This increased communication proved invaluable to efficient enforcement, so through the years radios were added to all ranger vehicles.

In 1961, however, the Department really moved into the era of modern communications when the present two-way radio system was acquired. The system literally gives statewide coverage, through the use of mountain-top repeater stations which can be turned on from mobile units to relay transmissions for much greater distances than had ever before been possible. Because the Law Enforcement Division was experienced in radio communications, it assumed the chore of manageing the new system. A dispatcher was assigned to handle the traffic, and in 1968 an additional dispatcher position was filled so the Department could begin maintaining the network over weekend and holiday periods. Until the second dispatcher joined the ranks, only critical weekends such as the opening of deer season had advantage of the Phoenix control station.

The Law Enforcement Division's involvement in communication took still another step upward once the financial crunch which hit in 1972 had eased. During 1974 the number of dispatchers employed by the Phoenix control station was increased to four, giving the Department 6 a.m. to 10 p.m. coverage seven days a week. This program is still in effect today.

Another advance in commuications was achieved in 1972 when the Department's dispatcher station was hooked into the National Crime Information Center. This "NCIC" provided almost instantaneous information on crime throughout the country. The Department also acquired access to a teletype which provides still better communications between it and other agencies.

the "HOW" idea

Communications began its most recent step forward in May of 1975 when the Department began distributing "HOW cards." ("HOW" means "Help Our Wildlife.") These cards were designed for citizens to carry with them, then take notes on any violations they witnessed. The cards were prepared on a postage-free basis, so that individuals could simply send them in to the Department with information about violations they had observed. The HOW cards were not very effective, however. Some people tended to use them as jokes, and in most cases the actual violation information submitted took too long to reach the Department to be of much value.

The HOW cards were added to the hunting regulations booklet in 1976 and '77 to achieve better distribution

of them, but the general idea didn't really contribute much until 1978 when the "HOW-Line" phone system was established. This allowed a citizen to dial a toll-free number from anywhere in Arizona, thus providing the Department with almost instantaneous information on law violations. Since the HOW-Line has been in operation, a large number of significant cases have been successfully completed from information supplied by citizens.

new laws to aid enforcement

The 1977 Legislature passed two laws which contributed to more effective law enforcement. One of these authorized the Commission to assess civil penalties against those who took wildlife illegally. Monetary values were assigned to various wildlife species, and the Commission could assess these amounts against individuals who took them illegally. The other law authorized reward payments to citizens who provided information leading to the conviction of game law violators.

The complexity of law enforcement continued to increase through the seventies, with such things as snake poachers who were collecting and selling protected reptiles as far back as 1970, considerable world-wide fuss over protected large cats, including Mexican jaguars which might occasionally wander into Arizona, and a growing interest by the public in various wildlife beyond those species of primary concern to sportsmen.

Perhaps the biggest furor occurred in late 1974 when the Department adopted a comprehensive set of regulations covering falconry. The Commission meeting at which these regulations were considered included seven hours of discussion, most of it by protection-oriented birders who wanted to be certain the new regulations adequately protected raptors. The following August essentially the same discussion was conducted for another five hours at a Commission meeting in Prescott, making this relatively minor matter the subject of the longest dis-

LAW ENFORCEMENT PERSONNEL — MARCH, 1958

L. to R. Seated: Cliff Sorrells, Rex Hansen, Bob Beasley, Carl Jones, Jack Bennett, Pat Kelly, Joe Wilbanks, Mervin Smith, Jack Wheeler, Jerry Andrews, Ralph Morrow. Kneeling: Chuck Bancroft, Bill Farrow, Tom Barnes, Harold VanSickle, Dutch Coons, Pete Peterson, Harvey Palmer, Bob Hernbrode, Wally Breese, Budd Hull, Arnold Kester. Standing: Charlie Luster, Don Moon, Don Smith, Ross Kidd, Don Wingfield, Orson Whipple, George Daniels, Harold Heddings, Norman Williams, Harold Pratt, Henry Stotts, Levi Packard, Jack Murray, Buck Wallace.

cussion in Commission history. Finally, however, the falconry regulations were adopted in the form effective today.

ranks continue growing

When the transfer of game rangers to the newly formed ranks of "Wildlife Managers" was accomplished in July, 1960, the previous ranger captains were retained as Rangers-at-Large, the ranks of which grew steadily to nine positions by July, 1969.

Prior to the Wildlife Manager system, enforcement responsibilities were carried solely by the rangers. The WM system, though, placed former biologists into jobs where enforcement was a major responsibility, and in 1962 the Department decided to utilize more of its personnel for this duty. In the fall of that year, most men in non-enforcement positions were sent on deer hunt patrol, and this program continues today, not just for deer hunts, but for other situations where additional help is badly needed.

Through the seventies, law enforcement responsibilities were more and more taken over by the regions, and in 1974 the law chief commented that the division had become a service organization, providing informational and technical services in support of the field enforcement effort. By July, 1974 the remaining rangers-at-large had been transferred to the newly created regional enforcement specialist positions.

During the latter half of the 1970's Law Enforcement Division activities became more and more involved with the updating and rewriting of regulations, and monitoring state laws for necessary changes or additions.

we take to the air

The Department owned a used military plane from 1950 until it literally

The 1952 elk hunt started mild enough, but a severe snow storm moved in and trapped many hunters. As soon as weather allowed, rangers scoured the hunt areas for missing persons. Six hunters died. Ranger Harold VanSickle shows his exhausion after the search.

Twenty years ago big game permit drawings were handled by Law Enforcement, often in the rotunda of the State Capitol Building. This was the 1959 sheep permit drawing.

wore out and was traded in on a car in 1954. For several succeeding years, the Department chartered planes when they were needed, but in 1962 we acquired our first new aircraft. It was a four-place unit destined to be used for many varied activities by the entire Department, but the scheduling and maintenance were placed under the Law Enforcement Division. Early in 1963 it was converted to a fish-planting plane with special belly tanks installed. It assisted with the first stocking of Lake Powell which was forming behind Glen Canyon Dam, planted striped bass in Lake Havasu, and performed many other fish-planting chores. In 1964 we acquired a second plane for slow, low-level survey work. Both these original planes have been replaced, but we continue to function with one larger aircraft and a smaller one for low-level work.

and to the water

When Arizona passed its first boating law in 1958, the Department was expected to cooperate in the enforcement of the title. In 1968, however, boating registration was formally transferred from the Highway Department and boating enforcement became an additional activity of the Division as well as the regional personnel.

The position of boating coordinator, which had been under the Director's Office, was formally transferred to the Law Enforcement Division during the 1973-74 fiscal year, and an education officer was added to the staff on a full-time basis by the following year. By July, '74, the Department had logged 6700 hours of watercraft enforcement effort on one year's time.

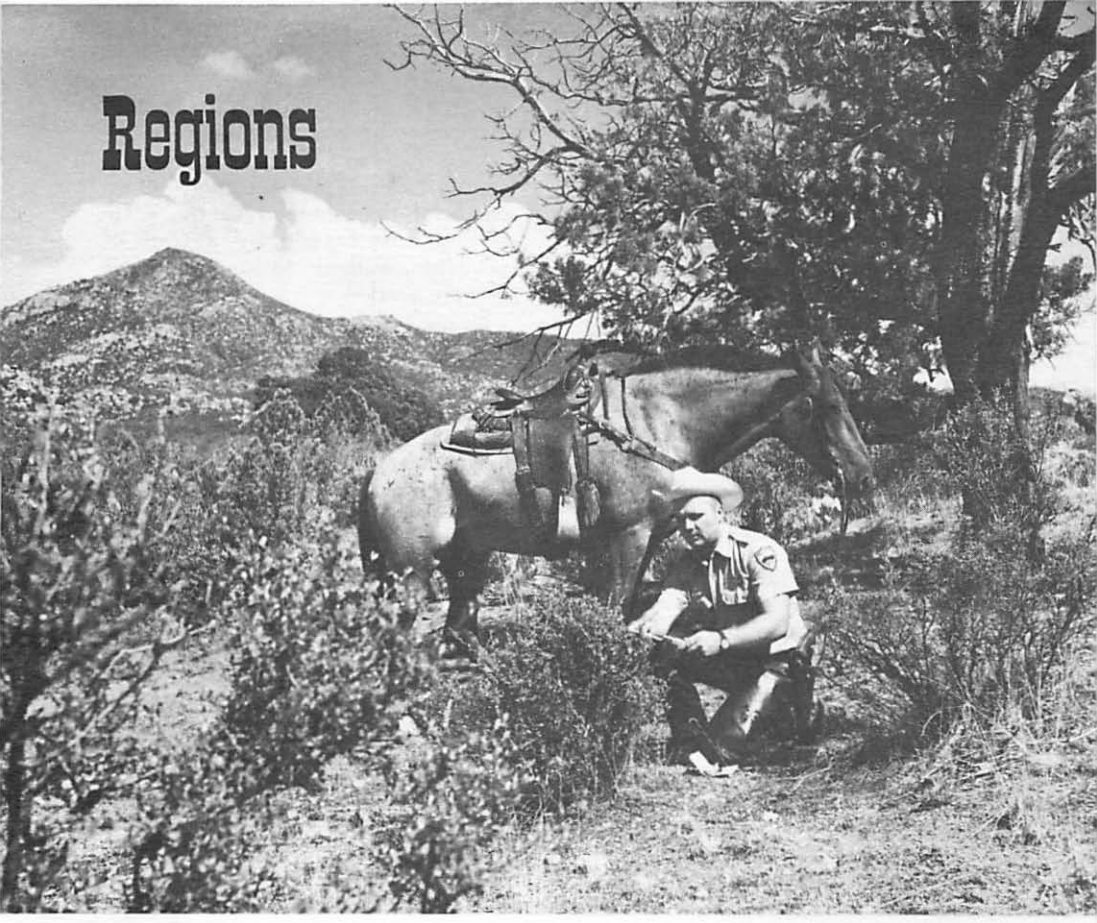
One other aspect of law enforcement has continued to develop through the years, and this is the

The game hogs who took these illegal deer, javelina and fish got caught by rangers Wally Breese (left) and Bob Beasley. It happened in 1960.

degree of professionalism required of enforcement officers. In the early 1970s' ALEOAC — the Arizona Law Enforcement Officers Advisory Council — assumed authority over certification of individuals who do law enforcement work. Those Department personnel who had been engaged in enforcement for five years or longer were automatically certified on the basis of experience, but new personnel were required to take a 200-hour training course. That course has subsequently grown through the years, and today over 400 hours of specialized enforcement training are required before a new recruit can be certified as an enforcement officer.

Although to some people the game ranger is still the "woods cop" of many years ago, today's game and fish officer upholds a much more complex set of responsibilities. Foremost of these is the spearheading of public contact in the field, and most sportsmen have learned to realize that the wildlife officer is present not only to enforce the laws, but to offer them advice, assistance, tips for better hunting and fishing and, in every way possible, to make the outdoor sports they pursue more enjoyable for everyone concerned. Human nature being what it is, though, enforcement will no doubt remain his primary function.

Regions



Wildlife Manager Jim Higgs on browse transect, July '64.

We pointed out early in this report that the early-day "game warden" was a composite of police officer, fish hatchery worker, public relations man, game manager, and. . . well, just about everything there was to be done in the line of game and fish conservation. Except for the number of people employed, about the only changes in the Department's enforcement staff through the years have been in the concept of the game and fish officer himself.

Twenty years ago these changes took an interesting course which might, at first glance, appear to form a circle which leads right back to the original starting point. The first game wardens did a little bit of everything, but as the field of wildlife management grew, we began to specialize. Then, in 1960, we adopted a system which directed our personnel's efforts to include both game and fish management plus some public relations activities. Going in circles? Let's take a closer look.

Back in the 1880's when Arizona's conservation efforts first got underway, the game warden did everything there was to do for one very good reason — there was no one else to do it. As more and more demands were made on the state's wildlife resources, though, some individuals began devoting themselves to certain phases of the overall effort. Some men raised trout. Some studied game. Others enforced the laws, until one fine day game and fish management had become a science, with specialists handling nearly all of its more technical aspects.

Specialization embraced the old

game warden, too. He became a "Ranger" whose specialty was game and fish law enforcement. Most of his management duties were relinquished to technicians, who in turn were satisfied to let him take care of the enforcement chores.

By 20 years ago, we had reached the point in this evolution where our former "special" functions had become routine. Ideas which were revolutionary 40 years earlier were just standard operating procedures by the late 1950's, and as a result the Department's technical personnel were often bogged down with this routine operation.

To solve the situation, the Department came up with an idea to delegate these routine procedures to field personnel, well trained to perform all the standard functions which had become a vital part of wildlife management.

Duties such as water analysis, creel census, game surveys, reading range transects, and many other innovations of 50 years ago are now performed on the district level, along with routine enforcement work. This leaves the staff of enforcement specialists and biologists free to tackle the more difficult situations which need attention but once had to be neglected because of the burden of routine chores.

So . . . while the field man once again more or less runs things in his district, for nearly 20 years now he has run them on a much more intensive level than he did in the early days, and is backed by a staff of specialists available to him whenever they are needed.

Rangers, wardens or whatever they have been called at various times, have always participated in such management activities as surveys and stocking. So many aspects of the wildlife manager plan were nothing more than giving district personnel the responsibility for planning the jobs they had been doing all along.

another cycle

Inevitably, the need to specialize gradually affected the regions just as it had the early game wardens. As the job grew bigger and bigger – a fact of life which seems to have no end point — the "general practitioner" wildlife managers found themselves unable to keep up with all the demands made on them.

The first major break in this situation occurred in 1970. In August of that year a group of regional assistants was added to the staff to handle the routine chores which were bogging down the WMs' efforts to complete their more professional duties.

Tucson sportsmen may remember this AGF "extension" office, operated from the mid-fifties until the regions were formed.

Rangers, biologists and other specialists learn hatchery procedures at Page Springs, April '59. Special schools were conducted for several years to train personnel for broader wildlife manager duties.

Each region got one assistant, thus freeing the wildlife manager.

By two years later it had become apparent that seven regions made the organization more combersome than it had to be, so the regions were reorganized into just six. The former Region Seven, headquartered in Pima, was split between Region Six at Tucson and Region One at Pinetop.

By December, 1972 the enforcement demands had reached the point where something more had to be done. The outdoors was getting more and more crowded with people, and the problems they created were growing accordingly. As a step toward alleviating these problems, a law enforcement specialist position was authorized for each region. In January, 1973, the posts were filled.

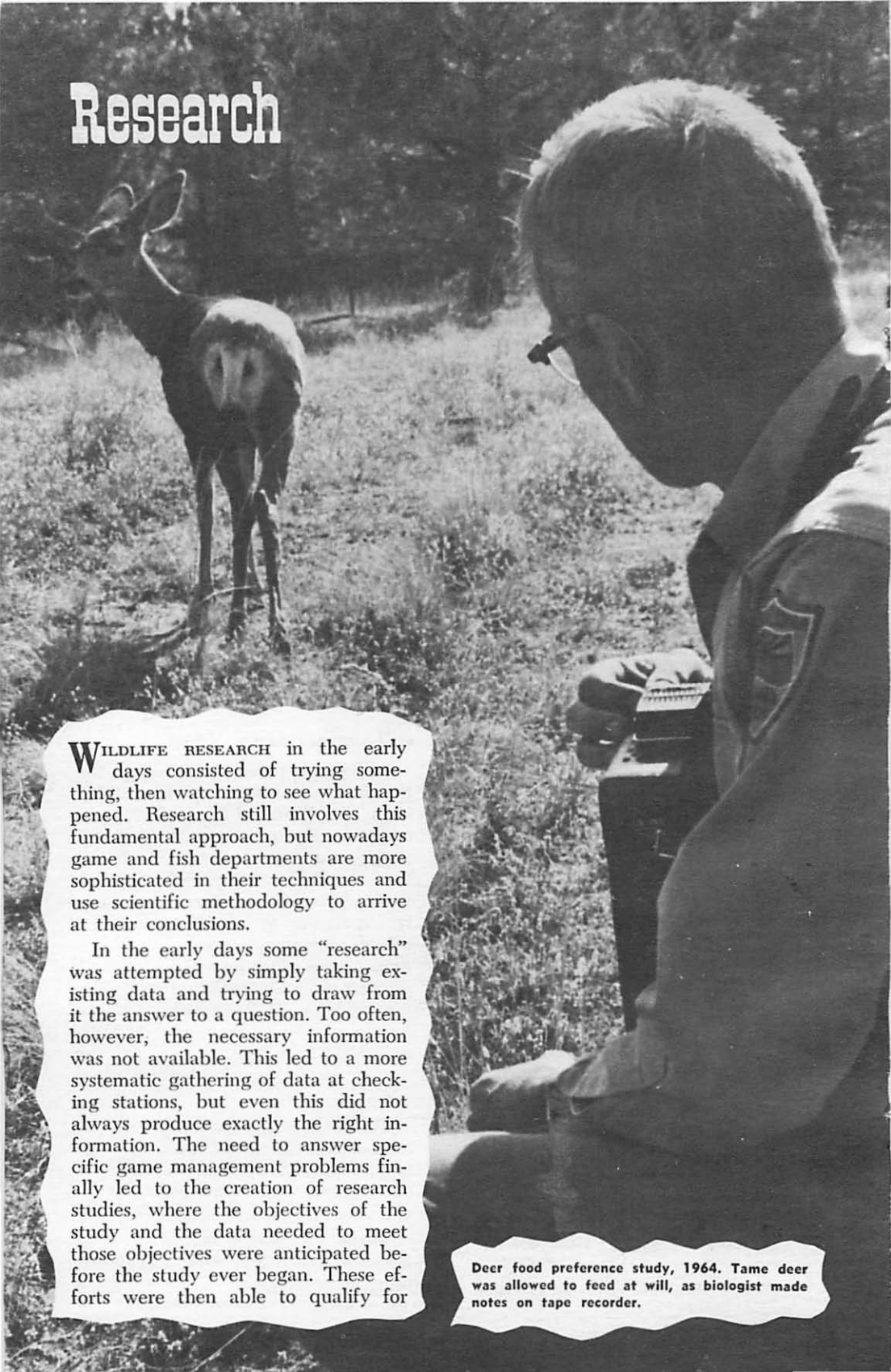
General wildlife management, like law enforcement, had become hard to keep up with, and a month later wildlife specialists were added to each region. These were followed by fisheries management specialists in March of '73. These specialists were not expected to do all the work indicated by their respective titles, but rather had the responsibility of coordinating and monitoring the work of the district managers.

still another paring down

Still another consolidation of the regions came about in May, 1977, when the former Region Five, centered in Phoenix, was divided up among the other regions and the Phoenix Metro Office was formed. With metropolitan Phoenix constantly expanding in all directions, the wildlife managers working out of the Region Five office found far too much of their time was required to handle metropolitan wildlife problems. The answer was to set up a special force to handle such matters, and let the district WM's go about their more normal business.

Today the regions still carry on the bulk of the management and enforcement responsibilities of the Department. The pattern established twenty years ago remains in effect; the only difference is the field efforts are more intensive, more organized and, hopefully, more effective.

Research



WILDLIFE RESEARCH in the early days consisted of trying something, then watching to see what happened. Research still involves this fundamental approach, but nowadays game and fish departments are more sophisticated in their techniques and use scientific methodology to arrive at their conclusions.

In the early days some "research" was attempted by simply taking existing data and trying to draw from it the answer to a question. Too often, however, the necessary information was not available. This led to a more systematic gathering of data at checking stations, but even this did not always produce exactly the right information. The need to answer specific game management problems finally led to the creation of research studies, where the objectives of the study and the data needed to meet those objectives were anticipated before the study ever began. These efforts were then able to qualify for

Deer food preference study, 1964. Tame deer was allowed to feed at will, as biologist made notes on tape recorder.

federal funds apportioned under the Pittman-Robertson Act. Game and fish research projects are now organized under one division and are supported for at least 75 percent of their cost by Federal Aid funds.

some important knowledge about quail

One of the earlier and more significant accomplishments of the research program was the Oracle Junction Quail Study begun in 1951. Within a very few years evidence began piling up, and by the late 1950's the study had demonstrated quite clearly that hunting was not a critical factor as far as Gambel's and scaled quail populations were concerned. The key factor was not hunting, but winter rainfall.

During the early 1960's the knowledge that winter precipitation was the dominant factor controlling quail populations was advanced by the discovery that vitamin A was a key to quail breeding behavior. This fact, established by the University of Arizona Cooperative Wildlife Research Unit which had been working with us since 1951, nailed down the quail reproduction factors somewhat more precisely. Soil moisture from winter rains helped produce green feed, which in turn produced the vitamin A, without which the quail did not reproduce. Vitamin A was important enough that quail did not even attempt pairing off when their diet was deficient in it.

deer studies

The Three Bar Wildlife Area bordering the west shore of Roosevelt Lake had been in existence for a number of years, but in 1961 it entered the deer hunting picture when controlled hunts were initiated to study the effects of hunting on deer population levels. These have been continued, and deer research there has since been expanded to investigate other factors of deer ecology.

One of these involved an extensive investigation of deer in a predator-free environment. By January, 1971, a nine-foot-high fence surrounding some 600 acres had been constructed, and researchers began rounding up deer to put inside the enclosure. The object was to put nine does and two bucks inside the fence, after all predators had been removed, then observe what sort of reproduction occurred in an area with no predation. Comparisons could then be made with reproduction in similar areas outside the enclosure.

By November, 1973 the 11 original deer had increased their numbers to 26 inside the enclosure, indicating that they were doing quite nicely without the presence of predators. By December of '75 the total number had reached 37, and fawn crops were running 80%. Biologists working the program felt at that point that this had demonstrated predators were indeed a serious factor influencing total deer numbers.

watershed treatments

In the late 1950's a proposal to turn some of Arizona's range lands into more efficient producers of both water and forage caused quite a stir among sportsmen and professional conservationists, and while the proposal was not carried out to the degree suggested by some of its supporters who wanted a "tin roof" watershed, it did result in some land manipulation experiments with which the Department became involved. Most of this work was done on the Beaver Creek study area north of Camp Verde, in the breaks of the Mogollon Rim, where small, study watersheds were treated in different ways, the effects of these treatments were then measured by the various agencies concerned. The Department's interest, of course, was in the effects these treatments would have on big game animals. A similar program in a different vegetation type was also conducted on the Three Bar.

The early sixties also saw some interesting developments involving quail call counts. It was found that the call-

ing of cock quail during the spring breeding season could be correlated to hunting success the following fall. This led to surprisingly accurate spring predictions of hunter success which could be expected the next fall.

One of the research tools which subsequently gained a great amount of publicity had also entered the picture by the early sixties. This was the tranquilizer gun, or "CAP-CHUR" gun, which was developed by Harold C. Palmer of Georgia in cooperation with the Crossman Arms Company. Research people of the Arizona Game and Fish Department had been testing and experimenting with this equipment and a variety of immobilizing drugs for a number of years before the general public became aware of its existence. The knowledge gained has permitted using the CAP-CHUR gun for both research and management purposes.

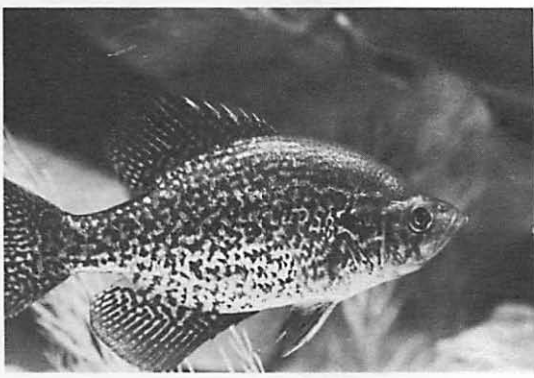
The blind elk study which began in 1956 continued into the 1960's, when the organism causing the problems was identified. In 1964 a roundworm was located in the blood vessels supplying the optic nerves of blind elk. An organism identified as *Elaeophora schneideri* was determined to be the culprit. By physically blocking blood vessels, the roundworm reduced the supply of blood to the eyes and brain with the result that blindness occurred. Since the organism was first identified, additional work has revealed exactly how it gets into the elk's bodies.

cows vs. deer

For years sportsmen on one hand and catlemen on the other had argued over the competition between deer and cattle for food. In some areas cattle are known to be heavy users of the same browse species eaten by deer. Studies conducted in the Chiricahau Mountains, however, showed clearly that the lack of browse in that area was due to over-use by deer, and was not significantly influenced by cattle. Study areas were fenced in various ways. Some kept both deer and cattle out while others excluded cattle only, and these were compared with the surrounding unfenced areas to gather the information needed to evaluate the situation.

Another innovation of research during the early sixties was the use of radio-tracking equipment on wildlife. Javelina and turkeys were captured,

Scuba divers Al Essbach and Andy Kemmerer get ready to go under during Roosevelt Lake crappie study. Once down, they studied spawning crappies like one below.



Part of the action during Three Bar bear study: bear has been caught in snare and will be tranquilized and radio-equipped.

small radio transmitters were attached, and then the animals were released. Field workers could return to the locale later, and with a radio-direction finder, relocate specific animals.

One more recent effort which relied heavily on radio-tracking involved an extensive investigation of mountain lions. The study was planned in the spring of 1970, but it was not until November, 1971 that it actually got underway in a carefully selected area near Prescott. Approximately 80 sections were to be included originally, but the size of the study area grew to some 150 sections after it got rolling. The first lion to be involved was captured with dogs and equipped with a radio-collar in December, 1971. The idea was to track the radio-equipped lion, either by aircraft or from the ground, then zero in when indications were that it had made a kill.

By July, 1975 twelve lions had been captured and equipped, and the work of tracking them was well underway. A little later that year some of the results coming out of the study verified that lions did indeed like to dine on calves when they were readily available. So far the study had supported the contention that lions do take a lot of deer, along with a considerable number of cattle, particularly, calves.

During the period of the study the area where it was occurring had been closed to hunting mountain lions.

It was reopened in July, 1976, after the necessary field data had been gathered. By September of '78 the results had been compiled. During the five years, 82 lion kills had been investigated, and it turned out that 67 percent of them had been deer, another 30 percent livestock – primarily calves — and the remainder other animals. An average of 11 lions had roamed the area during the period, and the study showed that lions make a major kill every eight or nine days. Thus the old idea of a lion killing a deer a week was similar to the research findings.

what about the Kaibab deer?

When the field work had been accomplished in the Prescott area, the idea of studying lion predation was moved to the Kaibab North. The program, which began in the summer of 1977, was designed to capture and attach radio collars to 50 deer. The lion aspect of the study had to do with the effects of lions and other predators on the deer population. Efforts to catch deer went slowly for a time, but in March, 1978 an effort involving the use of helicopters and large mist nets was utilized to capture 33 more deer, which were subsequently equipped with radio-collars. Ironically, about three weeks later one of them was killed by a lion.

The radio-tracking of deer in the Kaibab followed essentially the same idea as the lion tracking had near Prescott. It was designed to monitor movements of the deer, and when the radio transmitted a slightly different signal which indicated a deer had died, investigators went in on the ground to determine the cause of death. This study is still underway.

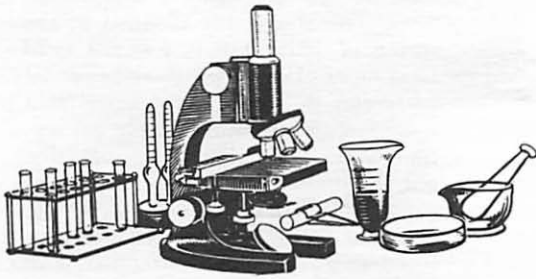
bears hibernate come whatever

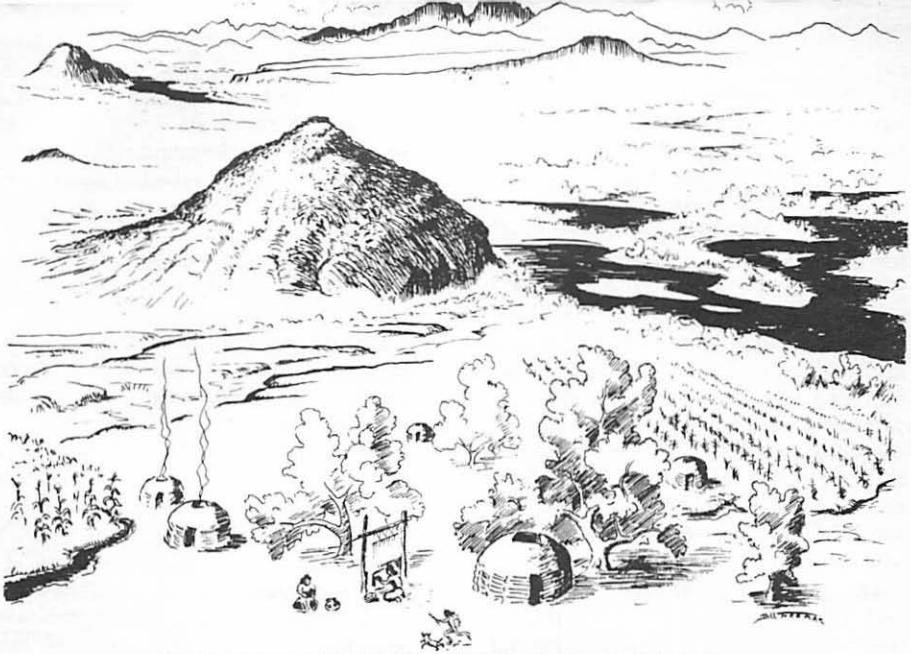
While mountain lions had been the subject of studies in other parts of the state, in the Three Bar Wildlife Area an effort to learn more about Arizona's black bears was getting underway in 1974. By September of that year 18 bears had been captured and collared, and were being radio-tracked to study their movements. One of the interesting things disclosed by this study was that bears do indeed hibernate, whether or not the weather makes it necessary. About mid-November each year, regardless of weather, they tend to hole up and remain mostly dormant until the following spring. Some speculation had occurred through the years that bear hibernation was largely a factor of weather, but the Three Bar study tended to disprove this idea.

The bear study, like the Kaibab deer study, is still going on. One other major effort marked the research efforts during the late seventies. This involved a study to find out if urban lakes could provide, at a reasonable cost, additional recreation for city dwellers. The one-year program involving heavy plantings of fish got underway in the summer of 1977. Special regulations were imposed, and special licenses required. The program ended June 30, 1978. It generated a considerable amount of interest among urban fishermen, but to date has not lead to any extensive programs to provide such fishing.

full status for research

Research reached its full stature as a Division on January 1, 1966. Until that time it had been a "section" but something of an orphan since it operated without any direct relation to any of the existing Divisions. That same year also saw the launching of the Roosevelt Lake crappie study and the Woods Canyon Lake fertilization study, which went hand in hand with the establishment of the Fisheries Research Branch of the Division.





Artist's concept of Robbins Butte Wildlife Area in pre-historic times.

Wildlife Planning and Development

THE WILDLIFE PLANNING and development division did not come into existence until 1953, when it was established by the Commission to handle all the land and water transactions involving the Department. Originally called the Lands Division, its duties included the acquisition and disposal of land or water areas, plus the engineering and investigations necessary for lake development programs. Applications for water rights needed in wildlife developments also constituted an important function.

As can be realized from the above paragraph, this division has been a kind of catch-all for those services required of the department, but which did not logically fit under the auspices of one of the more specifically oriented divisions. The name, consequently, has been changed several times to more appropriately describe the changing duties of the division. The latest of these was in 1971, when the name was changed to the present Wildlife Planning and Development.

The habitat maintenance and development functions, which had been carried under game management, were transferred to the division then, and the plannig effort was initiated. Planning had always been part of the Department function, but the need for coordination of various projects being accomplished by a multitude of federal and state agencies, along with utilities companies and various other organiaztions, made it glaringly apparent that the Department needed to remain on top of these developments, if wildlife interests were to be considered. The Planning Branch of the Department was created with these duties in mind and has continued to function as a coordinating service, along with providing the long-term planning to assure that wildlife is considered whenever developments involving potential wildlife habitat occur.

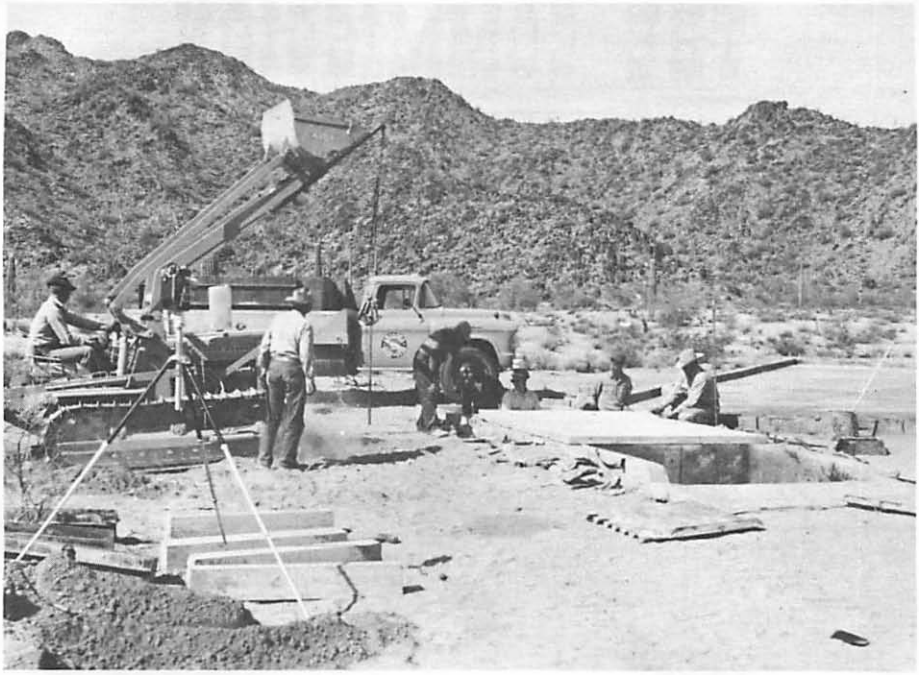
Before the division was established, land transactions involving federal aid funds under the P-R and D-J acts were handled by the federal aid coordinator. These transactions began in 1941, when P-R funds were first used for this purpose. Although the Department is not in the "land business," we do become involved in numerous programs which require negotiations, investigations and transactions. Most of these involve acquisitions of key wildlife areas, but others are special use areas, such as the Black Canyon Rifle Range, Roper Lake, and Three Points Rifle Range. Many more are simple land use agreements of one sort or another.

One of the ironical aspects of game and fish management in Arizona is that while the Department is expected to keep all the land in the state producing the optimum amount of wildlife, it has no direct authority over the other uses to which the land is put. Except for a very few parcels owned outright, we're much like the shop foreman who is expected to package a certain number of products each year, but has no say-so whatever over the production lines.

Lake developments, while the most easily noticed accomplishments of the Division, are not its only effort. As we said at the beginning, the Division was orginally called "Lands" and this designation continued until fiscal 1961-62, when it was changed to the "Field Services Division" and eventually to "Special Services." Actually, the term "special services" much more accurately describes the Division's functions, since it has always been involved in much more than managing lands (especially since the Department owns less than 3/10 of one percent of the land in Arizona for fish and wildlife purposes).

In 1962 the River Basins Branch was organized to delve into the effects major water projects might have on wildlife, and to make appropriate recommendations. The name of the branch was changed to "Land and Water Projects" in 1966, and it assumed the responsibility of statewide investigations of land and water projects that might affect wildlife. Another change in the divisional setup occurred in 1966 when the development projects which were largely involved with creation of rainwater catchments, renovation of wildlife areas and similar duties were transferred from the

Here's the way the Fool's Hollow Dam area looked in the summer of '56. Standing in foreground is Lou Brindley, the Department's first firearms safety officer.



Creating waterholes for wildlife has been an important function for many years. This rainwater catchment was being built in the Maricopa Mountains in the summer of '57.

Administration Division to Special Services.

The lake development program has slowed considerably over the last decade. Part of this has been due to the fact that suitable lake sites in the high country had been utilized, but another aspect was the increasing difficulty of obtaining suitable sites and making all the appropriate arrangements for the development of fishing lakes in southern portions of the state. For a time the Department was busily investigating lake sites in southern Arizona, but to date, no new lakes have been created beyond those already mentioned.

In addition to creating lakes, other waters have been acquired through the Department's efforts. These included Show Low, Lee Valley, Nelson Reservoir, and Painted Rock, plus, more recently, Alamo and Arivaca. Both Painted Rock and Alamo were obtained through cooperative agreements with the Army Corps of Engineers.

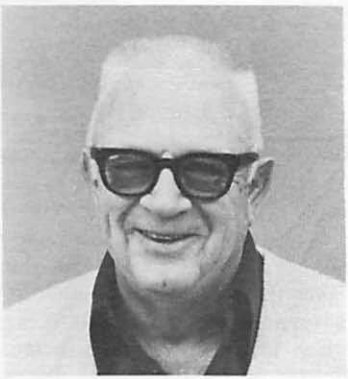
One of the more significant aspects of this division's responsibility had been negotiation of agreements and arrangements with other groups. A major effort along these lines occurred in 1976, when an Attorney General ruling determined that hunters and fishermen did definitely have access rights to public lands owned by the state. As a result of this ruling and consequent discussions with the Land Department, state land access rules were adopted in March of 1977, and became effective the following June. Wildlife Planning and Development played a major role in their development.

Inconspicuous, but highly important, have been the Division's efforts to coordinate wildlife features, not only with the various federal water salvage and control programs, but with the forthcoming Central Arizona Project and every other significant water-oriented reclamation or development effort in the state.

THE COMMISSION

MILTON G. EVANS, Flagstaff
Chairman

C. GENE TOLLE, Phoeonix



WILLIAM BEERS, Prescott

CHARLES F. ROBERTS, Bisbee

FRANK FERGUSON, JR., Yuma

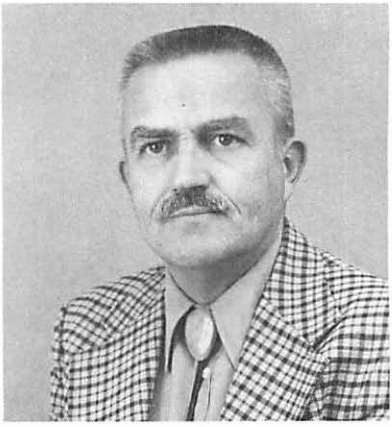
ARIZONA GAME & FISH DEPARTMENT

ANNUAL REPORT

1978-79

ROBERT A. JANTZEN
Director

PHIL COSPER
Assistant Director
for Operations



ROGER GRUENEWALD
Assistant Director
for Services

GAME MANAGEMENT

JOHN P. RUSSO
CHIEF

BIG GAME

PAUL WEBB
SUPERVISOR

ANTELOPE surveys for 1978 showed an increase in the number of fawns produced per 100 does. The total number of animals counted was also higher. Authorized firearms antelope hunting permits decreased from 1089 to 880, and number of archery permits were authorized. Hunter success decreased from 63% in 1977 to 49% in 1978.

Elk populations continued to remain relatively stable. Reproductive success was slightly higher compared to past years. Firearms permit numbers decreased slightly in 1978; archery permits increased. Overall firearms hunter success increased from 24% in 1977 to 28% in 1978. A late firearms season starting December 8 was held in Unit 5B.

Deer populations in the higher elevations of the state appear to be relatively stable. Fawn production with a few exceptions was noticeably higher in all parts of the state. This was especially notable among the whitetail populations in southeastern Arizona. The number of firearms deer hunters was limited to permit-only hunting. Of 81,675 permits issued, only 69,646 hunters went afield. Hunter success dropped from 17% to 16% in 1978.

Firearms hunting for Javelina has been by permit-only since 1972. Firearms hunter numbers increased slightly, from 17,365 in 1978 to 17,906. Hunting success and the number of javelina harvested was higher in 1979. Archery hunting continued without limits on the number of hunters. However, due to the impact both

SUMMARY OF ESTIMATED HUNT RESULTS, 1978-1979

Species	Hunters	Average Days Hunted	Harvest	Success	Dates
Antelope (Firearms)	849	2.2	415	47	9/23-9/25 9/23-9/28
Antelope (Archery)	142	3.5	13	9	9/8-9/13
Bighorn Sheep	54	5.2	45	83	12/2-12/17
Elk (Firearms)	5,502	4.0	1,601	29	9/29-10/4 11/25-12/3 12/8-12/13
Elk (Archery)	2,696	6.6	166	6	9/16-9/24 9/16-10/1
*Bear	8,985	—	276	3	9/1-9/10 9/1-12/31
*Lion	7,964	—	242	2.9	Yearlong
Turkey (Fall)	9,135	2.7	1,431	16	10/17-10/15
Turkey (Spring)	2,853	2.6	317	11	4/14-4/22 4/21-5/6 4/21-4/29 4/28-5/6
Deer (Firearms)	69,652	3.8	11,172	16	10/27-11/12 11/10-11/19 11/17-11/26 10/27-10/30 11/4-11/12 11/10-11/17 11/18-12/3 12/8-12/24
Deer (Archery)	7,313	4.0	381	5.2	9/1-9/15 9/16-9/24 9/16-10/1 10/21-11/5 12/1-12/31 1/1-1/15/79 1/1-1/31/79
Javelina (Firearms)	17,906	1.7	4,006	22	3/10-3/16/79 3/17-3/23/79
Javelina (Archery)	2,993	4.1	738	25	1/1-1/15/79 1/1-1/31/79 3/10-3/16/79
Whitewing Dove	47,750	3.8	327,555	1.8**	9/1-9/24
Mourning Dove	100,891	3.8	2,231,273	5.8**	9/1-9/24 12/9/78-1/3/79
Quail (all species)	78,142	4.8	1,580,309	4.2**	10/1/78-1/31/79*** 12/1/78-2/15/79
Cottontail	84,658	4.8	611,152	1.6**	Yearlong
Tree Squirrel (all species)	20,261	2.3	106,875	2.4**	10/7-11/19 9/1-9/15
Blue Grouse	638	2.5	670	1.05**	9/2-9/21
Bandtail Pigeon	594	2.2	1,439	1.09**	10/12-11/10
Chukar Partridge	19	2.0	0	—	10/1/78-1/31/79

Other Season Dates

Geese 11/9/78-1/7/79 or 11/9/78-1/19/79

Ducks 10/19/78-1/19/79

Wilson Snipe 10/19/78-1/19/79

Coots and Gallinules 10/19/78-1/19/79

Buffalo 10/14-27/78

*Sporting hunting only.
**Of the species per trip.
***Mearn's Quail—12/1/78-2/15/79.

The 1978 javelina hunt was structured differently from hunts of previous years. Hunters had to choose between making application for the general hunt in March, or hunting in the January archery-only season.

firemarms and archery hunters had on local javelina populations, a regulation was passed that hunters could go on an archery or a firearms hunt but not both. This reduced the number of javelina archery hunters from 6,819 in 1978 to 2,993 in 1979.

Summer turkey surveys showed that the percentage of young in the statewide population this year dropped slightly compared to past years. Adult survival appeared excellent, however. Fall turkey hunting continues without limitation on hunter numbers; spring turkey hunting remains on a permit-only basis. During the 1978 fall hunt, hunter numbers, harvest, and the hunting success increased significantly. The harvest and hunting success decreased slightly during the spring hunt.

A total of 1,312 bighorn sheep were classified throughout the state by aerial, boat, vehicle and foot surveys. Fifty-eight permits were authorized statewide. Forty-five sheep were harvested for a hunter success of 83%.

Unit 13 antelope, resulting from a transplant on the Arizona Strip southwest of Fredonia, continue to survive in good numbers. During aerial survey trend counts in 1976, 1977 and 1978, 95, 81 and 48 antelope, respectively, were counted and classified. Five permits were authorized in 1977 and 1978.

Bighorn sheep released near Aravaipa Canyon have remained in the near vicinity of the release site. Some reports have been received to indicate wider dispersal. Good reproduction has been noted.

Investigations of Sonoran antelope continued during the fiscal year. Seasonal distribution was determined by field investigations, reports of observations by reliable individuals, and observations made during aerial surveys. Food habits determination through use of fecal identification was accomplished as fecal samples became available. Plans are underway to publish a technical paper on the Sonoran antelope.

SMALL GAME

DAVID E. BROWN
SMALL GAME SUPERVISOR

THE PRIMARY mission of this job is to coordinate the study and monitoring of Arizona's varied small game resources. The knowledge obtained enables the Department to make sound recommendations to the Commission so that proper hunt regulations can be formulated. Knowledge of factors determining a species' abundance or scarcity is essential for management. Only then can the effects and propriety of hunting seasons and other management measures be assessed.

The benefits of this to the public are difficult to overstate. Many of the small game hunts that we take for granted now didn't exist 30 years ago. Some hunters can still recall when band-tailed pigeons, Mearns quail, Abert squirrels, Arizona gray squirrels and blue grouse were totally protected species. Even seasons on such periodically abundant species as the Gambel quail were, until recently, restricted to a few days. Today, these species collectively provide tens of thousands of days of hunting recreation and still provide optimum numbers for other wildlife enthusiasts.

All this has happened in an era when many have been worried about anti-hunting sentiment. This liberalization of hunts and hunting was made possible by scientific investigation and the understanding of the requirements and controlling factors for each species. There have also been some curtailments. The white-winged dove has suffered nesting, roosting, and feeding habitat losses.

The relatively low reproductive potential of this species and its popularity with hunters necessitated restrictive measures to reduce the kill of some populations. The days of the 25-bird bag limit and catered group hunts for this species have clearly passed. Other species with low reproductive rates (for example, the Abert squirrel) or high hunt mortality (Canada goose) are closely watched to determine if they are at optimum population levels. Should these populations subside, more restrictive management measures will be taken so that our small game resources can continue to provide quality hunting to an ever-increasing number of hunters.

Almost all the popular quail hunting areas of the state received abundant precipitation during the winter of 1977-78. The result was a measurable increase over the previous year in spring call-count surveys and subsequent hunt success on Gambel quail. Adequate precipitation during the previous two summers in the southern portions of the state provided conditions for good survival and reprodutcion of scaled and Mearns' quail. The result was an increased harvest and success on these species as well. All in all, Arizonan's experienced a fair to good quail year; an estimated 78,000 hunters harvested over one and one-half million birds.

Hunters assisted quail studies by reporting their success and depositing quail wings in bags, and provided insights into the effect of grazing, precipitation and hunter effort on quail populations. Such cooperation made possible the publishing of technical papers on scaled and Mearns' quail.

Dove survey and hunt data continued to be collected. This effort showed a healthy statewide population of mourning doves. This species provided a harvest in 1978 of 2,000,000 birds. The situation was not so bright for white-winged doves; 64,000 hunters bagged only 345,000 (harvests as high as ¾ of a million birds were reported in the past). Banding data indicate that the drop in white-winged dove harvest was due to the overshooting of key populations. This situation was initiated or aggravated by agricultural changes leading to fewer and fewer grain fields. Restrictive regulations were recommended to alleviate and correct the situation.

Although the winter rains were generous, a warm winter resulted in snow covers of short duration. The result: a banner year for tree squirrels. Our studies have shown that the principle factor affecting Abert squirrel harvest and hunt

Data collected through banding programs indicate that hunting has little or no effect on mourning dove populations, but may be an additive cause of mortality among whitewings. As a result, whitewing hunting was further restricted for the 1979 season.

Two consecutive wet winters resulted in improvement in an already excellent range-wide Gambel quail population.

success were both up in 1978. Hunt data continued to be gathered on Abert squirrels and a study of Arizona grey squirrels was launched. Eventually the Department plans to publish a booklet on Arizona's varied and interesting tree squirrel species.

1978 was an above-average year for blue grouse; this species also benefitted from copious winter-spring rains. Hunters reported a record harvest of 670 birds and an above-average harvest rate of over one grouse per hunter per season.

Almost 600 hunters reported hunting and bagging 1,439 band-tailed pigeons. The harvest of this species fluctuates from year to year with changes in available food supplies. In years of abundant pinyon nuts, acorns, and other crops, the southward migration of bandtails is delayed, resulting in improved hunting and harvests. Conversely, when foods are scarce, the birds migrate as soon as the young are fledged, resulting in smaller harvests.

Other activities of the Small Game Branch included the supervision of a sandhill crane study, further development of land and water resource classification systems and inventory, and plotting band recoveries of migratory game birds.

NONGAME INVESTIGATIONS

R. L. TODD
NONGAME BIOLOGIST

A MAJOR portion of the year was spent on literature research and preparation of a manuscript on the Yuma clapper rail. The Yuma clapper rail report summarizes the findings of other investigators as well as field observations over the past 11 years.

Field investigations during the year included a visit to Quigley Ponds in the Mohawk Valley and to Mittry Lake Wildlife Area along the Colorado River on Feruary 26 and 27. Twenty-seven days later, the survey was repeated. The objective was to determine the winter status of clapper rails in Arizona. As the breeding season approaches in late March, clapper rails, even solitary individuals, become more vocal and will usually respond readily to reproduction of their calls on tape recorders. In this manner, clapper rails were found only at the Mittry Lake Wildlife Area in a wet slough with a dense cattail cover immediately west of the U. S. Army's Yuma Test Station base facilities. These birds seemed to be solitary and spaced at least 100 meters apart. One individual was detected as early as the February survey. No birds were found in that part of Mittry Lake which consisted of open water bordered by marsh growth. This thus confirms the observations of previous years that the few birds that overwinter in the wildlife area seem to prefer the perennially wet, overgrown sloughs.

Another objective of the field activity was investigation of the status of summer clapper rails in Maricopa and Pinal Counties. Seven sites along the Salt River and

The winter of '77-78 was wet but warm in Abert's squirrel habitat, resulting in little winter die-off and good squirrel hunting in the fall of '78.

Much of the year's nongame work involved field investigation and literature research necessary for the preparation of a manuscript on the Yuma clapper rail.

two locations in Pinal County were visited. The only location where rails were detected was a Salt River slough east of the Blue Point Ranger Station. The behavior of three clapper rails found here indicated that none of them were mated the first week in June. Efforts to find clapper rails at Picacho Reservoir have been unsuccessful since 1976.

Inclement weather precluded an aerial bald eagle census scheduled for the period of January 16 through 19. Only southwestern and western Arizona were relatively free of low overcast conditions for varying portions of this period. During this time and on other dates, various riparian situations were observed from either the air or the ground to monitor habitat trends. This included the lower Colorado, lower Gila, lower Verde, lower Salt and Bill Williams Rivers, as well as Tangle Creek, Red Creek, Sols Wash and Whitlow Ranch Dam on Queen Creek.

Recent publications on the biology and management of all nongame bird and mammal species were reviewed. This activity occupied approximately 31% of the year's work time.

Approximately 25% of the year was spent on the preparation of various reports and manuscripts. This, in addition to the clapper rail work and annual reports, included an update on drafts of the habitat affiliations of mammals and birds in the Colorado River drainage within Arizona and the 'Regional Occurrences of Arizona Birds". Revised portions of the latter work were published in December 1978 and February 1979 issues of the Department's *Wildlife Views*. Coordination with the Department's projected "Threatened and Unique Wildlife of Arizona" program showed a need to compile a listing of mammal species and subspecies which are distributionally limited in Arizona. Work was initiated on this.

Various other activities during the year included participation in the annual Audubon Society "Christmas census" west of Phoenix and miscellaneous intra-Department and interagency coordination on the nongame aspects of various projects.

WATERFOWL

DON BERLINSKI
SUPERVISOR

IN GENERAL, the 1978-79 waterfowl season was good. Reports from the White Mountains area showed a poor season due to the late opening date (October 19). However, the Flagstaff area reports indicated a good season because of the late opening date. A wet fall and winter left all major lakes and smaller ponds with ample water. Heavy rains in December flooded most of the state. Due to the extreme wet conditions, ducks were scattered but plentiful. Mid-winter counts on ducks were up 15,000 from last year's count. These birds were mainly found around Painted Rock and flooded milo fields in the Willcox area.

Goose counts remained stable at Roosevelt Lake. The statewide goose count was 100 birds more than last year's.

WILDLIFE AREA MAINTENANCE AND OPERATION

DON BERLINSKI
SUPERVISOR

Raymond Ranch

General maintenance was performed at the headquarters area and the domestic well was repaired. The Anderson Canyon diversion ditch was cleaned of silt and the headgate inspected. Various wooden planks and guard rails were replaced on the Anderson Canyon bridge. The main road was repaired with Department Equipment. Boundary and cross fences were maintained, inspected, and repaired. Hay and salt were distributed to the herd during the year. Various water tanks (dirt) were repaired. The buffalo harvest in October totaled 37 animals. The herd population now stands at approximately 75 animals.

House Rock Ranch

Normal maintenance around the headquarters area was performed; equipment was serviced and winterized. The Department's heavy equipment repaired many ranch roads damaged by heavy summer rains. All fences were checked and repairs made during the year. Supplemental feed and salt were distributed to the herd. The main pipeline was inspected and minor repairs made. The harvest in October totaled 36 animals. The herd population is approximately 77 animals.

Gila River Areas

General maintenance was performed on all buildings; equipment was serviced and repaired. Heavy equipment repaired flood-damaged dikes. All irrigation ditches were cleaned and repaired. The main road was maintained and two cattleguards installed. Summer and winter crops totaling 220 acres were planted, fertilized and irrigated throughout the year for wildlife use. Various ponds were maintained with water for waterfowl use. Heavy floods during the year damaged all of the wildlife area. Complete reconstruction is planned during the coming year.

Cibola

The lessee planted 30 acres of winter crops for wildlife food.

Chevelon Creek

Flood waters prevented work on the various dikes. A total of 72 hours was spent pumping water for waterfowl use during the year.

Mittry Lake

Water was pumped into the slough area for waterfowl use.

Willcox Playa

Water was pumped to the potholes during the year. The boundary fence was maintained, potholes were cleaned, and three new potholes were dug.

Boghole Waterfowl Area

The boundary fence was inspected and minor repairs made to exclude cattle.

Roosevelt Lake

Land signs and water buoy signs were posted against hunting and entry on portions of the Roosevelt Lake Wildlife Area from November 15 to February 15.

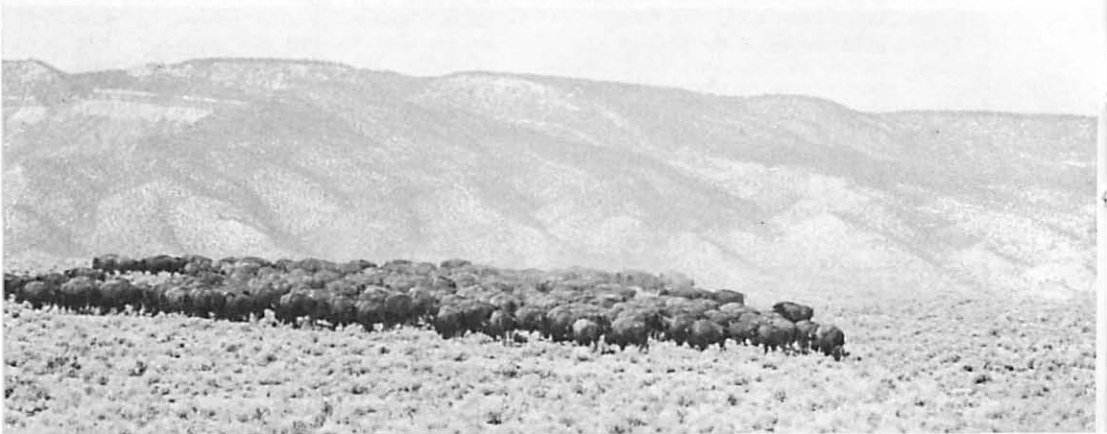
Alamo Lake

Portions of the Wildlife Area were posted against hunting and entry from December 1 until the end of the waterfowl season.

Cluff Ranch

Summer and winter crops were planted on 10 acres for wildlife use. Fences were checked and repaired. Noxious weeds were controlled by mechanical means.

HOUSE ROCK RANCH



A. R. ESSBACH
CHIEF

FISHERIES MANAGEMENT

SOME OF the more significant work successes, problems and plans that occurred during fiscal 1978-79 were:

The record precipitation of the winter-spring period filled virtually all reservoirs, lakes, ponds and streams to overflowing and permeated ground water tables to a point that will insure good fish habitat and production for at least several years to come.

The fish hatchery reconstruction gained considerable momentum and several major projects were completed successfully as pointed out in other supervisor reports below.

The Salt River trout planting schedule normally beginning in March or April had to be moved ahead until late June, 1979 because of lack of suitable food in the river due to flood scouring.

Some hatchery problems developed involving anchor worm, *Learnea sp.*, and yellow grub, *Clinostomum marginatum*. The former was eventually controlled through isolation, pond draining and chemical applications. The latter (yellow grub) has been a recurring problem for many years in varying degrees of magnitude. This year developed some heavy grub populations and research is underway to procure a suitable control. Applications of salt during certain more susceptible life cycle periods of the grub appear to offer the most promise for effective control.

A tempering-feeding experiment was initiated at Page Springs on fingerlings

brought in from Sterling Springs. In the past, a fairly high mortality (30-35%) could be anticipated in tempering the fish from about 52°F. to 68°F. The new technique utilized ice in the raceways to allow for a very gradual increase to 68°F. (over about 24 hours) rather than a much shorter time period. The slow tempering, coupled with more frequent feedings, worked very well with mortality being reduced 50% or more over previous levels. Additional work with this technique will be undertaken.

A shipment of 5,000 Florida bass (*M. floridanus*) was received from the Florida Game and Fresh Water Fish Commission, hopefully for stocking in Painted Rock Lake. Air freight charges were paid by the local chapter of B.A.S.S. (Bass Anglers Sportsmens Society). Water quality monitoring is continuing at Painted Rock Lake and high nutrient levels, hydrogen sulfide, etc., are developing which could be detrimental to fish (or Florida bass stocking) if such levels continue to increase.

A gift of 117,000 cutthroat trout eggs was received from the Nevada Department of Fish and Game and 140,000 rainbow trout eggs were received from the Utah Division of Wildlife Resources. These are two very appreciated gifts of fish that will supplement our production significantly.

Walleye pike fry were again received from federal hatchery sources (April) and stocked in Canyon and Lyman Lakes and Upper Lake Mary. Some successful reproduction of walleye is occurring in Lyman Lake and Lake Mary.

A theft of 14,000 6"-8" rainbow trout at Silver Creek Hatchery in March, 1979 did not help our scheduled plantings for the summer. As a result, some local plantings (Silver Creek Reservoir, etc.) had to be reduced. To date the thief (or thieves) has not been apprehended.

Adult threadfin shad (over 2,000) were seined from the residual flood potholes in the Agua Fria River below Lake Pleasant and transported to Lake Patagonia and to Page Springs in an attempt to establish the species. The fish were successfully anesthetized with MS-22 and salt and were transported for over 5 hours to Lake Patagonia, arriving in very good condition.

An abnormal over-abundance of funds left in the F-7-R (federal-aid) budget due to minimal "pick-off" time utilized (induced by bad winter and spring weather preventing field work) allowed for significant purchases of field and laboratory equipment. In effect, each region benefitted by setting up laboratory facilities of their own and by being able to purchase particular items of equipment and supplies in quantities that were heretofore impossible. The Phoenix office and water quality laboratory also obtained specific items and sophisticated equipment that will be very valuable for future work. Of particular note was the procurement of an atomic absorption spectrophotometer, fume hood and other lab supplies for the decided improvement of water quality analysis functions.

During this year major water pollution problems, involving primarily mining effluents, occurred in the San Pedro River, Pinto Creek, Pinal Creek, San Francisco and Gila Rivers. These are discussed in the water quality report.

A categorization of major Arizona reservoirs, from the nutrient standpoint, was made for the Environmental Protection Agency. Significant progress was made in settling state water quality standards and protected uses for fish and aquatic life through the state Water Quality Control Council.

The warm water "mitigation" hatchery in the Yuma area (to be funded by U.S. Bureau of Reclamation) came closer to reality with the allocation of funds ($1,086,000 plus $55,000 annually for operation and maintenance) and site selection near Somerton.

Peck's Lake, Clarkdale, was treated with an aquatic herbicide which successfully controlled aquatic weeds. It was then stocked with *Tilapia zillii* to evaluate the ability of this species to control any subsequent regrowth of vegetation during the summer.

A riparian zone-grazing effects forum sponsered by the U.S. Forest Service and U.S. Fish and Wildlife Service was attended in Denver.

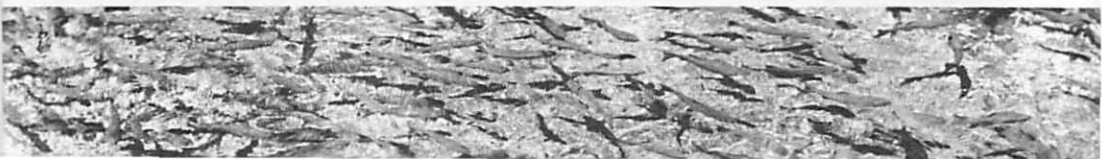
Ken Hanks, Water Quailty Analyst, attended an E.P.A. sponsored school in Athens, Georgia.

New personnel on board during the year included Ken Hanks, Water Quality Analysts; Gary Edwards, Hatchery Management Biologist; Carol Sandt, Division Secretary; Brian Havey, Hatchery Worker; Agnes Gara, Chemist; Gene Okamoto, Lab Technician and Paul Bidle, Hatchery Worker.

All "Position Description Questionaires" for Division personnel were revised and updated.

New record fish weights were established during the year and included carp, green sunfish, redear sunfish, *Tilapia* and rainbow trout.

The specific reports of various supervisors and biologists responsible for all entitles of Division functions follow below.



Electro-fishing at night on Bartlett Lake.

STATEWIDE FISHERIES INVESTIGATIONS (F-7-R-21)

JIM SPRAGUE
SUPERVISOR

STATEWIDE fisheries investigations are financed with federal and state funds on a 75/25 matching basis under the Dingell-Johnson Act of 1950.

This reporting segment represents the first year under new program narrative and job descriptions. The initial segment was to provide a solid base of field data from which to develop management techniques. Numerous changes were instituted brought about by the previous studie's. The objective of this segment is to continue gathering field data and to implement developing management techniques.

The five established regions are responsible for implementation of the project within their assigned areas. Monthly progress reports are submitted to the F-7-R supervisor. Fisheries specialists meetings are held periodically to discuss progress and problems. An annual performance report is submitted at the end of each fiscal segment.

Activities in all regions were severely curtailed due to major flooding statewide. In addition, two regions experienced a change in personnel. These positions have now been filled and all regions are adequately staffed.

Creel census was conducted on 21 lakes throughout the state. Data collected indicates high fishing pressure and an average catch/hour. The Colorado River was well censused from Lee's Ferry tailwaters to Topock Marsh. Fishing pressure is increasing and a change in species composition appears to be in evidence.

Thirty-three lakes were investigated with the use of gill nets, trap nets and electro-fishing. Numerous areas on the Colorado River were also electro-fished.

A comprehensive Environmental Assessment Report for the F-7-R project was prepared by the Fisheries Division.

FISH HATCHERIES

Eggs Purchased	5,413,200	Rainbow
	414,000	Brown
	308,000	Brook
Gratis Eggs	600,000	Cutthroat (State of Nevada)
	677,000	Rainbow (State of Utah)
	500,120	Brook (National Fish Hatchery, Nebraska)
Gratis Fish	1,000,000	Walleye Fry (National Fish Hatchery, Kansas)
	200,000	Channel Catfish Fingerling National Fish Hatchery, Oklahoma

Fish Stocked—Trout

	Fingerlings	Catchables
Page Springs	431,064	368,658
Canyon Creek	255,000	167,350
Tonto	1,017,000	167,285
Silver Creek	—	56,487

Warm-Water Species

Channel Catfish	464,311	Fingerling
Largemouth Bass	3,500	Fingerling
Florida Bass	6,700	Fingerling
Redear Sunfish	33,680	Fingerling
Black Crappie	56,500	Fingerling
Fathead Minnows	40,000	Adult
Tilapia zilli	50	Adult
Tilapia mossambica	30	Adult
Tadpoles	50,000	—

Construction improvements were continued at Page Springs Hatchery. Concrete walls were removed from raceways in Bank 'A' to provide wider raceways and better use of water.

Dikes were constructed mid-way in the new ponds 8, 9 and 10 to improve water conditions in the lower portion of the ponds.

Problems continue to exist with drainage outlets on ponds 14, 15 and 16. Engineering has determined the problem and reconstruction is programed for fiscal 1979-80. Other improvements are programed to provide additional water to the cold-water side of the hatchery.

Construction continues at Canyon Creek. Improvements to date were quite evident in the increased production in 1978-79, and also in the abatement of serious fish disease problems. Upon completion of the project, Canyon Creek should be capable of producing 500,000 catchables per year.

Silver Creek Hatchery was hard hit by flooding that passed through the rearing ponds. The main roads were washed out, and dikes between ponds were destroyed. Approximately 150,000 cutthroat fingerlings and 2,000 catchable rainbows were lost.

Production at Tonto and Sterling Springs was stable with estimated production levels being met. Tonto Hatchery was surveyed for major construction needs and budget requests have been made for fiscal 1980-81.

The cost of the fish eggs and fish food continue to increase gradually; consequently, the end products of the hatchery operation will be more expensive. These increasing costs, coupled with gasoline shortages and costs, will undoubtedly result in major changes in our stocking schedules.

NON-GAME FISH INVESTIGATIONS

BILL SILVEY
FISHERIES BIOLOGIST

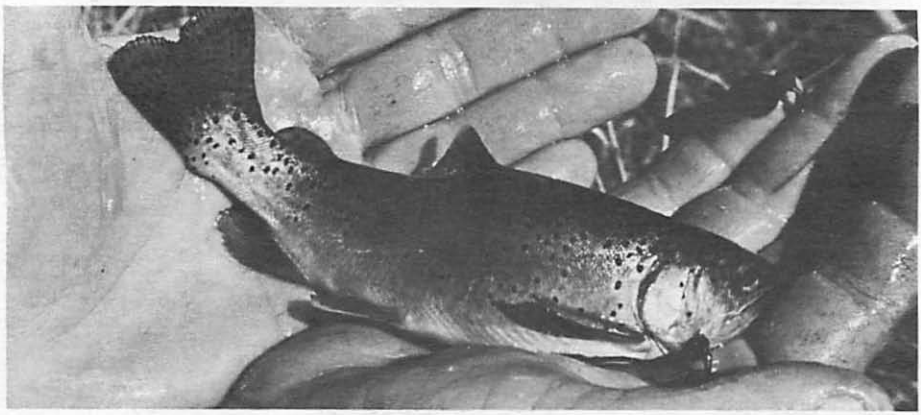
COOPERATIVE studies of non-game fish and stream investigations funded through the U.S. Forest Service and U.S. Fish and Wildlife Service continued during the year. However, abnormally high precipitation and runoff during the segment hampered these studies and termination of both project biologists during the latter half of the year precluded further field efforts.

Stream investigations conducted in the Verde, Black and San Simon River drainages during the year provided new information on 16 previously unsurveyed systems. Biological and related data collected will further expand the comprehensive data catalog of Arizona's waters.

The native fish restoration program was predominately confined to re-survey of previous introduction localities due to high rainfall of the previous two years and resultant habitat destruction. Two introduced Gila topminnow populations experienced drastic declines due to habitat change and a native population was destroyed by modification of its artesian well habitat. Two pupfish introduction sites were surveyed during the year; one secure locality now supports a large population; however, the other site was severly altered by high flows and the introduction failed.

Arizona trout restoration efforts were set back when biologists determined that the broodstock, originally acquired in 1975, consisted of old senile fish of low reproductive capability. As a result, offspring of the 1978 spawn have been retained in hatchery to provide young viable broodfish, and no introductions were

The brood stock for the Arizona trout restoration effort was replaced with younger fish, which should provide increased numbers of the native fish for future plants.



Water quality data was collected on 31 lakes and 49 streams and rivers, as well as five state fish hatcheries.

undertaken during 1978-79. However, those fish in excess of hatchery requirements for production will be released during fall of 1979. The young broodfish should provide increased numbers of the unique native trout in future years and expanded introduction efforts will be undertaken.

WATER QUALITY INVESTIGATIONS

KEN HANKS
ANALYST

WATER QUALITY data was inventoried on 31 lakes, 49 rivers and streams, and 5 state fish hatcheries were monitored per the National Pollution Discharge Elimination System (N.P.D.-E.S.) permits. Mine tailing ponds failures continue to plague Arizona waters resulting in fish kills and dead river systems. Selected lakes and rivers were sampled to document the presence and effects of sewage treatment plant discharges on water quality and aquatic life. Routine sampling of various waters in Arizona represent background water quality data which may prove helpful in establishing ambient water quality standards.

A total of five fish-kills was investigated during the year. Two were temperature related fish kills which primarily affected populations of *Tilapia sp.* The remaining three fish-kills were probably the result of heavy metal contamination resulting from tailings pond failures.

At least seven creeks, streams, or lakes in Arizona are experiencing continual or intermittent exposure to sewage discharge from either point or non-point sources. The better known sites which are typical of this type of pollution include: Rio de Flag, Pinal Creek, Salt River, Santa Cruz River, Show Low Creek, among others.

During the past years an instream flow study was conducted by members of the Fisheries Division on the Black River drainage basin located in eastern Arizona. Nutrient levels were sampled in over 20 tributary creeks and streams of the Black River drainage located on the Apache-Sitgreaves National Forest. Nutrient levels were generally found to be low. For example, ammonia ranged from 0.06 - 0.71, nitrate ranged from 0.00 - 0.16, and phosphates ranged 0.06 - 0.60. Other base-flow streams were sampled in early May just north of Phoenix and values were found to be comparable except that Big Bug Creek near Cordes Junction had a phosphate level of 1.30 mg/L, probably due to the number of homes and communities located along the river bank upstream. These data may prove invaluable in aiding in the determination of ambient or background water quality standards.

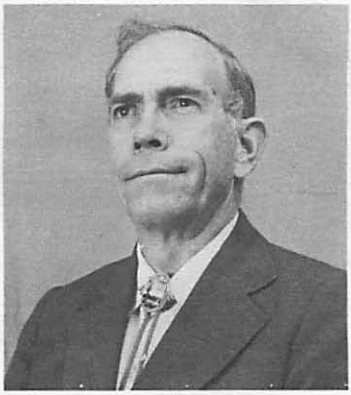
Hatchery effluent and influent water was sampled in 1978-79 in accordance with NPDES permits. The state-owned hatcheries requiring monitoring included: Page Springs, Sterling Springs, Tonto Creek and Canyon Creek. Silver Creek Hatchery was just recently acquired and is not currently covered by a NPDES permit. The hatcheries have conformed to effluent criteria set forth by the EPA and no problems have been detected.

Sampling stations during fiscal 7/78 - 6/79:

Hatcheries – 20 stations @ once/month = 240 samples
Creeks – 49 stations @ once/year or quarterly = 125 samples
Lakes – 31 stations approximately quarterly = 93 samples
Fish Kills – 5 sites @ once each = 5 samples
Total samples = 463

A total of 912 man-days were involved.

LAW ENFORCEMENT



THOMAS O. BARNES
CHIEF

THE INCREASED emphasis on the wildlife law enforcement program of the year appears to be showing some results. There has been a significant increase in all law enforcement activities.

The HOW Line (Help Our Wildilfe 1-800-352-0700), even though it is not yet being used to its maximum potential, has contributed considerably to the increased activity.

Probably the greatest disappointment has been the reward program. Most people making reports of violations are not interested in a reward. They are more concerned, about the resource than obtaining any monetary gain. This, of course, is commendable, but it was hoped the payment of rewards would stimulate some individuals who would not otherwise do so to report violations. This has not occurred.

An amendment to A.R.S. Section 17-309, passed by the Legislature last season, should reduce some other problems our officers have had in the past finding an appropriate section under which to write violations. The amendments provide specific sections under which a charge, such as taking wildlife during closed season, exceeding the bag or possession limit, etc., may be written.

Probably the most significant indicator of increased law enforcement activity was the marked increase in the total number of violators apprehended. In 1977-78, Department officers issued 2,450 citations for wildlife violations. In 1978-79, they issued 3,844 citations. This increase took place even though the num-

ber of hours spent by Department officers on wildlife enforcement remained about the same. In 1977-78, Department officers spent 72,597 hours on wildlife enforcement activities. In 1978-79, they spent 71,493 hours performing those duties.

The increased number of arrests per amount of time spent in wildlife law enforcement can probably be attributed to two factors. There appears to be a higher percentage of the sportsmen violating the law and concerned sportsmen are reporting violations and giving sufficient information for arrests to be made. If these reports keep coming in, the Department should be able to turn this situation around and reduce the number of violations taking place.

The Department's two aircraft have logged approximately 1,228 hours during the year; 430 hours in the Cessna 206 and 648 hours in the Super Cub.

The division now has two full-time pilots. Most of their time is still utilized in conducting wildlife surveys. Law enforcement has been able to effectively use the aircraft on antelope and dove hunt patrol, but other patrol activities have not been too successful.

Night patrol has only been tried a few times and the results are encouraging. We are hopeful that increased use of aircraft on night patrol during the 1979 fall hunts will be effective in reducing the amount of illegal night hunting with lights. This, of course, is a risky flying procedures and must be conducted under favorable conditions.

The communications branch continues to play a key role in the Department law enforcement program. Without an effective communications system, the law enforcement officer would be a one-man force. With good radio, telephone and teletype communications, he, in essence, has a whole army behind him.

The Division received requests for and issued 1,345 Pioneer Complimentary Licenses during the 1978-79 fiscal year. These licenses are available to persons 70 years of age or older, who have been residents of Arizona for the past 25 years.

The Department registered 85,811 boats in calendar year 1978. The trend towards increasing boat numbers in the state continues upward and shows no sign of levelling off.

The gasoline shortage in the spring and summer of 1979 kept some boat owners off the water as evidenced by the fact that while large numbers of people went boating, the overwhelming numbers were not present. This was a normal and expected reaction; however, we expect that by Easter, 1980, it will be business as usual.

A Coast Guard-sponserd seminar including law enforcement personnel on both sides of the Colorado River was conducted in March. That meeting pointed up the need for common communications between agencies to enhance safety patrols and search and rescue. Coast Guard is presently studying the problem and is preparing recommendations.

The Department cooperated with the Arizona Public Service Company to mark de-energized underwater powerlines that could cause problems to those using boats at Painted Rock, the state's most recently acquired lake.

One hundred (100) buoys were delivered to the Tonto National Forest to ultimately mark underwater hazards on Bartlett Lake.

Conferences of the Western States Boating Administrators Association and the National Association of State Boating Law Administrators were attended. The National Association is currently supporting a Congressional Bill, H.R. 4310, in the House of Representatives that is intended to return approximately 30 million dollars per year to the states for boating facilities and safety programs.

Boating accident investigations resulted in defect notifications being sent to first purchasers by two boat manufacturers advising the purchasers of inherent safety problems and how to correct them.

The 1979 State Legislature passed a bill increasing boat registration and transfer fees from $2.00 to $4.00. This will enable the Department to meet the rising cost of boat registration and maintain the current level of boater education.

INFORMATION & EDUCATION

BILL SIZER
CHIEF

THE SPECIFIC accomplishments of the division are included in the reports of the three branch chiefs, but certain efforts deserve comment from an overall point of view

The continued growth and recognition of the Wildlife Docent Program and its adoption by conservation agencies in other states were most heartening, as was its enthusiastic acceptance in Arizona. Conservationists in southern Arizona, impressed by the success of the effort in the Phoenix area, were vigorously encouraging the Department to expand the program to the Tucson area. Plans to accomplish this were well underway by the end of the fiscal year.

The elk sketch, mentioned in the AV Section report, generated almost wild acclaim during its initial showings as the year drew to a close. This sketch, somewhat more elaborate than those which preceded it in the series, included natural sounds of bulls bugling as well as remarkably excellent footage of the animals going about their daily routine. It marked the fifth sketch – simple films without elaborate lab touches –in the series.

Response to *Wildlife Views* was also very heartening, with subscriptions reaching past 60,000 by the end of the period, and the achievements of the Front Counter crew – always impressive – reached new highs during the year. Fortunately for this ever-growing function, relief in the form of personnel changes was in view by early summer.

Overall, it was a year of frustration and frantic effort, but in retrospect the results were well worth the hassle.

INFORMATION BRANCH

WES KEYES
INFORMATION COORDINATOR

Front Counter Section

AS LAST year, this function continued to dominate the efforts of the Information Branch during the year, requiring a third of the Division's manpower to meet the demands placed on it. The Front Counter operation is staffed by two information clerks, a secretary and an information officer. Functions include information services in the form of mail, phone calls and personal visits; news serices; license sales; central telephone switchboard for the Department; film loan library; plus many other miscellaneous and administrative duties.

Two years ago, the number of functions performed at the Front Counter reached the critical level, but the workload increased in the license sale/permit area along with an increase in information calls, visits and mail. Budgetary restrictions during the year provided no permanent relief in additional personnel, only with temporary assistance. Somehow, the Front Counter operation survived the year without serious deterioration of services.

License and tag sales increased during the fiscal year by $26,000 to a total of $135,000. Switchboard calls numbered 750 to 1,000 per day and visitors numbered in excess of 50,000. The incoming mail load continued to grow, approaching 20,000 pieces during the fiscal year. Demands on the film library, with the addition of several new titles and an increase in Firearms Safety classes, reached another all-time high. The news service continued as last year with production of 52 Weekly News Bulletins averaging four to five hard news stories. Subscriptions to the Weekly Newsletter increased slightly over last year.

Audio-Visual Section

The audio-visual efforts included the completion of a 24-minute sketch covering elk in Arizona. Production of a similar sketch on antelope was started toward the end of the fiscal year. Television news coverage assistance accounted for a number of news stories being aired on local stations, and the Department's weekly radio program continued to be sent to 24 stations throughout the state.

A major portion of the AV Section's time during the fiscal year was the providing of photographs for the Department's monthly publication *Wildlife Views*.

Filming and production of "Elk in Arizona" was completed and a similar film on antelope was begun. Filming wildlife is tedious, often costly work, but the product in this case proved worth the effort. The film was well received by the public.

EDUCATION BRANCH

BOB HERNBRODE
EDUCATION COORDINATOR

THE Department's Wildlife Conservation Docent program, which uses lay teachers to give an educational program in classrooms, continued to expand. During the 1978-1979 school year over 5,000 first and fourth graders received docent visits. At least three other states have duplicated the program and several more are using various parts of it.

Teacher workshops remained an important function of the Education Branch. Over 350 teachers from around the state attended the 15-hour-long workshops. Many of these teachers utilized other educational services of the Department during the school year.

One innovation occurring near the end of the fiscal year was the addition of ¾" video tape system to our A.V. Section. This equipment allows us to offer the Department-made films to school film libraries at a very low cost. As a result seven films were placed in five major school libraries: the Phoenix Public Library, State A.V. Extension Office and its county branches, Arizona State University, University of Arizona and Tucson School District #1.

Firearms Safety

During the last fiscal year 126 new instructors were certified and 3,935 students successfully completed the firearms safety course.

Two new hunter safety field courses were developed, one in Phoenix and one in Yuma. The use of video tape programs has also been introduced into the instructor training program.

PUBLICATIONS BRANCH

TERRY JACKSON
EDITOR

WILDLIFE VIEWS, the Department's monthly newspaper, almost tripled in circulation, climbing from 23,085 subscribers in June, 1978, to approximately 63,000 in June, 1979. This was accomplished through various promotion efforts, including the mailing of subscription forms along with watercraft registration renewals.

All regulations, including hunting, fishing, trapping, reptile, boating and Title 17 were published on schedule.

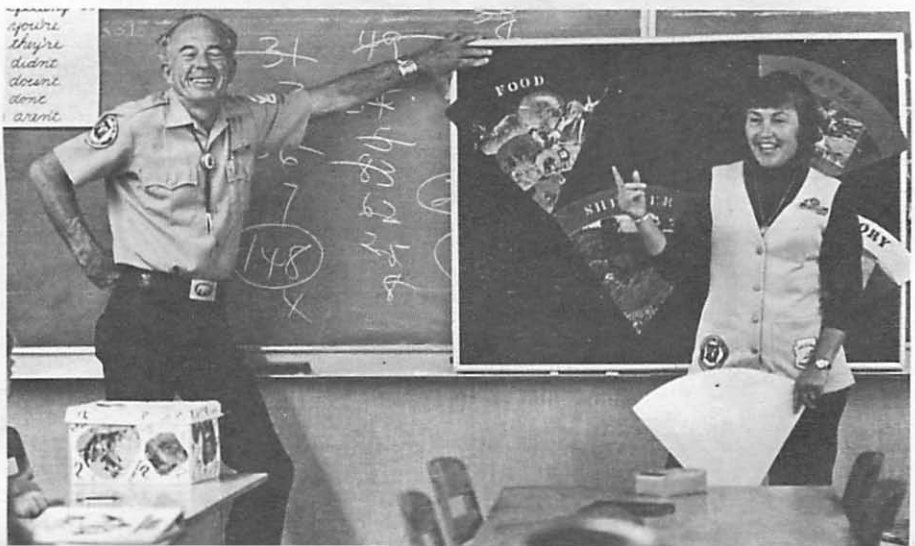
Six information pamphlets were prepared for publication and were awaiting printing as of June 30.

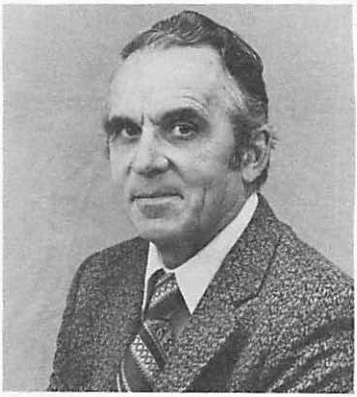
During the previous legislative session, a law providing for the sale of publications by the Department was created. The Commission subsequently established prices to be charged for certain publications. It was decided that *Wildlife Views*, "Arizona Fishin' Holes", "Now That You've Got It, What Are You Going To Do With It?", and unit maps would be sold beginning July 1, 1979. In addition, the sale of *Fishes of Arizona* would be transferred from the Administration Division to the Publications Branch.

Preparations were made and all of the above publications, except unit maps, were ready for sale by June 30.

Promotions for the upcoming sale of *Wildlife Views* were begun and the response was gratifying. By June 30, 3,660 paid subscriptions, many of which were for two or three years, had been received.

Continuing to expand, the Wildlife Conservation Docent program reached over 5,000 first and fourth graders during the fiscal year.





STEVE GALIZIOLI
CHIEF

RESEARCH

WILDLIFE RESEARCH

RON SMITH
SUPERVISOR

WILDLIFE RESEARCH conducted by this Branch is supported under provisions of the Federal Aid in Wildlife Restoration Act which provides for 75 percent of the funds to be spent on wildlife (game) research.

The staff of seven biologists is responsible for the conduct of some 17 job objectives, which are generally long-term problem-oriented studies. The Commission-approved wildlife species plans now define wildlife problems and their relative importance and guide the research program.

A few of the more noteworthy of these studies are summarized herein.

Mule deer

Several studies are in progress on this species in widely differing habitats. On the Kaibab plateau where that famous herd has fallen on hard times, biologists are studying the effects of predation, forage supply and weather to see if these factors can explain the six-year decline in population size.

On the Three Bar Wildlife Area the unhunted mule deer herd has maintained modest densities of eight-twelve deer per square mile. Many questions remain concerning the ability of this productive desert range to support higher densities of deer and ultimately a reasonable degree of hunting recreation. The herd presently appears to be controlled by a low rate of recruitment. Circumstantial evidence suggests that large predators have a signifi-

Wet weather made the deer collaring operation on the Kaibab a tough job.

cant effect on fawn survival within this herd, their influence varying depending on conditions of food and cover. Cattle grazing is also being examined to learn its effect on a deer herd adjacent to the Three Bar area and to what extent grazing alters the interaction of fawns, forage and predators.

Pronghorn Antelope

A four-year study of antelope and coyotes on Anderson Mesa has found that high coyote populations are severely limiting the recruitment rate of this antelope herd. Coyotes have taken an average of over 80 percent of the antelope fawns born on the Mesa each year of the study. The information supporting the conclusions of this study have been gained largely as a result of direct observations of coyotes and antelope during the fawning period from atop a tower on Pine Hill. Fawn observations during the study years have declined from 4.7 to 0.5 per hour, while coyote observations have increased from 0.1 to 0.9 per hour. The ratio of fawns observed to coyotes observed has declined from 39.4 to 0.6 fawns per coyote. Analysis of coyote scats has shown that antelope is a common food item during the fawning period. Over 63 percent of the scats contained antelope remains as compared with 10 percent during the winter months.

A new five-year experiment has now been approved and is underway to evaluate the effectiveness of coyote control for improving antelope population size on Anderson Mesa. Control costs will be evaluated in relation to changes in fawn survival rates and population trends.

Javelina

Ungulates with the exception of elk in Arizona have characteristically low recruitment rates. Under these conditions the female portion of the population can seldom be hunted without causing a population decline. Male and female javelina are indistinguishable in the field and hunting regulations for this species cannot be designed to protect the female. Javelina are thus vulnerable to excessive hunting in areas easily accessible to hunters. Research being conducted on the Three Bar Wildlife Area is attempting to evaluate hunt management strategies that will allow hunting opportunity yet reduce the probability of hunting success. For the past two hunting seasons a 2-weekend pistol-only hunt has been conducted for a limited (75 permits each weekend) number of hunters. In 1978 average success was 15 percent and in 1979, 13 percent. This compares with a hunter success rate of 31 percent in 1977, for about the same number of hunters, but when the season ran for seven consecutive days.

Black Bear

Studies of this animal are being conducted in the Mt. Ord-Four Peaks region of the Mazatzal Mountains. This effort is designed to provide data on population density' home range, denning behavior, food preferences, critical habitat, mortality rates, and other population statistics. This base of information is going to be of immeasurable value to hunters and wildlife managers alike by providing a sounder basis for the design of hunting regulations.

A portion of the black bear studies is now complete. The population of the study area has been estimated at about 40 bears in the 50 square miles of habitat, or about 1.25 bears per square mile of habitat. This information, along with data on the habitat components of individual bear home ranges, will provide a basis for estimating probable bear density in areas of similar chaparral habitat elsewhere in Arizona.

Work on describing the characteristics of bear habitat is continuing. In order to protect those elements of bear habitat which are critical to the well-being of that species, more information is needed on the relative importance of such habitat features as water, seasonal food supplies, and vegetative cover to individual bears.

FISHERIES RESEARCH

STEVE GALIZIOLI
SUPERVISOR

ALL FIELD work and data analysis for the Urban Fishing Study has been completed. A final report assessing the feasibility, cost/benefits and management requirements of providing "put-and-take" fishing on urban waters is being prepared and will be published in the immediate future.

The cost/benefit analysis of the study was accomplished through a contract with the Agricultural Economics Department, University of AZ. Their study focused on the monetary and non-monetary benefits that the program did and could provide, and compared these benefits to the cost of sustaining the program. Also, non-discriminatory monopolist values were calculated to ascertain the Game and Fish Department's revenue-maximizing price. The University's report has been completed and received and its findings will be incorporated into the final report.

Cost/benefit data would indicate that an urban fishing program would not be self-sufficient at the current 6 month price ($3.00 for adults, $1.00 for juveniles). Sale of urban permits will not offset the cost of providing the program. It will require an estimated annual expenditure of $2,700 per acre just to provide catchable fish. This does not include the other administrative and enforcement costs associated with the program.

At the $3.00/$1.00 price it is anticipated that permits would pay for 37 percent of the fish cost. If the permits were increased to $5.00/$2.00, an estimated 66 percent of the cost would be covered. Through the angler interviews it was established that charging $5.00/$2.00 would produce approximately the revenemaxamizing price.

Fish cost, permit revenue, angler usage and other associated benefits that urban fishing offers will be evaluated before making a recommendation as to its future. That the two study lakes on an acre basis (333 anglers/month/acre for Chaparral and 228 for Lakeside) were the most fished waters in the state during 1977-78 is partial evidence of the potential of urban fishing.

At the conclusion of the Urban Lake study, the Regional Operations Division was contacted for recommendations for implementation of new fisheries research studies. Following review of these recommendations, the *Fishery Investigations of the Colorado River from Glen Canyon Dam to the Confluence of the Paria River* study was selected. The official beginning of the new study is scheduled for the following fiscal year and no activities are shown for this report period.

Bear populations and individual behavior are under study in the Mazatzal Mountains.

WILDLIFE PLANNING & DEVELOPMENT

ROBERT D. CURTIS
CHIEF

DURING THE period covered by this report, numerous events and various happenings in Arizona impacted wildlife populations, habitats and programs.

The State of Arizona experienced its third wettest year in history, resulting in numerous floods with damaging economic results and public and political outcry for flood control. A conservation-minded Governor was elected and he initiated several new studies and programs relating to the environment. Task Forces on State Urban Lands, State Lien Selections and Alternatives to Orme Dam were established by the Governor. The State Legislature appropriated funds for channel clearing in the Salt and Gila Rivers. The U.S. Congress-House of Representatives-Public Works and Transportation Committee-Water Resources Subcommittee held public hearings in Phoenix relative to Salt-Gila Rivers flood control problems. A Plan for Unique and Nationally Significant Wildlife Ecosystems in Arizona under the President's National Heritage Program was completed by the U.S. Fish and Wildlife Service.

To cope with the many Federal, State and Local programs that may affect wildlife resources, the Wildlife Planning and Development Division has continued to direct its energies and resources toward balanced, planned programs, developments and activities that provide hunting, fishing and related nonconsumptive use of fish and wildlife resources throughoue Arizona, now and in the future.

These activities and programs include acquisition of land and water areas for wildlife, maintenance and development

of lakes and wildlife areas, development of public shooting ranges, surveillance of land and water projects and activities that often threaten or create impacts on Arizona fish and wildlife resources, and comprehensive fish and wildlife planning, both from within the Department and cooperately with other agencies.

Statewide comprehensive planning for wildlife continues to be a major goal of the Division. During the year, strategic plans for Arizona's ten big game species: antelope, black bear, bighorn sheep, buffalo, elk, javelina, mountain lion, mule deer, turkey and white-tailed deer were completed; received public comment; and were approved by the Arizona Game and Fish Commission. These plans, with their identifiable problems and strategies, illustrate that projected future uses of limited wildlife resources must be balanced with the ultimate availability of vital supporting resources: land, water and plants.

Coordination with other agencies and organizations continues to be necessary to meet our wildlife resource goals and objectives. The land management agencies: Forest Service, Bureau of Land Management, Fish and Wildlife Service, Arizona State Land Department, County Parks and other local governments are all vital links in the cooperative efforts to protect, preserve and manage the land and water habitats of Arizona's resources.

People and their respective agencies and organizations will determine the futures of those species of wildlife that they feel are important or deem enjoyable. Therefore, people must demand with a loud voice and be willing to fund substantially fish and wildlife programs that are aimed at fitting our wild contemporaries into the ever-changing conditions that we impose on them.

The above activities, programs and developments were carried out by the three Divisional Branches'. Development and Maintenance, Engineering' and Planning and Evaluation.

DEVELOPMENT AND MAINTENANCE BRANCH

DANIEL P. SCHADLE
SUPERVISOR

THE DEVELOPMENT and Maintenance Branch continues to supply the Department with the necessary labor and experienced personnel to perform the many and varied types of activities within the Department. As in the past, providing and maintaining wildlife habitat developments, especially water developments, continues to be one of our main objectives.

HABITAT DEVELOPMENT

DON BELKNAP
SUPERVISOR

THROUGH THE continuation of contracts with the Bureau of Land Management and Sikes Act, we continue to construct new catchments and reconstruct previously developed catchments located on BLM lands.

Five new catchments were constructed in the Arizona Strip and an additional ten catchments were redeveloped by enlarging reservoirs and by increasing the size of the rain collecting aprons to insure additional runoff.

Four potholes were completed in cooperation with the Arizona Desert Bighorn Sheep Society. Two potholes were developed by the construction of water tight masonry dams. One pothole was enlarged by raising the original masonry dam several feet. A fourth pothole, previously developed, received a shade roof to reduce the evaporation rate of the stored water.

Asphalt spraying equipment, a pump and compressor, was purchased to further the experimental process of using asphalt sprayed fiberglass and a polyester filament material as a rainwater collecting surface for rainwater catchment construction.

New equipment purchases during the year included a backhoe, water tank truck, 15-ton utility trailer and a 40-ton capacity heavy equipment transport trailer.

HABITAT MAINTENANCE

GERALD HAMMETT
SUPERVISOR

WILDLIFE HABITAT maintenance was continued on a statewide basis. Personnel responded to many non-maintenance emergencies in addition to their regularly scheduled activities.

The maintenance of water developments, with stress put on rainwater catchments, continues to be a major activity of this program. Supplying water to water deficient catchments on a statewide basis was continued when necessary. Two hundred and fifty rainwater catchments were maintained. Approximately 252,750 gallons of water were hauled to 162 water deficient catchments.

Lake maintenance was performed at 13 lake sites.

The Lynx Creek water division canal was maintained and cleared for water deliveries.

A total of 33 miles of fence was maintained on developments.

The development and maintenance of water catchments for use by wildlife in arid areas continues to be an important function of the division.

Road maintenance was performed at Three-Bar, Raymond and House Rock Buffalo Ranches.

The Copper Creek Cabin was maintained.

Wooden corrals at Ryan and Three-Bar were replaced with metal pipe moveable corrals.

The Roper Lake inlet ditch was repaired and cleaned.

The annual helicopter survey was conducted in Southwestern Arizona to determine the maintenance requirements needed on approximately 100 water developments which are widely spaced and located in remote areas.

Other developments which were maintained includes windmills, springs, retention dams, parking lots, restrooms, boat ramps and signs.

Statewide building Maintenance

Major building renovation work was performed at Deer Valley North I&E foyer area. This area was remodeled to provide additional space and add counter space to improve the service to the general public.

The employee lounge was enlarged by removing a partition in a storage area and refinishing it to blend into the employee lounge.

A warehouse and storage area at the Yuma Regional Office was converted into additional office space and a minifish lab.

Additional gasoline storage was provided by installing 1,000 gallon underground tanks at Ryan and Three-Bar. A 2,000 gallon gas tank was installed at the Yuma Regional Office.

A new parking lot was completed at Deer Valley South. The parking lots at Deer Valley North and Yuma Regional Office were resurfaced.

Roof maintenance was performed at Region II office building.

Restrooms were altered and concrete ramps were constructed to accommodate wheelchair occupants at Deer Valley North and Deer Valley South.

Seven large routed redwood signs were removed, refinished and replaced.

Many emergencies were answered during the year. These included plumbing, electrical, carpentry and painting activities.

ENGINEERING BRANCH

RAY O. PERKINS
ENGINEERING SUPERVISOR

DURING THE fiscal year 1978-79 the Engineering Branch provided technical assistance including surveys, designs, plans, specifications, construction supervision and coordination with other branches and agencies. Due in part to changes in personnel the work completed this year has placed this Branch in a catch-up position.

The following is a list of projects that this Branch has been involved with:

Completion of the construction inspection of Region I Headquarters.

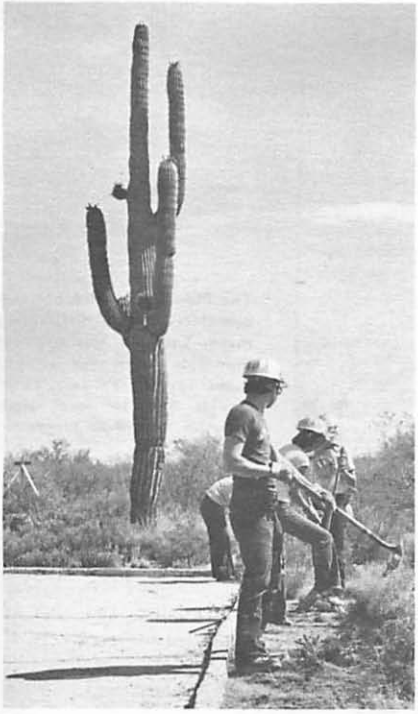
Plans, specifications and construction supervision were provided for the Deer Valley South Parking Lot.

The Branch provided technical assistance on the Federal Disaster Assistance Administration projects at Robbins Butte, Black Butte and Arlington Wildlife Areas.

Prepared contract for professional services to survey 120 acres of the Silver Creek Hatchery.

Performed soil study of Arivaca Lake Road for soil cement crossing at Oro Blanca Wash.

Prepared plans and contract for professional services for the subsurface investigation of Nelson Reservoir Dam.



This activity was coordinated with the Arizona Water Commission and the United States Forest Service.

Participated, with the Arizona Water Commission Dam Safety Engineer, in annual safety and maintenance inspection of twenty-one Department dams.

Determined what work would be needed and what elevations are required to bring Pena Blanca Dam within the requirements of the Arizona Water Commission. This was done and the dam is now in compliance with the Arizona Water Commission requirements.

At Canyon Creek Hatchery the rearing pond modifications were completed and piping systems installation started. This work has involved designs, plans, specifications, construction supervision and surveys.

At Page Springs the dividing walls in the three large rearing ponds (ponds 8, 9 and 10) were completed. This required design, surveys and construction inspection.

PLANNING AND EVALUATION BRANCH

JOHN N. CARR
SUPERVISOR

THE PLANNING and Evaluation Branch has the responsibiliity of: 1) preparing strategic plans for Arizona fish and wildlife resources; 2) to review and comment on environmental impact statements and to coordinate fish and wildlife planning for federal land and water projects in compliance with the Fish and Wildlife Coordination Act; 3) to prepare environmental assessments for Department projects; 4) the appraisal of lands for acquisition or disposal; and 5) the administration of the shooting range development fund.

Planning

The documentation of wildlife inventory is one of the primary responsibilities of the planning program. From data provided by the field staff, a series of wildlife distribution maps was completed. The distribution of all the big game species found in Arizona is now displayed on maps. Preparation of distribution maps for the small game species is now in progress.

Strategic plans for seven species of big game have been completed. These plans identify the Department's goals and objectives for future management programs and also project the future hunting demands. Each species plan identifies problems that affect the successful management of the species and suggest strategies to solve the problems.

Evaluation

One of the primary concerns to the Department is the loss of fish and wildlife habitat due to land and water development projects and management programs. The National Environmental Policy Act and the Fish and Wildlife Coordination Act provide for the review of development projects to protect and enhance fish and wildlife habitat. Under the provisions of these and other laws and regulations, the Game and Fish Department is provided the opportunity to review proposed projects and to offer suggestions to reduce the impacts to the fish and wildlife resources. Often the opportunity exists to enhance or improve the existing conditions for fish or wildlife.

The National Environmental Policy Act has created a public awareness of the values of fish and wildlife resources. As a result, the Department reviews many more development projects or management programs of other agencies (federal, state and local) than ever before. In 1961, when the Planning and Evaluation Branch was established, only 10 federally funded projects were evaluated for their effects on the fish and wildlife resources. During the past year, the Department reviewed a total of 1,885 projects or land use programs.

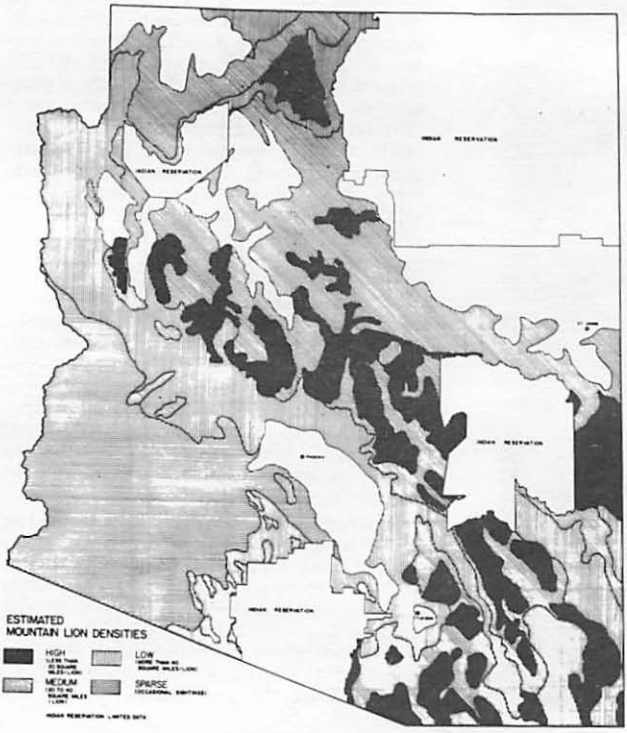
These projects vary in size from the multi-million dollar Central Arizona Project to a borrow pit used for a highway maintenance project. A total of 300 federally sponsored projects and 666 state agency projects were reviewed during the year. In addition, there were 45 projects from private industry that required review and comment.

Many of the projects reviewed by the Planning and Evaluation Branch were determined to have little or no impact on the state's fish and wildlife resources. Just over 1,000 of these projects required a response from the Department and 328 projects required an in-depth review to determine impacts to the fish and wildlife resources.

The large major federal projects require continued monitoring and coordiantion to insure fish and wildlife values are considered. The Central Arizona Project is the classic example. This was one of the 10 original projects evaluated by the Branch in 1961. The evaluation and coordination of this project is expected to continue long after the expected completion date of 1985.

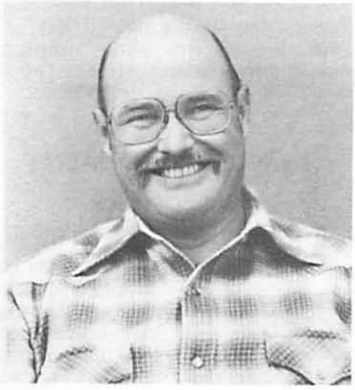
Shooting Range Fund

Two organizations applied for monies from the Shooting Range Development Fund. These funds are available through the Department and Commission and the applications are processed through this Branch. The Arizona Game and Fish Commission approved funding for two projects that totalled $10,000.



The Planning Branch has now completed range distribution maps, such as this one for mountain lions, for all big game species. Preparation of similar maps for small game species is now in progress.

REGIONAL OPERATIONS



KELLY NEAL
COORDINATOR

METROPOLITAN BRANCH

DON VANCE
LAW ENFORCEMENT SPECIALIST

FISCAL YEAR 1978-79 began with the Metropolitan Branch being at its full strength of one law enforcement specialist, two wildlife managers and two wildlife assistants. During the previous year problem areas, public demands and priorities were assessed. At the direction of the Commission, Director's office and Division Chief, Metro, along with the rest of the division, launched a program to increase enforcement effort and efficiency.

A comparison of enforcement results for fiscal 1977-78 and fiscal 1978-79 indicates a good deal of success in reaching our goals.

	1977-78	1978-79	Percent Increase
Persons checked	1282	2701	110.6
Citations issued	100	227	127.6
Citations per 100 checks	7.8	8.4	7.6
Enforcement per hour worked	4887	5142	5.2
Citations per hour worked	.020	.044	120.0
Fines assessed	$2214.00	$5220.45	135.7

As it was anticipated, the increased enforcement effort was accomplished at the expense of other services. Response to nuisance wildlife calls was reduced by 57.1%; response to depredation, disease and road kills was reduced by 38.4%. The number of live animals picked up by Metro officers was reduced from 248 in fiscal year 1977-78 to 171 this year, with the most common being owls, hawks and skunks.

It should be noted that a large percentage of the enforcement push took place during the first quarter of the year, while the Metro Branch was at full strength. Wildlife Assistant Bill Werner was promoted to Wildlife Manager in October and transferred. His position was not refilled. Wildlife Assistant Bill Frantz resigned in January. Although his position was filled, his replacement was not commissioned until late June. This replacement was Donna Hayes—the first female to be commissioned as a Game Ranger in Arizona.

As a result of the above manpower shortages and the loss of approximately fifty man-days to illness and injury, warrant service, routine patrol and lake patrol were discontinued.

REGION I
—Pinetop

MIKE YEAGER
REGIONAL SUPERVISOR

THE YEAR began with construction well underway on the new Pinetop Regional Office. The move to the new site was actually made during the first week of September. The facility is a welcome relief from the cramped offices of old and many years overdue.

Record numbers of calls were received from local residents concerning nuisance bears in most of the higher elevations from Show Low to Greer. On the other hand, campground bears are becoming less and less a problem, primarily because of the way in which the Apache-Sitgreaves National Forest has handled the collection and disposal of refuse in these areas.

Region I budget expenditure of $431,989 represented an increase of 15.3 percent over the past fiscal year.

Various transfers into and out of the Region through this period kept manpower slightly under that of a full compliment.

LAW ENFORCEMENT

ART QUEENAN
SPECIALIST

A TOTAL OF 631 citations was issued during this period and $14,324 was collected in fines. Wildlife managers spent 66.6% of their time in law enforcement activities, which is up 8% over last year, as per our direction from the Commission. Seventy boating, 56 big game, 63 small game, 422 fishing and 20 other citations made up the total of 631 citations.

Twenty-seven HOW Line calls were completed with some very good cases resulting from reporting from the public, this is the second year of operation for the HOW-Line and the benefits have improved greatly.

Three antelope, 16 deer and four elk cases were investigated without a citation being written. These figures are down consideably over the previous year and thought to be a decrease in reporting rather than a decrease in actual case investigations.

Some notable statistics for the region are: 52.1 arrests per officer and 21.5 hours per arrest, 487 cases where a penalty was assessed and 142 cases dismissed or suspended for a no-penalty percentage of 34%, as compared to 31% the previous year.

It is hard to draw meaningful conclusions from these statistics; however, the number of people using the recreational resources of the White Mountains is increasing drastically and the amount of time, effort and equipment needed to monitor this increasing number of people should be increased accordingly.

GAME MANAGEMENT

JACK O'NEILL
SPECIALIST

BIG GAME seasons during the fall of 1978 and the spring of 1979 provided recreation for over 22,000 hunters within Region I. The harvest for this period included: 113 antelope, 161 bear, 2202 deer, 378 elk, 575 javelina, 77 lions and

561 turkeys. Small game hunting opportunities included open seasons for blue grouse, dove, quail, tree squirrel, bandtail pigeons, rabbits and waterfowl. Interest in fur trapping remained high, with substantial numbers of coyotes, foxes and bobcats reported taken.

Wildlife surveys indicated generally stable deer populations, with elk, javelina and turkey numbers on the increase. Antelope numbers have not recovered from the 1967-68 winter storm, and are declining throughout much of the Region. Quail numbers have risen dramatically, as a result of two winters with good precipitation. Waterfowl production in the higher elevations appeared above average in the summer of 1979, with the increasing availability of water and nesting cover.

Wildlife management activities during the year included: a release of eight Rocky Mountain bighorn sheep in the upper Blue River area, elk movement and livestock inventories, development of wetland areas with nesting islands, and blue grouse habitat needs and movements.

A great deal of cooperation occurred between Regional personnel and the various Federal land management agencies in developing Sikes Act projects and in examination and design of timber and range programs to improve or protect wildlife habitat.

FISHERIES MANAGEMENT

JIM NOVY
SPECIALIST

REGION I personnel expended a total of 535 man-days conducting fisheries related activities. The majority (72%) of this effort was associated with the federal-aid project centered around popular surveys, creel census and limnological work.

Creel census was carried out on seven Region I lakes. The information collected was useful in evaluating special regulations at Becker Lake and the return of stocked trout in lakes (Fools Hollow, Rainbow, Scotts, Show Low and Woodland) which have large populations of bass and roughfish. Analysis of the past three years of creel data on these waters should determine whether continued trout stocking is warranted or if conversion to middle-range species represents a better alternative.

Fish population surveys were carried out on eighteen lakes. A diversity of gear was used to conduct the annual surveys. These surveys were useful in evaluating several recent introductions of new species into Region I waters. Scale samples were collected from largemouth bass, walleye and northern pike to evaluate growth of these species.

Eight Rocky Mountain bighorns, including six pregnant ewes, were released into historic habitat in eastern Arizona.

Comprehensive limnological surveys were completed at Black Canyon and Willow Springs Lake. Causative factors in an annual summer die-off of trout at Black Canyon Lake have been determined. Base data necessary for implementation of Lake restoration techniques were established at that lake.

The Arizona trout restoration program was continued during the past year. The recovery plan for this species was completed and submitted to the Director, U.S. Fish and Wildlife Service, for approval. Seven streams containing Arizona native trout or considered candidate waters for introduction were surveyed. Construction of fish barriers by the U.S. Forest Service was completed at Lee Valley and Bear Wallow Creek. Renovation of those streams above the barriers is planned for June, 1980, with restocking of Arizona natives scheduled later that year.

Diquat was applied to two lakes (Concho and Luna) to control submergent aquatic vegetation in shoreline areas. Amitrol was used at Roper Lake in an attempt to control cattails.

A record snow pack in the White Mountains left all reservoirs full this past spring. Maintenance of above normal water levels throughout the next year is anticipated at all reservoirs except Bear Canyon and Fools Hollow Lake. Failure of a value at Bear Canyon and opening of a fault at Fools Hollow will result in both of these lakes being drained by September, 1979.

Purchase of equipment during this fiscal year made possible establishment of a laboratory at the regional office to carry out routine and nutrient water chemistry, using standard methods. This will facilitate future limnological work and help solve some of the management problems associated with the eutrophication of regional trout waters.

REGION II
—Flagstaff

LEVI PACKARD
REGIONAL SUPERVISOR

THE following table gives a breakdown of manhours spent on activities by regional personnel:

Game Mgt. (W-53, Dev check, Sikes, Habitat Protection)	7,578
Law Enforcement	13,149
Fish Mgt. (F-7)	4,644
I & E	126
Administration	1,789
Watercraft (enforcement & reg)	772
Other activities	6,410
W-85 (buffalo hunt)	104
TOTAL WORK HOURS	34,572

There were 186 horse-days and 355,622 miles spent on the various activities listed above.

LAW ENFORCEMENT

RAY PARENT
SPECIALIST

IN FISCAL year 1978-79 Region II officers reported checking 13,119 persons taking wildlife during the year. Region II officers apprehended 803 violators of game and fish and watercraft laws, and the courts assessed $20,490 in fines.

Region II law enforcement hours decreased from the previous year from 15,958 hours in 1977-78 to 13,620 in 1978-79 due primarily to restrictions in overtime hours. Violations apprehended increased from 677 in 1977-78 to 803 in 1978-79 despite reduced hours spent in law enforcement activity.

Closed season big game violations, elk hunt violations and night hunting of wildlife continue to be the primary law enforcement problems in the Region.

GAME MANAGEMENT

THOMAS L. BRITT
SPECIALIST

A TOTAL OF 7,578 game management activity hours were expended during Fiscal Year 1978-79. This total comprised 21-percent of the total hours worked by Region II personnel. The majority of this time was expended for wildlife surveys, primarily big game.

Big game survey efforts produced the following total observations: 1,539 antelope, 1,387 elk, 1,965 mule deer, 122 whitetail deer, 1,036 turkey and 499 javelina. Deer and javelina survey efforts were enhanced by the use of helicopter in certain areas.

Big game harvest during 1978-79 changed little from that reported in the previous year. Antelope hunters reported harvesting 140 animals, a 25-animal decrease from the previous year. Fawn survival again decreased and permit numbers were reduced downward for the second consecutive year.

Elk herds were again extremely productive and calf survival increased over levels reported in 1977. Hunters reported harvesting 1,387 elk in 1978. Total harvest increased 241 animals, a record level for Region II. Elk permits were decreased slightly in 1979. A special post season was again recommended for the northern portion of Unit 5B. Elk herds in Region II appear to have stabilized.

Deer herds in Region II generally remained static in 1978-79. Firearm hunters reported harvesting 2,818 mule deer and 228 whitetails in 1978. Archery harvest was believed to be about 150 animals and similar to that reported last year. The average number of days expended to harvest a deer increased from 23 in 1977 to 27 in 1979. Deer harvest recommendations in 1979 were similar to those of 1978 except additional multi-unit hunt areas were dismantled in favor of single-unit hunts.

Turkey hunters, both spring and fall, reported harvesting 1,193 birds in 1978-79. Spring and fall hunt success increased slightly. The extreme winter of 1978-79 inflicted some losses on local turkey populations, thus reducing the fall population significantly in 1979. The condition was of little concern because the productivity rate of turkeys enable them to recover quickly from population reductions.

Elk trapping and collaring continued in both Regions I and II. The project is a management study to determine patterns of elk migrations and herd integrity.

Javelina hunters reported harvesting 1,721 animals in 1978-79. This total includes both archery and firearms harvest. Total harvest decreased slightly from the previous year. The decrease was attributed to loss of archers as a result of implementation of archery javelina permits. A similar but less stringent management strategy was recommended for 1979-80 in order to control the increasing archery javelina harvest in key management units near Phoenix.

Hunters reported harvesting 41 lions and 63 bears in 1978-79. This level of harvest was lower than that reported the previous year. One lion and one bear were reported taken as livestock depredators under the provision of A.R.S. 17-302.

Small game hunting was excellent in 1978-79 for tree squirrel, cottontail rabbit, Gambel quail, mourning dove, blue grouse and waterfowl. Again, as in 1977-78, band-tailed pigeon, chukar and white-winged dove hunting was generally poor.

The fur trapping harvest was similar to that reported the previous year. Trapping activities were severly hampered along the Mogollon Rim by heavy snowfall.

The bighorn sheep reintroduction proposed for Unit 22 came closer to being a reality this year. The extensive inventory phase was completed and a reintroduction site was selected at Goat Mountain adjacent to Apache Lake.

The blue grouse transplant program was inactive this past year. Grouse observations, although few in number, were more common this year than in previous years.

Elk trapping was more successful this year than in all previous years. A total of 75 animals were marked at four separate trap locations. A trapping technique utilizing portable traps was evaluated and found to be most effective. This technique will be utilized more in 1979-80.

FISHERIES MANAGEMENT

DAVID C. BANCROFT
SPECIALIST

A TOTAL OF 4,644 man-hours was expended in fisheries related activities in Region II. The shift of Wildlife Manager priorities toward law enforcement greatly impacted the regional fisheries program. Most of the manpower was utilized for special projects with definite management goals, and little time was spent on basic fishery surveys.

The Peck's Lake dredging project was resubmitted to the Arizona Outdoor Rereation Coordinating Commission for State Lake Improvement funding. Feasibility studies are being conducted and with final approval the funding date will be July, 1980.

As an interim method of controling the vegetation in Peck's Lake a chemical weed control project was accomplished in the spring of 1979. The Clarkdale Kiwanis Club raised over $7,000 through donations by local individuals, businesses, other service clubs and conservation groups. The department provided $3,000 for chemicals and the equipment and manpower for the job. *Talapia zillii* and crayfish *(Orthomectes causii)* were introduced in an effort to assess a combination of chemical and biological control methods.

The Lee's Ferry fishery is still being threatened by everything from over-fishing to new dams. The most imminent threat is a Peaking Power development at Glen Canyon Dam which would seriously alter downstream flows. A fisheries research team was reestablished with a two-year study of the Lee's Ferry fish population as their first priority. The four-fish limit has been well accepted and appears to be accomplishing the desired result—in part. Further regulations are being evaluated for future use.

In a cooperative effort with the Clarkdale Kiwanis Club, Peck's Lake was once again de-weeded.

REGION III
—Kingman

WES MARTIN
REGIONAL SUPERVISOR

INCREASED manpower allowed an increase of 3,457 man-hours over fiscal 1977-78. However, a 40-hour work week was implemented in September, 1978 and the positive effect of the increased manpower was largely negated as it was accompanied by increased responsibilities. Had the 40-hour work week not been implemented, the increased manpower would have resulted in a 5,707 man-hour increase in regional output. The eventual impact of both the increased manpower and the 40-hour work week is not known but manpower scheduling and priority establishment have become more critical. It has become obvious that some lower priority jobs will not be accomplished unless we wish to further deteriorate work quality.

Following are summaries prepared by the Region III staff specialists and an "Expended Manpower Summary."

EXPENDED MANPOWER SUMMARY

Activity	Hours	Percent
Game Management	5,705	17.1
Fisheries Management	2,611	7.8
Lake Mead Project	3,564	10.7
Game and Fish Enforcement	10,560	31.6
Watercraft Enforcement	1,018	3.1
Watercraft Registration	665	2.0
Baseline Inventory	1,809	5.4
I & E	825	2.5
General Supervision	1,603	4.8
Search and Rescue	7	.02
Special	407	1.2
Miscellaneous	4,615	13.8
TOTALS	33,389	100.02

FISHERIES MANAGEMENT

THOMAS A. LILES
SPECIALIST

A TOTAL OF 281 man-days was spent conducting creel census in Region III. This consisted of 9,501 angler contacts at five locations on four bodies of water; Temple Bar on Lake Mead, Willow Beach and Katherine Landing on Lake Mohave, the Colorado River from Davis Dam to Fort Mohave, and Topock Marsh. The most significant change noted this year was the displacement of largemouth bass by striped bass as the most common species creeled at Temple Bar. Fishery surveys utilizing electrofishing gear, sonar recorder, gill nets, seines and scuba were conducted on Lake Mead, Lake Mohave, the Colorado River below Davis Dam, Topock Marsh, Lynx Lake, Antelope Tank, Carter Tank, Boulder Creek, Burro Creek, Conger Creek, Hassayampa River, Knight Creek, Trout Creek and Willow Creek. The following species, listed as "Threatened and Unique Wildlife of Arizona," were collected or observed: Bonytail chub (Group II) Lake Mohave and the Colorado River below Davis Dam; Razorback Sucker (Group III) Lake Mead and Mohave; Roundtail Chub (Group IV) Boulder, Burro, Conger and Trout Creeks.

The following bodies of water were stocked with the respective game species: Lake Mohave – 541,700 rainbow trout (48,207 kg total weight); Colorado River below Davis Dam – 572,906 rainbow trout (10,117 kg total weight); Topock Marsh – 25,000 channel catfish (455 kg total weight); Lynx Lake 28,835 rainbow trout (3,894 kg total weight). The major changes in our stocking program were: discontinue stocking "catchable" sized rainbow trout below Davis Dam and increase the total number and frequency of fingerling plants of that area; discontinue stocking largemouth bass and sunfish in Topock Marsh.

Two studies contracted with the Bureau of Reclamation continued through this year (i.e. The Five-Year Black Bass Study on Lake Mead and the Baseline Study from Bolder Canyon Upstream to Separation Rapids).

GAME MANAGEMENT

KENT JACKSON
SPECIALIST

HABITAT degradation along the Colorado River continues. The newest development is a proposed FAA-manned radar site on Crossman Peak. An Environmental Impact Statement is being drafted

by the BLM for this site at the present, and if the project is allowed it will be a severe blow to the remnant Bighorn population of the Mohave-Needles Mountain complex.

The 1978 antelope hunt results were generally down from the 1977 hunt. The *most dramatic* decrease was in Unit 10 where the harvest and hunter success decreased 36%. Unit 18B realized a slight increase in harvest which, coupled with a permit reduction, improved the hunt success by 50%. Other units were slightly down in both harvest and hunt success. These declines reflect the low fawn crops experienced in the region.

The antelope fawn production has been maintained in Units 18B and 19B, but declined again in Units 17A, 17B and 18A. Unit 10 declined slightly (23.2:100 does) from the 1978 surveys but this unit did not have good production in 1978 (25.6 fawns: 100 does). Even with two years of good precipitation, Region III antelope production has not improved as well as can reasonably be expected. To realize any real increase in antelope population we need to institute an effective predator control program.

Our bighorn surveys again yield record numbers of observations in Units 15B, 15C and 15D, but obeservations in Unit 16A are still difficult to obtain. A water development program was initiated in the Black Mountains which should improve habitat in an area that contains a productive bighorn population.

Deer surveys revealed better fawn survival in most units with the following exceptions: Unit 16A was about the same as 1978, Unit 13 was down from 1978 but still above the long term average for the unit, Unit 17A was down and this unit's population is also down. Though Unit 18B fawn survival was up from 1978, it is still lower than the long term average for the unit. We have again had a good precipitation year and hopefully we will again see an increase in production during our upcoming unit surveys.

Small game populations have responded in a spectacular manner to the past two years' precipitation, and are now at the highest levels within at least the last six years.

LAW ENFORCEMENT

DONALD TURNER
SPECIALIST

DURING THE 1978-79 fiscal year, the law enforcement specialist position changed hands. Jim Whitham transferred to Phoenix based duties in March. Consequently, the replacement specialist, Don Turner, was only temporarily active in the region for about a month. This report, therefore, was prepared pursuant to regional enforcement records rather than personal knowledge.

From July 1978 to June 1979, Region III officers contacted approximately 11,694 persons involved in wildlife or watercraft oriented recreation activities. A total of 12,578 hours of enforcement effort were logged with 10,560 hours spent towards wildlife enforcement and 1,018 hours of watercraft enforcement.

Results of the efforts culminated in 548 cases filed with $11,975 in fines assessed. Obviously the cost-effective benefit of enforcement-generated revenue is not a justification for enforcement activities.

Of the 548 cases filed, 26 were big game, 59 small game, 250 fish, 31 other wildlife, 16 licenses, 113 watercraft, 42 miscellaneous game and fish and 11 other state laws. Additional fines were assessed in 374 cases and suspended in 88. Thirty-five were acquitted or dismissed and 35 were dropped because the subjects were out of the jurisdiction of the State of Arizona. Warrants were issued for 96 people and 19 juveniles were remanded to the juvenile authorities.

Average cases filed by wildlife managers for the report year were 62 with an estimated 55.6% of their time directed towards enforcement. The establishment of the HOW Line report system was a definite benefit to the program. HOW calls in Region III, however, are not as frequent as in other regions.

In comparison with the previous fiscal year (FY 77-78), Region III officers contacted 1,469 more people (13%), filed 140 more cases (23%), which resulted in an increase of fines assessed by $2,182 (24%).

The next fiscal year should reflect additional positive results. An increase in wildlife managers, increased training, enforcement emphasis and citizen use of the HOW Line, as well as the establishment of a reward system, should result in better protection of Arizona's wildlife resources.

REGION IV

—Yuma

DON WINGFIELD
REGIONAL SUPERVISOR

RAIN AND flood waters had quite a bit to do with wildlife within the Region during the year. Alamo Lake raised 122 feet which made it one of the major fishing waters in the state. This also provides a lot of new room for quite a few different species of waterfowl. There were also some fairly heavy releases of water from Alamo down the Bill Williams River, but this was kept pretty much under control by the Corps of Engineers.

Water release from Painted Rock to Yuma has kept that section of the Gila River in flood stage since early last spring. This has provided good fishing and waterfowl habitat, but it has also destroyed valuable mesquites and other plants by their being flooded for such a long period of time.

Construction of the Central Arizona Project continues with some wildlife already being trapped in the canal even before water has been put in. If the C.A.P. cooperates, this can be one of Arizona's major fishing streams; otherwise it won't be of much value as far as wildlife is concerned.

We lost some hunting lands in the Planet Ranch and Cibola areas as the U. S. Fish and Wildlife Service increased its refuge system.

Personnel-wise, the Salome district was vacant a good portion of the year.

As for over-the-counter business, the Region sold $15,057 worth of licenses, $1,228 in the different special fishing stamps and $5,662.17 for registering boats, for a total of $21,947.17.

Following are summaries written by the Region IV staff specialists:

LAW ENFORCEMENT

GEORGE E. DANIELS
SPECIALIST

During fiscal year 1978-79 Region IV adjudicated 868 charges which are broken down into the following types of violations:

Game and Fish—444. Fines and forfeitures totaled $13,214.30.

Average penalty—$29.76
Cases dismissed—34
Out of jurisdiction—12
Sentences suspended—49
Juvenile cases—3
Jail time suspended—140 days

Watercraft and miscellaneous violations—424. Fines and forfeitures totaled $7,544.10.

Average penalty—$17.79
Cases dismissed—22
Out of jurisdiction—22
Sentences suspended—37
Jail time suspended—70 days

FISHERIES MANAGEMENT

BRAD JACOBSON
SPECIALIST

FISHERIES activities in Region IV involved creel census, fish population surveys, limnological surveys and fish stocking.

Creel census was conducted at seven areas. During 233 days of census 2,465 anglers were checked. They spent 5,366 hours of angling to catch 5,031 fish for an overall catch rate in the Region of 0.94 fish per angler hour.

The body of water in the Region with the best overall catch rate for the year was Alamo Lake (1.41 fish/hour). The lowest yearly catch rate was at Mittry Lake (0.17 fish/hour).

Population surveys were limited to the Colorado River (Ehrenberg Strip) and Colorado River (Imperial Reservoir).

Largemouth bass (31.6 percent) and sunfish (28.1 percent) were the predominate game species taken while electrofishing the Ehrenberg Strip.

In the Imperial Reservoir area two survey methods were used (electrofishing and hoop nets). Through electrofishing the dominate species taken were largemouth bass (34.2 percent) and sunfish (60.6 percent). With hoop nets, sunfish (60.7 percent) and black crappie (32.1 percent) were the major species.

Limnological data was collected at Alamo Lake, Bill Williams River, Colorado River (Ehrenberg Strip) and Painted Rock. All readings taken showed nothing out of the ordinary for each of the areas sampled.

During the year the following areas of Region IV were stocked:

Date	Species	Number	Size (inches)	Location
8/24/78	Ch. Catfish	35,000	1 to 1¾	Lake Pleasant
8/24/78	Ch. Catfish	35,000	1 to 1¾	Painted Rock
9/27/78	Redear	500	2 to 3	Painted Rock
9/27/78	Fl. Bass	5,400	3	Painted Rock
9/27/78	Tadpoles	1,000	2	Painted Rock
9/27/78	Tadpoles	1,000	2	Gilligan's Island
10/30/78	Tadpoles	5,000	2	Alamo Lake
10/30/78	Tadpoles	5,000	2	Lake Pleasant (lower)
12/27/78	Ch. Catfish	30,000	2 to 5	Alamo Lake
3/1/79	Ch. Catfish	2,311	3 to 5	Black Canyon Shooting Range Pond

A total of 102,311 channel catfish and 17,900 tadpoles were stocked.

GAME MANAGEMENT

JIM deVOS
SPECIALIST

THIS YEAR'S game management activities were quire diverse. In order to meet the region's game management responsibilities, nearly 15-percent of the total hours expended by personnel were spent doing game related activities.

Annual big game surveys were very successful this reporting period. The deer herds in the region appear to be in good condition. Fawn survival increased this year, but hunter success was lower. This decrease is probably a result of adverse weather conditions during the hunt rather than a problem with the deer herds.

Most of the region is marginal javelina habitat. The notable exception is Unit 20B which continues to supply the majority of the region's hunt opportunity. All javelina harvest is done with primitive weapons. It appears as if all areas are responding to this mode of harvest and herds are expanding.

Desert bighorn sheep surveys in most areas were very encouraging. In most units, record numbers of sheep were surveyed. The units in the southern part of the region were exceptions. Hunters enjoyed a banner year. Almost all units had a 100-percent hunter success. A sheep die-off in Unit 44B remains a partially solved mystery. Pathology reports on two sheep that were discovered implicate a form of bacterial pneumonia as the cause of death. Information that will be gathered from sheep harvested during the hunt may shed light on the problem. Efforts will continue in all directions to determine the magnitude of this die-off.

Bighorn sheep continue to attract interest from several different concerns. In Unit 44B a study of these animals and their habitat continues to provide valuable information applicable to proper management. A study has just been initiated in Unit 44A. This study will involve radio-collaring 10 bighorn sheep and will try to determine the impact the Central Arizona Project Aquaduct will have on this herd of sheep.

Abnormally heavy rainfall has benefitted all wildlife but especially so small game and non-game wildlife. Quail and cottontail rabbit numbers are higher than they have been in many years. This rainfall produced exceptional annual forage throughout the region. Seeds produced allowed doves to utilize many desert areas.

A new hunter check station was conducted in the Wellton area to gather needed data on dove harvest in the southwest portion of the region. Over 100 limits of whitewings were checked at this station.

Water releases from full impoundments resulted in a great deal of outstanding waterfowl habitat in the region. Both game and non-game birds were present in large numbers. Many birds spent the summer in the newly created habitat.

Several non-game programs were initiated in the region. The most notable is monitoring the abundance and composition of non-game animals being trapped in the C.A.P. Canal. This is shedding light on densities and composition of the reptilian guna in the area.

In conclusion, this year has been an active one for regional personnel conducting game management activities. Further, climatic conditions have been favorable for wildlife production and most species have responded through increased numbers.

REGION V
—Tucson

BUD BRISTOW
REGIONAL SUPERVISOR

REGION V received a marked increase in front counter sales due to the requirement for javelina permits, trapping license sales and fur tagging requirements. Approximately $46,700 was received compared to $29,770 in 1978.

Region V personnel effort was spent in the following manner:

Law Enforcement	37.98%
Watercraft Enforcement	17.52
Game Management	17.72
I & E	1.16
General Supervision	4.46
Fisheries Management	4.17
Other & Unknown	16.16
Development	.17

This percentage reflects administrative activity as well as field personnel. The need for additional information and education services is greatly increasing. It is no longer even possible to respond to the unsolicited requests for speakers and information.

GAME MANAGEMENT

RON OLDING
SPECIALIST

REGION V personnel expended 18.4 percent of their man-hours on game management activities during the 1978-79 year. The primary activities conducted through this expenditure of effort were big game surveys, small game index counts, preparation of hunt recommendations and annual report preparation.

Mule deer and whitetail surveys occupied the majority of the game management effort. Mule deer surveys produced 2,663 observations, a significant increase from 1977-78 surveys. The bucks: 100 does ratio remained relatively stable. Fawn survival demonstrated a slight improvement from last year, when calculated to be 41.5 fawns:100 does.

On the basis of slightly increased fawn survival for the past several years, the mule deer population is felt to be increasing slowly from previous low levels.

Single season mule deer hunts were conducted in seven game management units. Seven other game management units' hunts were conducted with split seasons. Split hunts appear to be meeting with general approval of most parties involved. Hunter effort is greater and success generally slightly lower on the second of the two hunts but more hunting time is allowed during that season. Harvest statistics from single season hunts appears to be intermediate between those of the first and second hunts of the split season.

Overall, Region V allocated 11,727 mule deer permits and had a total mule deer harvest of 2,022.

Whitetail survey data indicated the highest fawn survival in many years. Survey observations were up 34 percent from 1977-78, primarily due to an increase in effort. Observations totalled 838 and demonstrated a slight increase in the Region's bucks:100 does ratio and a 61-percent increase in fawn survival.

The southern Arizona whitetail hunt, which encompasses 13 game management units, was conducted under split season structure for the first time. Both hunts worked out very favorably with little of the hunter concentration problems which were evident in previous years.

Hunt statistics were very similar between the two hunts. Overall, hunter success was up from 1977-78 with 1,640 bucks harvested for a 16.2 percent hunter success.

In summary, 29 percent of the state's deer hunters hunted in Region V. They harvested 3,662 bucks for an 18.0 percent success.

Javelina surveys are conducted concurrently with regional deer surveys. Survey totals almost doubled from 1977-78, once again primarily due to an increase in manpower and survey effort. One hundred ninety-nine herds were observed containing 1,782 animals for an average herd size of 9.0. This is a considerable increase over the previous year's 6.8 average herd size. Although the surveyed reproduction checked during the harvest indicate that the previous mild wet winter was conducive to survival of young born during that period. This information, coupled with the increase in average herd size points to an increase in population. If this trend can be maintained, several of the management goals called for in the strategic plan for javelina can be met.

The 1979 general hunt was conducted

with six of the units having split hunts and the remaining ten having single season hunts. Units with split hunts had more favorable hunter success and reduced hunter effort per animal harvested when compared with single seasons. Several more years with hunts under both structures will be needed to allow a meaningful evaluation of this hunt structure. Overall hunter success increased appreciably.

Bighorn sheep hunts were conducted in game management units 33 and 37 A/C of Region V. Five permits were allotted. All hunters harvested rams despite some problems with an anti-hunting group which attempted to disrupt the hunt. In fact, in Pusch Ridge, where the main interaction occurred, hunters harvested 4 rams in a total of 9 hunter days versus the previous year's 32 hunter days which were required to harvest 3 animals.

Harvest data indicate that 1978 was the best quail year for the past several. This was as predicted from 1977-78 winter precipitation and spring 1978 call counts. With normal survival and another winter of abundant precipitation, the 1979 call count data indicated that the 1979 hunting season would far surpass 1978.

It appears a positive trend in wildlife populations has occurred in Region V with a few exceptions. The exceptions — antelope, whitewing dove, etc. — are due partially to increased habitat modification by man.

LAW ENFORCEMENT

T. W. SPALDING
SPECIALIST

During fiscal year 78-79, the following arrests were reported:

133 counts of watercraft violations
615 counts of Title 17 violations
14 counts of miscellaneous violations
762 total violations

Fines amounted to $17,236.20.

91 cases resulted in suspended sentences
150 cases were dismissed
38 cases were listed as out of jurisdiction and warrants were placed on A.C.I.C. (6 violators placed on A.C.I.C. were eventually arrested and fined).
35 cases were adjudicated by juvenile authorities
454 cases resulted in an average fine of $38.00
18,482 field contacts were reported
721 hours were expended in watercraft enforcement
13,114 hours were expended in Title 17 enforcement
1 citation was issued for each 18.2 hours spent in enforcement activities

Total time expended in Title 17 enforcement was up two percent, arrests were up three percent. Watercraft enforcement time was down 41 percent, Title 5 arrests were up 14 percent.

During the fiscal year, many manhours were expended in State Land access cases. All cases that have gone to court have been dismissed due to Commission action or lax prosecution.

The high number of cases dismissed was due to the practice of a few judges of dismissing license cases when the violater purchases a license.

The use of aircraft and the HOW-Line has increased law enforcement effectiveness in the region.

A hunter-harvested buck is aged at a check station during the southern Arizona whitetail hunt.

ADMINISTRATION

DAVID A. ROE
CHIEF

INTERNAL AUDITS were conducted according to the Director's policy and schedule, and upon request from the Chief of Regions.

New and renewed watercraft registrations increased six and one-half percent from the 1977 to 1978 calendar year. There were 86,473 watercraft registered in calendar year 1978.

License fees were increased on January 1, 1979, in accordance with the first annual phase of the stepped increases outlined in H.B. 2049.

In the Game and Fish Fund there was a 1.2 percent increase in sales quantity of licenses, trout stamps, tags and special licenses from the prior fiscal year. There was a 13% increase in dollar sales. We had $222,828 in federal aid on indirect costs come in. There was no auction held 1978-79. Subscription income was a new source of revenue and $14,556 was received. Fines increased 24%.

Applications for Fall, 1978 and Spring, 1979 hunts were received from 200,314 people, and 118,049 permits were issued.

Because of its favorable safety record, the Department received dividends of $33,908 on workmen's compensation insurance premiums.

FUNDS COORDINATION

WARNER POPPLETON
COORDINATOR

The Federal Aid in Wildlife Restoration Act, commonly called the Pittman-Robertson Act, provided an apportionment of $1,652,758 to the Department.

The funds are derived annually from an eleven percent manufacturer's excise tax on sporting arms and ammunition. This apportionment was an increase of

31.7 percent over the previous fiscal year. In addition, $140,780 was provided the Department for the Firearms Safety Program. This fund is derived from a ten-percent manufacturer's excise tax on handguns, ammunition and archery equipment. The Department must provide 25-percent matching funds for these programs.

The Federal Aid in Wildlife Restoration Act, commonly called the Dingell-Johnson Act, provided an apportionment of $564,970. These funds are derived through a ten-percent excise tax collected from manufacturers of fishing equipment. This apportionment represents an increase of 10.9 percent from the previous fiscal year. The Department's matching requirement is 25 percent of this program, also.

Funds received from the U.S. Bureau of Commercial Fisheries amounted to $25,000. This program derives its funds from an appropriation from Congress and is authorized by the Commercial Fisheries Research and Development Act of 1964. This work, subcontracted to Arizona State University, consists of investigations to evaluate pump-generation operations relative to abiotic and biotic factors in hot-desert reservoirs. The State must provide 25 percent matching funds for this program 12½ percent of which is provided by Arizona State University.

The Federal Boating Safety Act of 1971 this year made $55,665 available to the State of Arizona to assist in carrying out the boating safety program administered by the Department. This money is provided by a Congressional appropriation, and requires the states to provide 50 percent matching funds for Fiscal Year 1978-79.

In addition, $432,810 in other grants and contracts were awarded the Department from the U.S. Bureau of Reclamation, Federal Disaster Assistance Administration, U.S. Forest Service, U.S. Bureau of Land Management and the U.S. Fish and Wildlife Service for various studies and construction projects.

SUPPLY BRANCH

BILL NOWINSKI
SUPERVISOR

THE SUPPLY BRANCH had its usual increase in the number of requests to purchase equipment' supplies and service.

Some of the dollar values purchased were: $291,933 dollars for sedans and half to one-ton trucks, $9,069 dollars for marine equipment and $93,476 dollars for heavy construction equipment.

The warehouse personnel were kept busy this past year. Some of the dollar values issued were $61,000 dollars worth of vehicle parts, $34,043 dollars worth of bulk fuel and lube, $24,930 dollars worth of field supplies and $7,000 dollars worth of small stationery items.

There were 1350 warehouse issues plus gasoline that was issued during the year.

The Deer Valley Shop had an increase in work load. A total of 1300 repairs was made. These repairs included motor overhauls, front-ends, brakes, complete power train overhauls, tuneups, electric, installation of 45 enforcement packages, welding of all kinds, from construction of equipment to large and small repairs.

The motor pool had its busiest year. The Deer Valley motor pool consists of 24 vehicles, ranging from patrol sedans to 2½-ton stake platform trucks, and is backedup by a general motor pool consisting of fourteen to thirty vehicles depending on the time of year. The motor pool dispatcher issued 1,087 vehicles for a total of 407,042 miles.

Applications for hunts during the year numbered 200,314. The computer selected 118,049 permittees for participation in the various big game hunts.

Arizona Game and Fish Department

REVENUES

Year Ended June 30, 1979

	Game & Fish Fund	W/C License Fund	Federal Funds	Water Cons. & Recrea. Dev. Fund	Trust & Agency Funds	Wildlife Theft Prevention Fund
License, stamp, tag and permit sales	$4,952,702	$ —0—	$ 19,424	—0—	1,863,065	—0—
Numbering and registration fees	—0—	207,216	—0—	—0—	—0—	—0—
Federal grants	273,042	—0—	2,779,325	—0—	—0—	—0—
Private grants	—0—	—0—	—0—	—0—	1,396	—0—
Allocations from State Lake Improv. Fund	17,600	40,000	—0—	—0—	—0—	—0—
Other allocations from state agencies	—0—	—0—	—0—	—0—	—0—	—0—
Interest income	189,583	1,935	65,004	22,429	19,379	—0—
Rentals and lease income	15,878	—0—	8,061	—0—	—0—	—0—
Fines and Civil Penalties	78,575	—0—	—0—	—0—	—0—	3,338
Intradepartmental Equipment Rental	472,225	—0—	106,469	—0—	—0—	—0—
Number sales and services and misc.	12,223	1,196	3,978	—0—	1,975	7
Firearm safety instructs' donated labor	—0—	—0—	68,736	—0—	—0—	—0—
Dividends on Industrial Insurance	27,465	339	6,103	—0—	—0—	—0—
Federal Excess supplies granted	—0—	—0—	—0—	—0—	—0—	—0—
Cost paid by Watercraft Federal Aid Fund	—0—	64,166	—0—	—0—	—0—	—0—
Appropriated from State General Fund	—0—	—0—	—0—	—0—	—0—	10,000
Subscription Income	14,556	—0—	—0—	—0—	—0—	—0—
Return Matching from our Federal Fund.	82,378	—0—	—0—	—0—	—0—	—0—
TOTALS	$6,136,227	$314,852	$3,057,100	$22,429	$1,885,815	$13,345

NOTE: In addition we collected Watercraft Tax for and remitted $353,201 to AORCC.
NOTE: The Game and Fish Fund also transferred $789,356 to the Federal Joint Fund of the Dept. for state's matching share.

Arizona Game and Fish Department

EXPENSES

Year Ended June 30, 1979

	Game & Fish Fund	Watercraft Licensing Fund	Federal Funds	Water Conserv. & Recrea. Dev. Fund	Trust & Agency Funds	Wildlife Theft Prevention Fund
Salaries, wages & related costs	$3,213,575	$212,849	$1,520,661	—0—	—0—	—0—
Travel	642,136	22,671	323,035	—0—	—0—	—0—
Data processing services	84,073	21,090	10,106	—0—	—0—	—0—
Professional services	28,878	—0—	75,337	—0—	—0—	—0—
Postage	70,472	28,000	33,734	—0—	—0—	—0—
Printing	35,802	14,304	18,547	—0—	—0—	—0—
Telephone & telecommunications	106,186	224	1,449	—0—	—0—	—0—
Utilities	65,524	—0—	8,381	—0—	—0—	—0—
Maintenance & repairs	68,912	4,456	76,229	—0—	—0—	—0—
Office & data processing supplies	40,727	15,680	5,719	—0—	—0—	—0—
Licenses, stamps & tags	40,565	—0—	—0—	—0—	—0—	—0—
Equipment rental & photocopy	41,654	2,807	26,639	—0—	—0—	—0—
Insurance	54,100	—0—	—0—	—0—	—0—	—0—
Operating supplies	223,462	367	132,713	—0—	—0—	—0—
Fish, fish eggs & fish food	100,465	—0—	—0—	—0—	—0—	—0—
Land rental	3,162	—0—	1,288	—0—	—0—	—0—
Building rental	6,303	3,938	—0—	—0—	—0—	—0—
Miscellaneous operating expense	45,930	1,203	35,213	—0—	—0—	—0—
Federal matching or return	789,357	—0—	82,378	—0—	—0—	—0—
University & federal contracts	37,139	—0—	29,815	—0—	—0—	—0—
Special transfers to Game & Fish Fund	(107,162)*	—0—	65,004	22,429	19,379	—0—
Transfers to other funds	4,185	—0—	64,167	—0—	308,237	—0—
Remittances to Colorado River states	—0—	—0—	—0—	—0—	$ 164,518	—0—
Remittances to U.S. Government	—0—	—0—	—0—	—0—	8,100	—0—
Refunded to unsuccessful applicants	—0—	—0—	—0—	—0—	1,161,561	—0—
Reward payments	—0—	—0—	—0—	—0—	—0—	$350
TOTAL	$5,595,445	$327,589	$2,510,415	$22,429	$1,661,795	$350

*This is the amount of interest earned by other funds for the Game & Fish Fund during 1978-79.

Balance Sheet

June 30, 1979

ASSETS	Game & Fish Fund	Watercraft Licensing Fund	Federal Funds	Water Cons. & Recreation Dev. Fund	Trust & Agency Funds	Wildlife Theft Prevention Fund	Fixed Assets Account Group
CASH	$ 486,908	$ 32,248	$ 138,567	$ 19,906	$337,891	$ 1,495	—0—
CASH — Office Revolving	2,665	—0—	—0—	—0—	—0—	—0—	—0—
INVESTMENTS	2,576,947	97,599	838,309	410,000	188,241	11,500	—0—
RECEIVABLE FROM:							
Dealers & Agents	500,332	—0—	—0—	—0—	—0—	—0—	—0—
U.S. Government	50,214	—0—	902,677	—0—	—0—	—0—	—0—
Other Funds	230,937	775	17,691	—0—	—0—	—0—	—0—
Miscellaneous	13,611	—0—	1,656	—0—	—0—	—0—	—0—
ACCRUED INTEREST ON:							
Investments	20,285	1,161	11,367	11,179	962	144	—0—
Mortgages	276	—0—	—0—	—0—	—0—	—0—	—0—
INVENTORY OF SUPPLIES & FISH FOOD, at cost	60,351	304	—0—	—0—	—0—	—0—	—0—
PREPAID EXPENSES	30,939	—0—	—0—	—0—	—0—	—0—	—0—
MORTGAGES RECEIVABLE	12,638	—0—	—0—	—0—	—0—	—0—	—0—
LAND IMPROVEMENTS—							
In progress	—0—	—0—	2,034	—0—	—0—	—0—	—0—
PROPERTY AND EQUIPMENT:							
Land and lakes and rifle ranges	—0—	—0—	—0—	—0—	—0—	—0—	$ 2,682,021
Dams	—0—	—0—	—0—	—0—	—0—	—0—	3,164,960
Buildings and Hatcheries:							
On department lands	—0—	—0—	—0—	—0—	—0—	—0—	1,193,735
On federal lands	—0—	—0—	—0—	—0—	—0—	—0—	1,581,524
Equipment	—0—	—0—	—0—	—0—	—0—	—0—	3,389,761
Federal lands improvements	—0—	—0—	—0—	—0—	—0—	—0—	1,312,009
Leasehold improvements	—0—	—0—	—0—	—0—	—0—	—0—	80,675
TOTAL ASSETS	$3,986,103	$132,087	$1,912,301	$441,085	$527,094	$13,139	$13,402,685

Balance Sheet

June 30, 1979

LIABILITIES, EQUITIES AND FUND BALANCE	Game & Fish Fund	Watercraft Licensing Fund	Federal Funds	Water Cons. & Recreation Dev. Fund	Trust & Agency Funds	Wildlife Theft Prevention Fund	Fixed Assets Account Group
PAYABLE TO:							
Trade Accounts	$ 125,748	$ 2,310	$ 108,329				
Other State Agencies	4,185	169	—0—	—0—	70,562	—0—	—0—
Other States	—0—	—0—	—0—				
Other Funds	17,926	34,990	184,202	$ 11,179	$ 962	$ 144	—0—
ACCRUED PAYROLL EXPENSE	1,483	—0—	—0—				
ACCRUED VACATION & COMP. TIME	726,739	8,414	202,308				
DEFERRED RENT INCOME	5,705	—0—	—0—				
CONTINGENT LIABILITIES	—0—	—0—	—0—				
RESERVE FOR CONTINGENCIES	—0—	—0—	—0—	—0—	455,570	—0—	—0—
Equity:							
State	—0—	—0—	—0—	—0—	—0—	—0—	$ 9,559,197
Federal	—0—	—0—	—0—	—0—	—0—	—0—	3,843,488
FUND BALANCE	3,104,317	86,204	1,417,462	429,906	—0—	12,995	—0—
FUNDS HELD IN TRUST FOR GAME DRAWING	—0—	—0—	—0—		455,570	—0—	—0—
TOTAL LIABILITIES, EQUITIES & FUND BALANCE	$3,986,103	$132,087	$1,912,301	$441,085	$527,094	$13,139	$13,402,685

SALE OF HUNTING & FISHING LICENSES
1978 CALENDAR YEAR

LICENSES	Issued	Price	Sales Before Commission
Fishing, Resident General	175,800	$ 4.00	$ 703,200
Fishing, Nonresident General	5,576	12.00	66,912
Hunting, Resident General	80,383	7.00	562,681
Hunting, Nonresident General	10,929	30.00	327,870
Comb. Hunting & Fishing, Resident	99,490	12.00	1,193,880
Comb. Hunting & Fishing, Nonresident	480	45.00	21,600
Fishing, Nonresident 9-Day	3,744	8.00	29,952
Fishing, Nonresident Colo. River only	11,071	12.00	132,852
Fishing, Resident & Nonresident 1-Day	9,719	3.00	29,157
Fishing, Nonresident 5-Day	33,034	6.00	198,204
Duplicates	4,973	3.00	14,919
TOTAL LICENSES	435,199		$3,281,227
TROUT STAMPS			
Resident	111,227	3.00	333,681
Nonresident	2,036	8.00	16,288
TOTAL TROUT STAMPS	113,263		$ 349,969
TAGS			
Deer, Resident	72,046	4.00	288,184
Deer, Nonresident	6,455	30.00	43,650
Turkey, Resident	14,946	3.00	44,838
Turkey, Nonresident	161	10.00	1,610
Bear, Resident	8,960	2.00	17,920
Bear, Nonresident	55	25.00	6,375
Mountain Lion, Resident	7,860	1.00	7,860
Mountain Lion, Nonresident	120	10.00	1,200
Javelina, Resident	21,168	3.00	63,504
Javelina, Nonresident	1,075	20.00	21,500
Antelope, Resident	1,031	20.00	20,620
Antelope, Nonresident	20	50.00	1,000
Bighorn Sheep, Resident	47	50.00	2,350
Bighorn Sheep, Nonresident	11	250.00	2,750
Elk, Resident	8,607	20.00	172,140
Elk, Nonresident	266	75.00	19,950
Duplicates, Resident & Nonresident	497	3.00	1,491
TOTAL TAGS	138,325		$ 711,942
OTHER			
Becker Lake Fishing Permits	1,208	3.00/5.00	5,818
Urban Waters Fishiing Permits	6,876	1.00/5.00	15,566
Buffalo Permits—Bull	26	500.00	13,000
Buffalo Permits—Yearling	32	160.00	5,120
Trapping License—Resident	1,171	30.00	35,130
Trapping License—Nonresident	62	150.00	9,300
Minnow Dealers Permits	151	15.00	2,265
Taxidermist Licenses	49	25.00	1,225
Guide License—Big/Small Game	105	50.00	5,250
Guide License—Small Game & Fish	61	15.00	915
Other Special Licenses and Permits	494		3,045
TOTAL OTHER			$ 96,634
GROSS SALES BEFORE DEALER COMMISSION			$4,439,772

ARIZONA-COLORADO RIVER SPECIAL USE STAMP
1978-79 REPORT

	Annual License Year	Number Issued	Sales Before Commission
Sold by California	*Calendar 1978	46,791	$140,373
Sold by Nevada	**Fiscal 1977-78	65,971	197,913
Sold by Arizona:			
To California Licensees	Calendar 1978	10,160	30,480
To Nevada Licensees	Fiscal 1978	707	2,121
To Utah Licensees	Calendar 1978	309	618
TOTAL		123,938	$371,505

*Payment was not received from California until July, 1979.

** Includes sales of a nine month transition period for charging to calender year. The price per stamp went from $2 to $3.

ARIZONA GAME AND FISH FUND
APPROPRIATIONS LESS EXPENDITURES
YEAR ENDED JUNE 30, 1979
(Rounded)

Game & Fish Fund	Appropriations	Expenditures	Variance
Commission and Director			
Personal Services	$ 184,700	$ 177,400	$ 7,300
Employee Related Expenditures	39,200	36,300	2,900
Travel — State	8,800	8,100	700
Travel — Out of State	10,000	8,100	1,900
Operating Expenditures	7,300	7,300	—0—
Capital Outlay Equipment	200	200	—0—
Commissioners Reserve	35,000	34,100	900
Federal Matching Money	801,900	789,300	12,600
Operations			
Personal Services	1,921,500	1,877,400	44,100
Employee Related Expenditures	703,700	668,300	35,400
Professional & Outside Services	23,300	23,200	100
Travel — State	136,300	112,500	23,800
Operating Expenditures	325,200	320,100	5,100
Capital Outlay — Equipment	27,200	27,000	200
Cooperative Wildlife Research	15,000	15,000	—0—
Cooperative Fishery Research	15,000	15,000	—0—
Services			
Personal Services	782,200	775,300	6,900
Employee Related Expenditures	172,500	158,600	13,900
Professional & Outside Services	96,000	89,700	6,300
Travel — State	229,700	210,900	18,800
Operating Expenditures	571,400	569,300	2,100
Capital Outlay — Equipment	360,200	358,200	2,000
Capital Outlay — Rifle Range Improvements	10,000	10,000	—0—
Capital Outlay — Deer Valley Fuel Tank & Pump	2,000	1,900	100
Capital Outlay — Cattle Guards & Alternate Access to Public Lands	50,000	—0—	50,000

NOTE: Expenditures in this statement are on the modified accrual basis for governmental accounting and reporting.

CASH PAYROLLS AND RELATED EXPENDITURES
YEAR ENDED JUNE 30, 1979
(Rounded)

Game and Fish Fund	$3,693,300
Federal Funds	1,101,700
Watercraft Licensing Fund	137,900
TOTAL	$4,932,900

Increases Less Decreases in Land, Improvements & Equipment
Year Ended June 30, 1979

	Equipment	Land, Bldgs. Improvements
Game & Fish Fund	$424,051*	$ (5,171)
Federal Aid Projects—Joint Fund	194,202	444,296
Trust Fund	—0—	—0—
Water Conservation & Recreation Developmetn Fund	—0—	—0—
Watercraft Licensing Fund	2,572	—0—
TOTAL	$620,825	$439,125

*Inflated because of capitalization of Federal Excess Equipment donated to the Dept. by the U.S. Govt.

FEDERAL FUNDS

Project Expense

Comparative

PROJECTS	1976-1977	1977-1978	1978-1979
Coordination	$ 49,400	$ 33,800	$ 42,500
Game Management Survey	705,400	642,700	658,400
Wildlife Area Maintenance & Operation	170,400	197,500	179,200
Fisheries Research	45,400	55,700	25,900
Game Investigation	319,300	382,200	416,800
Firearms Safety	124,300	96,100	111,200
Fisheries Investigation	251,700	244,700	284,100
Commercial Fisheries Research	24,700	22,300	20,500
Habitat Development & Maintenance	340,800	304,800	447,300
Planning and Evaluation	78,100	93,500	115,600
Watercraft Program	55,900	99,900	64,200
Bureau of Reclamation/Land Management & Forest Service	57,700	138,900	107,300
Federal Motor Pool & Other	118,100	38,400	42,200
Project Income Contra	46,300	55,200	33,100
Boghole Waterfowl Area Development	83,200	—0—	—0—
Willcox Playa Land Leases	18,400	—0—	—0—
Bear Springs Tract Acquisition	68,900	—0—	—0—
EDA-LPW Canyon Creek Hatchery	—0—	122,200	353,700
EDA-LPW Region I Headquarters	—0—	181,000	18,900
TOTAL	$2,558,000	$2,708,900	$2,920,900

NOTE: Property, dams and equipment acquisition, construction and improvement expenses are included in this statement. A "cost" for donated labor is included in the Firearms Safety Project.

Total Equivalent Licenses

Calendar 1978

	Resident	Non-resident	One-day	Total
FISHING				
General Fishing	$175,880	$ 5,576	$ 9,719	$191,175
Combination Hunting & Fishing	99,490	480	—0—	99,970
Five-Day Fishing	—0—	33,034	—0—	33,034
Nine-Day Fishing	—0—	3,744	—0—	3,744
Colorado River Only Fishing	—0—	11,071	—0—	11,071
	$275,370	$53,905	$ 9,719	$338,994
FISHING STAMPS				
Trout Stamps	$111,227	$ 2,036	$ —0—	$113,263
Arizona Colorado River Stamps				123,938
				$237,201
HUNTING				
General Hunting	$ 80,383	$10,929	$ —0—	$ 91,312
Combination Hunting & Fishing	99,490	480	—0—	99,970
	$179,873	$11,409	$ —0—	$191,282

NOTE: AZ-CO River stamps include those sold by Nevada during a nine month transition period from fiscal to calendar year. Not included above were 1,378 Complimentary Pioneer Hunting and Fishing Licenses Issued.

NOTES TO FINANCIAL STATEMENTS

June 30, 1979

Note 1—PRINCIPLES OF ACCOUNTING

The accounting records are maintained on the accrual basis for each of the Department's funds except that depreciation of property and equipment is not recognized. Agency funds are on the cash basis, except that interest income is accrued.

Note 2—MORTGAGE RECEIVABLE

The mortgage receivable consists of notes held by the Department from the sale of land parcels of the Wellton-Mohawk property. The terms of the 20-year old notes require equal annual principal payments plus 5% interest on the unpaid balance.

Note 3—PROPERTY AND EQUIPMENT

As of June 30, 1979, the cost of property and equipment included federal funding. The federal government charges the Department with the responsibility of proper utilization of this property and equipment; equity rights, according to original funding, generally remain with the federal government, however Federal excess property was fully granted to the Department.

Note 4—CONTINGENT LIABILITIES

Long Term Leases

The Department has two and five year leases with purchase options on six (6) photocopiers and one (1) word processor. Monthly payments range from $134 to $267 per month.

Sick Leave

Employees of the Department may accrue up to 240 hours of vacation time and 80 hours of compensatory time, with no limitation on accumulated sick leave. The amounts for accrued vacation and compensatory time have been recorded as real liabilities in various Game and Fish Department funds. The amount for accrued sick leave has not been recorded. As of June 30, 1979, the following sick leave amounts, by funds ,have been earned:

Fund	Sick Leave
Watercraft Licensing	$ 17,586.00
Federal Aid Projects	518,683.00
Game and Fish	1,709,432.00
	$2,245,701.00

Painted Rock Wildlife Area

The Department acquired, by a specific use agreement and without charge, approximately 5,845 acres from the U. S. Army in 1962. The Department is to have use of this land (Painted Rock Wildlife Area) for 50 years.

Since 1965, the Department has entered into land-use agreements with various parties.

Rental income is deposited in the Land Use Agreement Trust Fund. Expenditures from the Fund were for Painted Rock Wildlife Area Project purposes.

The Department and the Army are in disagreement as to the disposition of excess income earned, resulting in a contingent liability of $70,562, which is held in trust pending final determination.

Note 5—CAPITAL OUTLAY—BUILDINGS AND IMPROVEMENTS

In the Game and Fish Fund, appropriation accounts for capital outlay-land, buildings and improvements not lapsing at June 30, 1979, had balances totaling $113,566.

Note 6—NEW FUND

The legislature appropriated $10,000 from the State General Fund to establish the Wildlife Theft Prevention Fund effective October 1978. It will be self-sustaining through receipts of civil assessments for fish and wildlife.

ARIZONA GAME AND FISH DEPARTMENT
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