

## **Louisiana's Alligator Management Program**

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*Abstract:* Inventory methods, harvest regulations, tagging requirements, reporting requirements, and a computer program were established to regulate and monitor the harvest of surplus alligators (*Alligator mississippiensis*) in Louisiana and yet distribute the kill in proportion to existing populations over the area open for harvest. Ten seasons were authorized for the taking of alligators between 1972 and 1983. In 1972, only 1 parish was open for hunting; the hunt area was gradually expanded until in 1981 it was state-wide. During the 10 alligator seasons, 5,337 licensed hunters harvested 100,712 skins averaging 2.11 m (6 feet 11 inches) in total length. The value of all skins taken was \$9.8 million. Skins, meat, and other parts were followed through commercial channels with no evidence of illegally-taken skins or parts entering the legal traffic. An alligator nuisance complaint removal program initiated in 6 parishes in 1979 and 1980 was expanded statewide in 1981.

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Louisiana's first program to manage the alligator on a sustained yield harvest was initiated in 1972. The management program resulted from 15 years of research, dedicated enforcement, and enactment of effective state and Federal laws governing the taking, possession, and transportation of alligators and

their products. By 1970, such legislation was in effect in Louisiana (Joanen et al. 1981).

Public Law 91-135, known as the "Amended Lacy Act," was passed in December 1969. Lacy Act provisions made it a Federal crime to sell or transport in interstate or foreign commerce any form of wildlife or products made from wildlife taken in violation of the laws of any state or foreign country. In 1970, the Louisiana Legislature enacted Act 550 giving the Department of Wildlife and Fisheries full authority to regulate the alligator in the state. Louisiana law classifies the alligator as a non-game quadruped along with wild fur-bearing animals valuable for their skins or hides. The alligator is, therefore, considered a commercial wildlife species and Act 550 formed the framework which permitted the implementation of a closely-regulated commercial harvest (Palmisano et al. 1973).

Alligators occur throughout Louisiana. Populations have demonstrated dramatic increases in recent years. The majority of habitat and the largest segment of the alligator population are found in the southern third of the state in coastal marsh and cypress-tupelo swamps. Due to the species' value and vulnerability to hunting, special regulations are required to regulate the harvest of surplus animals yet equally distribute the kill in relation to population levels. A system of applications, licenses, tags, and report forms was implemented in the management program.

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## **Methods**

### **Inventory**

Aerial nest censuses have been conducted annually in the coastal marsh zone since 1970 and were used to project alligator population levels (Chabreck 1966, McNease and Joanen 1978). In areas of Louisiana (swamps and upland lakes and streams) where the aerial nest count method could not be applied, a minimum population estimate for non-marsh areas was used as described by Taylor (1980). Taylor (1980) used data from size class composition of adults taken from night counts and hide measurements to derive these minimum estimates. These data were used for distributing the harvest in proportion to existing populations.

Available alligator habitat within Louisiana coastal marshes comprises 1,178,000 ha (2,900,000 acres) (Chabreck and Linscombe 1978) and is sub-

divided into 3 major subdivisions according to origin: the Chenier Plain, Sub-Delta, and Active Delta zones. The Chenier Plain makes up 445,000 ha (1,100,000 acres) and is located in the southwest corner of the state. The Sub-Delta Marsh Zone contains 640,000 ha (1,570,000 acres) and extends from the Vermilion Bay complex to the Mississippi-Louisiana border. The Active Delta comprises 93,000 ha (230,000 acres) and consists of the present Mississippi River Delta.

Each marsh zone is further divided according to salinity and vegetation (Chabreck and Linscombe 1978). The fresh marsh made up 39% of the area or 460,000 ha (1,131,000 acres), intermediate marsh comprised 23% or 271,000 ha (667,000 acres), and the brackish marsh, minus marshes over 10 ppt salinity, comprised 38% or 447,000 ha (1,102,000 acres). Alligators do not normally utilize the saline marsh type, nor brackish marsh >10 ppt salinity, hence 360,000 ha (880,000 acres) of these types were omitted from the survey.

Taylor (1980) reported total statewide alligator habitat for non-marsh areas as 474,000 ha (1,171,000 acres). He further subdivided habitat available into upland streams, swamp streams, cypress-tupelo lakes, and cypress-tupelo swamps. The latter 2 habitat types were most important for alligators.

#### Establishing Harvest Regulations

The Louisiana Department of Wildlife and Fisheries authorized 10 seasons for the taking of alligators for the sale of skins between 1972 and 1983 (Palmisano et al. 1973, McNease and Joanen 1978). The first hunt, authorized in 1972, was confined to 1 parish in southwestern Louisiana which, according to the aerial nest survey, housed the largest segment of the coastal marsh alligator population. The hunt area was gradually expanded until in 1981 when it was opened statewide (Table 1).

No season was allowed in 1974 as a result of the passage of the Federal Endangered Species Act. After an 18-month delay, caused by delisting requirements of the U.S. Fish and Wildlife Service, Louisiana again initiated its harvest program expanding to a 3-parish area, 1975–1977. Due to limited markets of skins within the United States and the ban on overseas shipment of skins as a result of the Convention on International Trade of Endangered Species (CITES), no season was allowed in 1978. CITES, in March 1979, allowed the export of skins in international commerce. Along with the CITES action, the U.S. Department of the Interior, Fish and Wildlife Service delisted an additional 9 coastal Louisiana parishes. As a result, the Louisiana Department of Wildlife and Fisheries authorized a regulated harvest in 12 coastal parishes in 1979 and 1980. In 1981, the alligator was reclassified in the remaining 52 parishes as threatened, similarity of appearance and a statewide harvest was authorized.

Harvest strategy (Palmisano et al. 1973) and alligator population characteristics (Chabreck 1966, Taylor and Neal 1984) for marsh habitats were

**Table 1.** Season dates and areas opened to alligator harvest in Louisiana, 1972–1983.

Year	Season dates	N hunting days	Parishes
1972	5 Sep – 17 Sep	13	Cameron
1973	10 Sep – 28 Sep	19	Added Vermilion
1975	20 Sep – 19 Oct	30	Added Calcasieu
1976	9 Sep – 8 Oct	30	No change
1977	1 Sep – 30 Sep	30	No change
1979	7 Sep – 7 Oct	31	Added Iberia, St. Mary, Terrebonne, Lafourche, St. Charles, Jefferson, Plaquemines, St. Bernard, St. Tammany
1980	4 Sep – 4 Oct	31	No change
1981	31 Aug – 30 Sep	31	Statewide (63 parishes)
1982	4 Sep – 3 Oct	30	Statewide
1983	10 Sep – 9 Oct	30	Statewide

described in detail by Joanen and McNease (1981). Taylor and Neal (1984) developed a size class frequency distribution model to estimate alligator population characteristics. Night count data were used in conjunction with the model to derive tag allocations for harvest in non-marsh habitats.

State law prohibited the taking of alligators between the hours of sunset and sunrise and those animals <1.2 m (4 feet) in length. Other provisions regulating the taking and shipment of alligators were established by the Louisiana Department of Wildlife and Fisheries.

Harvest regulations, licensing requirements, tagging requirements, reporting procedure, nuisance alligator control regulations, a successful law enforcement program, and a computer program were established to regulate and monitor the harvest of surplus animals and yet distribute the kill in proportion to the existing populations over the area opened for harvest (Joanen and McNease 1981).

## Results and Discussion

### Population Surveys

Population estimates in the coastal marsh varied from a low of 134,000 in the drought year of 1971 to a high of 520,000 (Table 2). Overall, populations increased dramatically in the Chenier Plain and Sub-Delta Zones from 1970 to 1983. The Active Delta showed the lowest alligator population of the 3 marsh zones. A comparison of alligator densities from 1979 to 1983 shows higher population levels in the Chenier Plain Zone. The Chenier Plain averaged 1 alligator per 2.2 ha (5.4 acres), the Sub-Delta, 1 per 3.6 ha (9.0 acres), and the Active Delta, 1 per 10.5 ha (26.0 acres). Population distribution by marsh types on a coastwide basis showed the intermediate marsh type contained the highest alligator densities, 1 alligator per 2.1 ha (5.3 acres). The brackish and fresh marshes were about equal in area; however, population

**Table 2.** Louisiana coastal marsh alligator population based on nest surveys, 1970–1983.

Year	Population estimate	Percent change from 1970
1970	172,000	
1971	134,000	-22
1972	182,000	+6
1973	153,000	-11
1974	213,000	+24
1975	272,000	+58
1976	282,000	+64
1977	274,000	+59
1978	285,000	+66
1979	520,000	+202
1980	400,000	+132
1981	289,000	+68
1982	368,000	+114
1983	379,000	+120

density in the brackish marsh was 1 alligator per 4.1 ha (10.2 acres) and in the fresh marsh 1 alligator per 2.8 ha (6.9 acres) (McNease and Joanen 1978, Joanen and McNease 1981, Unpubl. La. Alligator census records 1980–1983).

The coastwide average annual percentage increase of nests for the 1970–1983 period was 10.1%. Privately-owned property, 90% of which was hunted, showed an average annual increase in nest production of 11.0% during the 14-year period from 1970 to 1983. Refuges and wildlife management areas, where only limited hunting occurred, had an average annual increase of 9.7% in nesting for the same period. The average annual increase in the Chenier Plain of southwestern Louisiana was 10.4% for the same period. A further analysis of population dynamics in the Chenier Plain demonstrated that average annual increases in nest production were considerably greater on 333,550 ha (825,000 acres) of privately-owned property than for the 111,375 ha (275,000 acres) of public property.

Air temperature affects the timing of nesting and egg laying activity (Joaanen and McNease 1979). Nesting occurred in early June during the years with highest March to May temperatures and occurred as late as the first week in July when springtime temperatures were the lowest. The above factor must be taken into account when establishing time tables for nest censusing and season dates. Extremes in water levels, droughts, and floods adversely affect nesting (McNease and Joanen 1978). Surface water conditions probably affect nesting potential more than any other environmental factor, and thereby may cause considerable bias in annual population estimates based on nest transects.

Joaanen et al. (1981) conservatively reported the minimum after-hatching alligator estimate as 168,000 for non-marsh habitat. Highest non-marsh alligator densities were 1 alligator per 1.7 ha (4.1 acres) found in the 35,275 ha

(87,100 acres) of cypress-tupelo lakes contained in Louisiana. Cypress tupelo swamps, 329,000 ha (813,000 acres) contained an estimated 127,000 alligators for a density of 1 alligator per 2.6 ha (6.4 acres). The estimated population of the Atchafalaya Basin, containing 144,200 ha (356,000 acres) of alligator habitat, was 19,500 for a density of 1 alligator per 7.4 ha (18 acres).

### Alligator Harvest

During the 1972–1983 period, 107,878 alligator tags were issued to 5,337 hunters. Average tag allotment per hunter was 20.2 (Table 3). Ninety percent of the privately-owned wetlands open for harvest were actually hunted. A total of 100,712 alligators was taken (93% hunter success). Not all skins were sold; 3,860 skins were tanned by the individual hunter or landowner for trophies or manufactured into boots, saddles, gun cases, belts, or other items. Skin prices varied from \$17.50/foot (0.3 m) in 1981 to \$7.88/foot (0.3 m) in 1975. Prices varied according to the demand for skins, restrictions placed on the sale of products within certain states, international prohibition on foreign commerce, and inflation or devaluation of Japanese, French, and United States currency.

The largest alligator population occurs in the lower third of the state. This area comprises approximately 85% of the total statewide alligator habitat. As a result, 77% of the hunters are in the coastal zone and they accounted for 91% of the kill. The central third of the state had 16% of the hunters and 7% of the kill. The northern third of the state had 7% of the hunters and 1% of the kill. Non-resident hunters purchased 4.8% of the alligator licenses in 1983.

### Sex and Size Composition of Harvest

Telemetry studies (Joanen and McNease 1970, 1972) suggest a September hunt restricted to daytime hunting and open water areas would result in a kill composed primarily of larger males and immature animals of both sexes. By restricting the pole hunting method in interior marshes, the take of breeding females was minimized.

**Table 3.** Alligator harvest in Louisiana, 1972–1983.

Year	Hunters	Tags issued	N taken	Success (%)	Avg. t.l. (cm)	Value of skins	Avg./0.3 m	Ha hunted
1972	59	1,961	1,350	68.8	210.8	\$ 75,505	\$ 8.10	111,267
1973	107	3,243	2,921	90.1	213.4	\$ 268,994	\$13.13	216,544
1975	191	4,645	4,420	95.2	226.1	\$ 258,791	\$ 7.88	329,147
1976	198	4,767	4,389	92.1	215.9	\$ 512,240	\$16.55	327,036
1977	236	5,760	5,474	95.0	223.5	\$ 488,499	\$12.23	395,665
1979	708	17,516	16,300	93.0	213.4	\$1,711,500	\$15.00	1,047,230
1980	796	19,134	17,692	92.5	203.2	\$1,609,972	\$13.00	1,313,538
1981	913	15,534	14,870	95.7	210.8	\$1,821,575	\$17.50	1,415,488
1982	1,184	18,188	17,142	94.2	208.3	\$1,621,633	\$13.50	1,617,504
1983	945	17,130	16,154	94.3	210.8	\$1,452,568	\$13.00	1,417,038
Total	5,337	107,878	100,712	93.4	213.4	\$9,821,277	\$12.99	

During the 1972 harvest season, 303 alligator carcasses were examined. Adult males (>1.8 m [6 feet]) made up 83.1% of the mature alligators inspected. Adult females constituted 16.9% of the adult alligators examined. During the 1973 harvest, 843 alligator carcasses were examined. Adult males made up 67.9% of the mature alligators harvested. The total percentage of males in the kill was 66.3%. Adult females constituted 32.1% of the mature alligators examined (Table 4). The high kill on females in 1973 as compared to the 1972 season was attributed to flooded conditions resulting from tropical storm Della. Excessive rainfall combined with high tides provided hunters easy access into interior marshes which were usually not accessible at that time of year (Joanen et al. 1974).

In 1975, 85.5% of 684 mature alligators examined were males. Mature males also comprised the majority of the kill the following 2 years: 78.3% of 398 in 1976 and 70.3% of 212 in 1977 (Table 4). The average size of the animals taken during the 10 years of harvest remained fairly constant from year to year. The average skin length was 2.11 m (6 feet 11 inches) with a range of between 1.2 and 4.2 m (4 to 14 feet). Of the skins taken, 79% were between 1.5 and 2.4 m (5 to 8 feet) (Fig. 1).

The largest female harvested was taken in the Mermentau Basin of southwestern Louisiana (2.73 m [9 feet 1 inch] and 94 kg [208 pounds]). Internal examination of the ovaries indicated she was barren. The largest male was taken in the Pearl River complex of southeastern Louisiana and measured 4.3 m (14 feet); no weight was obtained.

Mature animals,  $\geq 2.1$  m (7 feet) and above, appeared to be taken at the rate at which they existed in the hunt area. However, other factors, such as limited hunter accessibility to animals during low rainfall years, easy accessibility during high rainfall years, and skin prices, may affect the harvest to some degree. When high prices were paid for skins, hunter interest was stimulated the following year. The reverse was true when prices were lower.

Most of the large animals were taken by the fishing method. Those shot swimming freely were generally of the smaller size classes. Smaller alligators usually remain in shallow interior marsh ponds and feed on crustaceans or small fish (Chabreck 1971, Valentine et al. 1972, McNease and Joanen 1977). Immature females and adult females preferred natural marsh during the

**Table 4.** Size and sex composition of alligators sampled in Louisiana, 1972–1977.

Year	Total sample		Adults in sample	
	N	Males (%)	N	Males (%)
1972	303	78.5	195	83.1
1973	843	66.3	595	67.9
1975	782	82.7	684	85.5
1976	591	76.3	433	78.3
1977	281	68.7	212	70.3

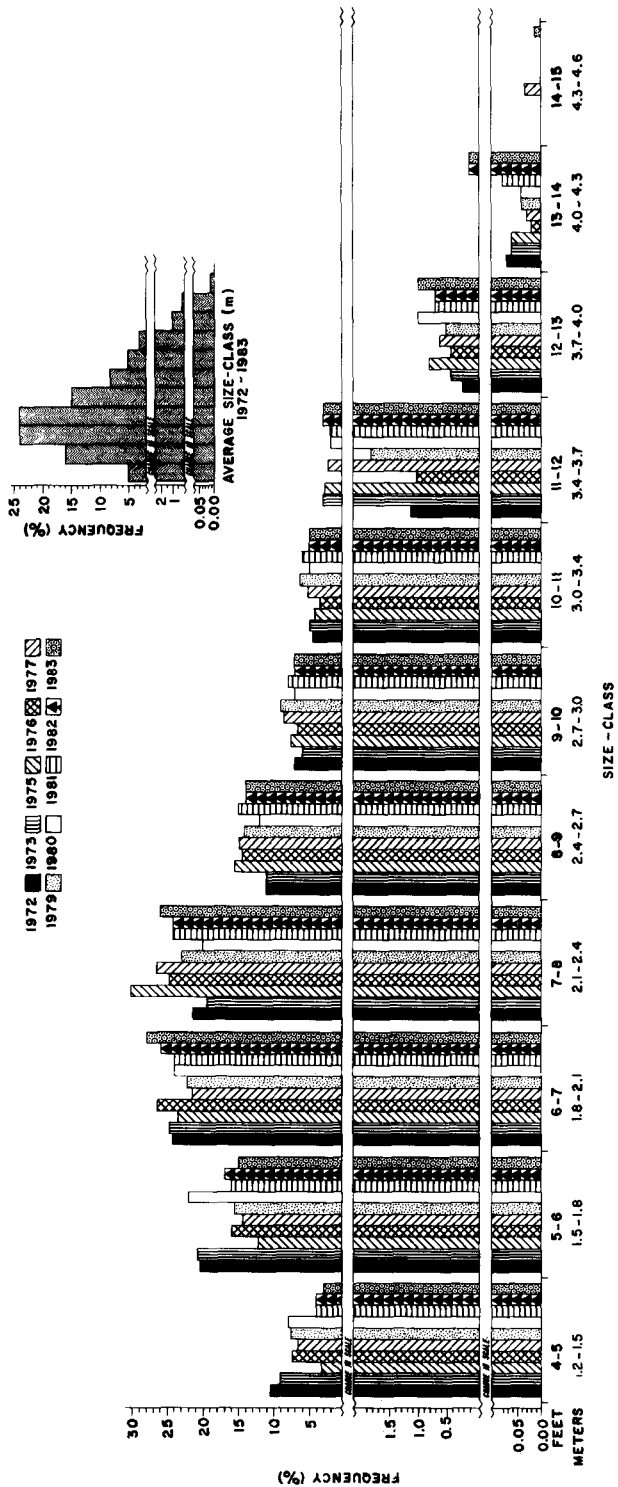


Figure 1. Percentage composition by 0.3 m (1.0 foot) increments of alligator hides taken during the Louisiana harvest, 1972-1983 (N = 95,963).



autumn period (Joanen and McNease 1970, McNease and Joanen 1974). Only 40% of the immature female segment of a population would be available if hunting were restricted to deep water bayous, lakes, and canals. Data collected during Louisiana's 1972 experimental alligator season (Palmisano et al. 1973) indicated immature females constituted 29.6% of the immature size classes of alligators harvested. In 1973, 1975, 1976, and 1977, immature females made up 37.5%, 36.7%, 29.1%, and 36.2%, respectively, of the immature alligators harvested (Table 4). Immature males showed a marked preference for deep water areas during summer and autumn. When availability of natural marsh was considered, usage by males was less than expected during all seasons (McNease and Joanen 1974).

#### Validation and Sale of Skins

From 1972 to 1977, when a maximum of 3 parishes were opened for hunting, hunters were required to bring their hides to a central check-in station. Department personnel measured and validated each skin. After validation, skins were sold at public auction. As the harvest program expanded statewide, buyers were required to submit detailed reports concerning their commercial transactions (Joanen and McNease 1981).

As the hunt area and kill was expanded, so did the amount of paperwork involved in monitoring the kill and commercial aspects of the harvest. Consequently, in 1979 a computer program was developed and upgraded through 1983 to follow hides from the hunter's level through commerce until tanned into leather. Taxidermy or trophy hides, which did not enter commercial channels, and alligator meat and parts were monitored through a system of report forms.

Early in the program, from 1972 to 1977, American tanners showed a strong interest in alligator leather and as a result purchased the majority of the skins taken during those years. However, since the delisting, when foreign buyers were allowed to export skins abroad, the French, Italians, and Japanese have purchased the majority of the skins taken in the Louisiana harvest.

A total of 11 tanneries and 1 trading company purchased skins in Louisiana during a 12-year period. Of these, 4 were located in France, 3 in Japan, 2 in Italy, and 3 in the United States. Of the 95,963 skins sold from 1972 through 1983, French tanners purchased 48.4% of the skins. United States tanneries purchased 27.7% of the skins; Italian, 12.4%; and Japanese, 11.5%.

#### Nuisance Alligator Control

During the 1979 nuisance harvest program, 11 hunters killed 51 alligators in 6 coastal parishes. In 1980, 34 hunters in the same 6 parishes took 225. The number of tags issued were based on the number of complaints received (Linscombe 1975). Complaints were randomly investigated on the site by personnel from the Louisiana Department of Wildlife and Fisheries.

Alligators taken under this program were taken in accordance with state and local regulations/ordinances.

During 1979 and 1980, departmental personnel relocated numerous nuisance alligators in the delisted areas. A statewide nuisance complaint program was begun in September 1981. Nineteen nuisance control hunters took 197 alligators in 1981, 131 by 19 hunters in 1982, and 167 by 15 hunters in 1983. Skinning instructions issued by the Department were for 1 year and any skin not prepared according to the instructions was considered illegal. Disposition of skins, meat, and parts taken in the nuisance complaint program was the responsibility of the local governing body and/or the hunter. During the 5-year period from 1979 to 1983, 771 alligators were harvested through the nuisance removal program by 98 licensed hunters.

#### Alligator Meat and Parts

Since the 1979 season, approximately 45,000 kg (100,000 pounds) of alligator meat have been sold annually from the Louisiana harvest. Prices varied across the coast; however, average prices paid to hunters in southeastern Louisiana were about 75 cents per 0.5 kg (1 pound) whereas in southwestern Louisiana prices averaged \$1.50 per 0.5 kg. More than half of the meat sold was purchased by individuals for home consumption. The remainder was sold to restaurants and fish markets. New markets have been developed in California and along the east coast.

Fifteen licensed alligator parts dealers reported that teeth and skulls were sold to the jewelry trade and biological supply houses. Most jewelry items were sold within Louisiana, primarily in the New Orleans area.

#### Law Enforcement

The number and severity of alligator law violations were analyzed to determine detrimental effects that the harvest program might have on the resource. Federal and state enforcement agents were assigned annually to alligator law enforcement. No major hide poaching cases have been made in Louisiana since 1976. During the 1983 season, only 8 alligator-related cases were filed by state agents during the September harvest program, and all were of a relatively minor nature. Two hundred and twelve Louisiana field agents devoted part of their working hours to alligator enforcement activity. It is evident that Louisiana's alligator harvest program did not stimulate alligator poaching.

#### Literature Cited

- Chabreck, R. H. 1966. Methods of determining the size and composition of alligator populations in Louisiana. Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm. 20:105-112.
- . 1971. The foods and feeding habits of alligators from fresh and saline

- environments in Louisiana. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 25:117-124.
- and G. Linscombe. 1978. Vegetative type map of the Louisiana coastal marshes. *La. Dep. of Wildl. and Fish., Baton Rouge.*
- Joanen, T. and L. McNease. 1970. A telemetric study of nesting female alligators on Rockefeller Refuge, Louisiana. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 24:175-193.
- and ———. 1972. A telemetric study of adult male alligators on Rockefeller Refuge, Louisiana. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 26:252-275.
- and ———. 1979. Time of egg deposition for the American alligator. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies.* 33:15-19.
- and ———. 1981. Management of the alligator as a renewable resource in Louisiana. *Ga. Dep. Nat. Resour. Tech. Bul. WL 5:62-72.*
- , ———, and G. Linscombe. 1974. An analysis of Louisiana's 1973 experimental alligator harvest program. *La. Wildl. and Fish. Comm., New Orleans.* 20pp. Mimeo.
- , ———, and D. Taylor. 1981. Alligator management plan, State of Louisiana. *La. Dep. Wildl. and Fish., New Orleans.* 22pp. Mimeo.
- Linscombe, G. 1975. Alligator complaints summary, 1975. *La. Dep. Wildl. and Fish., New Orleans.* 8pp. Mimeo.
- McNease, L. and T. Joanen. 1974. A telemetric study of immature alligators on Rockefeller Refuge, Louisiana. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 28:482-500.
- and ———. 1977. Alligator diets in relation to marsh salinity. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies.* 31:36-40.
- and ———. 1978. Distribution and relative abundance of the alligator in Louisiana coastal marshes. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies.* 32:182-186.
- Palmisano, A. W., T. Joanen, and L. McNease. 1973. An analysis of Louisiana's 1972 experimental alligator harvest program. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 27:184-206.
- Taylor, D. 1980. An alligator population model and associated minimum population estimate for non-marsh alligator habitat in Louisiana. *La. Dep. Wildl. and Fish.* 15pp. Mimeo.
- and W. Neal. 1984. Management implications of size-class frequency distributions in Louisiana alligator populations. *The Wildl. Soc. Bul.* 12(3): 312-319.
- Valentine, J. M., J. R. Walther, K. M. McCartney, and L. M. Ivy. 1972. Alligator diets on the Sabine National Wildlife Refuge, Louisiana. *J. Wildl. Manage.* 36(3):809-815.