News & Analysis

Pet Foods, and Animal Health and Welfare

The Pet Food Institute, which represents the pet food industry, has petitioned the Food and Drug Administration (in the *Federal Register*, vol. 48, no. 12, Tuesday, January 18, 1983) to seek FDA approval for proposed changes in the regulations that govern what information pet food manufacturers must include in their labels indicating the constituent ingredients of each product. Under the suggested new regulations, corn husks and peanut shells would be listed simply as "vegetable fiber"; hydrolyzed poultry feathers as processed "poultry protein products"; cheese rinds as "cheese"; and ground bones as "processed animal protein."

Furthermore, the actual ingredients in each can of product would not be ascertainable, since class (or category) names of some ingredients would be allowed—"cereal grains," for example, could mean rice, barley, or wheat. Such vagueness in labeling could cause serious problems for those pets who are allergic to certain food materials such as wheat (which can cause epilepsy in dogs), since the pet owner would not know whether the harmful ingredient was present or not. And the labeling of animal by-products that are actually of little or no nutritional value as "protein" constitutes a practice that is not only misleading to the public, but can also be detrimental to animal health.

This recent move by the pet industry (which they claim will save themselves and consumers $200 million per year) seems to be motivated by three factors. First, the cost of quality ingredients continues to increase steadily. Second, the industry follows a policy of "lowest-cost feed formulation," which leads to a downward spiral of deteriorating products, in which competitors strive to undercut each other by manufacturing palatable, but ever-lower-quality food with cheap ingredients. Third, these cheap and ready available ingredients are by-products of the highly diversified agribusiness/food industry; the industry therefore hopes to gain by profitably dumping its waste products into pet food subsidiaries, rather than using them as organic fertilizer.

Awareness of the downward spiral in the quality of pet foods has already induced many pet owners to buy the more expensive (but higher quality) brands that are recommended by their veterinarians, or to make their own pet food. And more veterinarians are finding that many pet health problems, especially those affecting the skin, are partially alleviated or totally cured, simply by taking the animal patient off all regular processed commercial pet foods. The precise magnitude of the effect of these foods on animal health problems remains only to be quantified.

The FDA has indicated that it is giving this petition serious consideration by making it public and therefore subject to public comment. To stop the proposed changes in labeling regulations, The Humane Society of the United States and the American Veterinary Holistic Medicine Association have already voiced their opposition, to protect pets and consumers from what could amount to a nationwide animal health dilemma.

More Money in Support of Taub

The American Psychological Association, according to the *APA Monitor* (March 1983), has decided to give psychologist Edward Taub an additional $6,000 from its Psychology Defense Fund, in addition to the two previous grants of $5,000 each that were donated to his In-

stitute for Behavioral Research. As stated in the announcement, these funds will be used to help pay for legal expenses incurred in the Taub case. The American Psychological Association's Board of Directors has taken the position that "Taub's appeal raises broad constitutional and jurisdictional questions related to scientific and educational issues surrounding the care and use of animals in research and experimentation. The grants are not intended to be a statement on Taub's innocence or guilt, the Board has indicated, but have been made to ensure a fair airing of the issues relevant to psychology."

The article admitted that earlier grants had generated controversy among some psychologists, who had argued that Taub's case concerns veterinary care, not freedom of scientific inquiry. However, Taub, in his defense, has artfully turned the entire issue around to one of scientific freedom. The new $6,000 grant will purportedly be used immediately to pay for the transcribing and printing of earlier trial proceedings, as is required by the Maryland State Court of Appeals because Taub is appealing his conviction.

Should Immunocastration Replace Surgical Castration?

These days, the literature on agricultural science abounds with reports on possible methods and preliminary results of tests with hormonal and immuno-castrating agents. In particular, the U.S. Department of Agriculture's *Research News* has summarized the efforts of physiologist Bruce Schanbacher, of USDA's Agriculture Research Service.

Dr. Schanbacher has developed a method that employs the hormone LHRH (or "luteinizing hormone releasing hormone"), which causes the release of luteinizing hormone (LH) from the pituitary. The presence of this hormone in the blood works to suppress the production and secretion of those hormones that are responsible for male characteristics: gonadotropin from the pituitary and, in turn, testosterone from the testis. After LHRH treatment, rams showed severe inhibition of testicular growth and total loss of testis function, accompanied by weight gains comparable to those of surgical castrates. An alternate procedure, immunization of lambs against testosterone, was only partially successful, since the testis remained normally sized, and continued to produce sperm and to excrete testosterone.

In the *Research News* article, the USDA expressed its hope that: "Immunocastration could be an effective alternative to surgical castration — and without the stress and discomfort associated with conventional castration." This is the lead sentence of the article; it raises some hesitant expectation that one important rationale behind the research reported in the following paragraphs might be concern for animal welfare. Yet, as you read on, the weight of evidence seems to suggest that the chief reasons for perfecting immunocastration techniques are (what else?) efficiency and profitability. As Schanbacher observes, the shock of surgical castration, and the potential for hemorrhage and later infection, "can contribute to temporary or prolonged setback in animal growth and performance." Also, immunocastration, since it can easily be done to an animal at any age, can be targeted for a "specific stage in the growing-finishing cycle to promote lean growth and optimize lean-to-fat ratios."

What this choice of verbiage seems to indicate, then, is that animal welfare may not be a prime consideration in the fine-tuning of immunocastration techniques or their possible large-scale application. While, on balance, these new methods of castration would appear to be less traumatic and injurious to animals, animal welfare advocates will have to keep a close eye on continuing developments, to ascertain that welfare considerations are not simply left in the dust, in the ever-quickening race for more efficient ways to convert plant stuffs to animal protein.

Predicting Carcinogenic Potential With Mathematics

Whenever the litany of potential techniques for replacing the use of live

animals as subjects in toxicity testing comes up, "computer modeling" will be certain to be dutifully placed on the list. Yet, while numerous illustrative examples will be provided for the other types of alternatives listed, examples of computer modeling will often be conspicuously absent. This is due in no small part to the fact that such models require considerable mathematical sophistication. However, K. Enslein and P.N. Craig have recently published an article (*J Toxicol Environ Health 10*:521-530, 1982) that summarizes a model for predicting the carcinogenesis of new chemicals that have not yet been subjected to analysis (either in animals or in culture dishes). This article, though highly complex, can offer some insight into the process of model development, and the extent to which it may eventually assist in limiting the numbers of animal tests, if not actually replacing them entirely.

First, it is important to keep in mind that the Craig-Enslein model is described as "a predictive structure-activity model." This means that the equation developed from the model attempts only to classify chemicals according to their possible carcinogenic potential; there is no attempt in this work to formulate a hypothesis of, or test for, cause-and-effect relationships.

To derive the equation of the model, Enslein and Craig utilized data on known carcinogens compiled by the International Agency for Research on Cancer. Information on 343 compounds was obtained from IARC records. Each of the compounds was then characterized according to the chemical characteristics of its substructural elements (such as the presence of various non-cyclic components), as well as certain physical parameters — though only molecular weight proved to be of any real utility in assessing carcinogenicity). Then, from the list of potential chemical characteristics that possibly have been related to carcinogenicity, those parameters that contributed least to the ability to discriminate between definite carcinogens and indefinite carcinogens were weeded out by mathematical techniques. Several further mathematical manipulations were conducted next to further narrow and refine the list of characteristics that are predictive of carcinogenic potential. Finally, statistics were employed to the results of the final equation to verify its accuracy. Any final assessment of a compound's potential for inducing cancer, however, must come from an integration of the results derived from the analysis of the various sub-components and other parameters that make up the chemical, since the breakdown into substructure that is part of the model means that only the fragments are correlated with carcinogenicity.

The equation was found to have correctly classified between 87 and 91 percent of the definite carcinogens, and between 78 and 80 percent of the indefinite carcinogens (according to comparisons with IARC data). In several cases, the authors even assert that the results of their work indicate that the testing in animals is suspect, and that their equation is a better predictor than live-animal or other tests on animal-derived material.

The model will have to be updated as better means of characterizing the subcomponents of potentially carcinogenic compounds become available. But this kind of effort, when intelligently integrated with results from other nonanimal studies like the Ames test, may well serve to greatly reduce the numbers of the relatively crude tests in whole animals that are being performed today.

Vancouver Spay/Neuter Clinic Finds Unexpected Benefits

In 1976, the city of Vancouver, B.C., opened a low-cost spay and neuter clinic. Since that time, the city's SPCA has been happily compiling an ever-increasing list of significant benefits that seem, directly or indirectly, to have resulted from the spay/neuter program. Some examples, as reported in the Spring 1983 edition of *Animals Canada*:

- The city pound is beginning to lose money, because so few stray dogs are now found wandering around the city.
- Pet owners are showing more responsible behavior — in 1976, the SPCA

reported that 80,000 animals had to be euthanized; in 1982, only 15,300 were killed.

- The claim rate for animals that *are* impounded has increased from 33 to 70 percent.
- Complaints of cruelty have declined by 60 percent, in part because the surplus of animals has been reduced so significantly.
- Reported numbers of dog attacks have been halved, because neutered males tend to remain at home.

New Treatment for Cat Allergies

Those of us who thought that allergies to cats were caused primarily by dander from the animals were surprised to read a *USA Today* note (March 29, 1983) that a new therapy for the problem involves densensitizing injections that use purified extracts of cat *saliva*. Speaking before a meeting of the American Association of Allergy and Immunology, Dr. John Ohman described his results with a 3-month series of saliva-derivative injections: subjects achieved permanent, although partial, relief of symptoms. It had previously been hypothesized that cat-allergy symptoms are triggered when cat saliva becomes vaporized as the cats lick themselves in grooming.

Dr. Ohman is hoping to receive FDA approval to market the saliva-derived material in 2 years.

For Dogs, Chocolate Can Be Deadly

There appear to be few species capable of resisting the appeal of chocolate. It is even possible that disdain in the presence of chocolate could provide the most plausible basis for distinguishing genuinely sentient from nonsentient organisms. But in dogs, one of the chemicals in chocolate, the stimulant theobromine—which is closely related to caffeine and theophylline—can result in urinary incontinence, seizures and, finally, death.

A. Glauberg and H.P. Blumenthal, reporting in the *Journal of the American Hospital Association* (19:246-248, 1983), described a case of fatal intoxication with theobromine in a 21-kg female springer spaniel. During a single afternoon, the dog had eaten a 2-pound bag of Hershey's chocolate chips. That evening, some mild symptoms began to appear: the dog was restless and had urine incontinence. The next day, the animal's condition had deteriorated noticeably, and she had become "agitated and extremely nervous." Then, generalized motor seizures began; after 15 to 20 minutes of seizures, the animal died.

Postmortem testing showed that, at the time of death, the dog had a serum theobromine concentration of 133 mg/liter. She had most likely ingested about 1,920 mg of theobromine, which is approximately 5 times the amount given therapeutically (theobromine was formerly used to treat angina pectoris, cardiac insufficiency, and some forms of arteriosclerosis). To find out what idiosyncrasies in canid metabolism had led to the onset of seizures and death in the springer spaniel, the authors fed a smaller amount of chocolate, a 4-ounce Hershey bar, to a 20-kg mixed-breed female dog, and took blood samples for analysis of serum theobromine levels before chocolate ingestion, and at 10 observation points over the first 28 hours after ingestion. They found that blood theobromine level peaks at about 4 hours after chocolate is fed, but then decreases only very slowly over the next 24 hours. The authors speculated that this delayed rate of clearance from the blood might be caused by slow absorption of theobromine from the bowel, a long serum half-life, or both. In contrast, the serum half-life for theobromine in humans is only 7 hours.

Potential treatments suggested in the article include induced vomiting and gastric lavage with an activated-charcoal "shake." But, as usual, the best treatment is prevention—an awareness among owners of the danger that chocolate poses for dogs, coupled with a sensitivity to suspicion of theobromine poisoning as a possible cause of otherwise inexplicable symptoms, such as a sudden onset of agitation and incontinence.

Rabies Diagnostic Technique for Live Animals

Of all the terrible consequences of rabies, one of the worst is that an animal that is merely suspected of having the disease must be killed in order to get a reliable diagnosis. This is because the standard method currently in use for identifying rabies requires that a sample of brain tissue be submitted for testing. If the diagnosis is positive, the animal would have had to be killed anyway. But if the result comes back negative, it is too late to save the animal; it can only become another statistic in some table in a public health report.

However, a new method, described by B.G. Wright (*Vet Med Small Anim Clin 78*:237-238, 1983) makes use of tactile hair samples from living animals to arrive at a rapid diagnosis of rabies. It was previously known that the rabies antigen can be found in the nerves of the skin, especially those that are of cranial origin. So Wright reasoned that the tactile hairs, which are richly supplied with such nerves, might be a good source of diagnostic material.

He took hair samples from a calf suspected of having rabies and, after sectioning them in a cryostat, stained them with fluorescein thiocyanate-labeled globulin. Under ultraviolet microscopy, the fluorescent antigen-antibody complexes were clearly visible, thus confirming the presence of rabies. Subsequent examination by the standard histological method, done on a section of the calf's brain after it had died, further corroborated the identification of rabies.

This method is quick (results can be obtained in 6 to 8 hours), and does not require shipping of samples to a distant regional lab. It is to be fervently hoped that this new method will be adapted for testing in other species, and made generally available, when perfected, for large-scale testing in both wild and domestic animals.

Socialization by Humans Reduces Health Risks Among Chickens

Beginning on the first or second day after hatching, chickens studied for the effects of socialization were divided into three treatment groups. The first group were "socialized" by the use of slow, deliberate movements among husbandrymen; they were also talked to softly and offered food (corn) by hand. The second group were simply "ignored"; they were given minimal human contact. The third group, the "hassled" birds, were ignored for the first 4 weeks of life. Then they were shouted at, their cages were banged on, and loud noises were made in the room. (They were never physically harmed, however.) All three groups were then challenged with inoculations of *Escherichia coli* and were tested for antibody response to canid red blood cell antigens.

Simple observation showed that the socialized birds showed better behavioral adjustment to their environment than did the other two groups: they "eagerly approached the research worker's hand" and ate the offered corn. When they were touched, they faced the worker and made no attempt to flee. Ignored and hassled birds were both more fearful of any handling and avoided contact with humans whenever possible.

In terms of the two immunological measures, the socialized birds showed far better development of immunity to *E. coli.* They also demonstrated far less variance among individual birds, in terms of strength of immune response, than did those in the other two groups. Socialized birds also had an increased antibody response to the RBC antigen administered. (Abstracted from W.B. Gross and P.B. Siegel, *Am J Vet Res 43*:2010-2012, 1982.)

Jealousy an Innate Tendency in Dogs, Cats, as Well as People

In attempting to study whether the phenomenon of jealousy is a culturally conditioned, *i.e.,* learned behavior, E.W.

Mathes and D.J. Deuger (*Psychol Rep 51*:351-354, 1982) were really interested in getting some sound data for refuting the "culturally conditioned" side of the innate vs. learned behavior controversy. But to test their hypothesis that jealousy was, in fact, an inborn "distress response" and an inevitable concomitant of love that is only subsequently modified by learning, the investigators studied jealousy in dogs and cats, as reported by students who owned these animals.

In particular, the authors hoped to provide evidence to counter recent suggestions that, since jealousy is merely a learned behavior, it can be rapidly unlearned. In their 1972 book, *Open Marriage,* N. and G. O'Neill claimed that jealousy is neither natural, instinctive, nor inevitable, and cited anthropological evidence of cultures, such as the Eskimo, where jealousy is nearly absent. The O'Neills then asserted that the prime cause of jealousy in Western society has a quite specific and destructive root: sexual exclusivity.

Mathes and Deuger therefore studied students' reports of inferred jealousy in their companion animals, to see if in fact jealousy had a more generic causation—the perception of *any* threat to a love relationship, regardless of whether sexual exclusivity was a factor or not. The behavior of the students' 58 cats and dogs was studied via a questionnaire, which consisted of some yes-or-no questions (sample: Has your pet ever shown signs of jealousy?) and three open-ended questions (sample: If your pet has shown signs of jealousy, what kinds of emotions does it show when it is jealous?). To make sure that the students' responses were not just projections of their own problems with human jealousy, a second questionnaire was also given to ascertain that the students themselves were not troubled by recurrent sensations of jealousy.

It was found that the scores in this second questionnaire did not correlate with the responses on the questionnaire related to perceptions of animal jealousy, so the authors felt confident that their results could not be explained away simply as artifacts of human projection.

Seventy-nine percent of the cat owners and 91 percent of the dog owners did report instances of inferred jealousy among their animal companions. Commonly reported causes of jealousy among cats included focusing attention on other animals (reported 31 times), people (16 times), objects like stuffed toys (6 times), and being ignored (17 times). The same causes for jealousy, in similar proportions, were reported for dogs as well. Jealous behaviors in cats included seeking attention, meowing and yelling, attacking the third party, withdrawing, staring with a sad or angry face, and crying. Among dogs, behaviors indicative of jealousy were again virtually identical to those seen among cats.

"Cures" for jealousy that were commonly used included giving attention to the animal, just letting the animal get over the bout of jealousy by itself, getting it to like the third party, and talking to it.

Noting the considerable similarity in the general phenomenon of jealousy among both dogs and cats, the authors stated that the high instance of jealousy imputed by students to both species "suggests that jealousy is probably an innate response," and observed that "replication of the correlation between love and jealousy described in the behaviors of cats and dogs suggests that the dynamics of jealousy transcend species."

What is most interesting in this article to those interested in animal welfare, however, is the extent to which these authors, publishing in a psychological (*not* an animal-oriented) publication, feel comfortable ascribing human emotions to dogs and cats. Cats and dogs are reported as showing a broad range of affect: sadness, affection, anger, anxiety, and loneliness. This development seems to bode well for those of us who feared that the realm of emotion was, in the minds of those working in the discipline of psychology, to be forever limited to the sole purview of Homo sapiens. The endless cries of "anthropomorphism" in respect to animal emotion seem, at least in some quarters, to be subsiding.

Complex Tactics Required for Combat in Galapagos

Bruce Rudd and Robert Barnett, in a recent issue of the *Journal* (4(1):44-58, 1983), related the story of efforts to control the burgeoning population of wild dogs on the islands of the Galapagos. In earlier years, the dogs had had only a minimal impact on native species, preferring to prey on other introduced species. But then, in recent times, native species, especially land and marine iguanas, began to become common prey for the dogs. Some means for controlling the dog population had to be devised. Poisoned baits were selected, because these could be carefully placed in sites where dogs, who locate food primarily by using scent, would easily find the baits, whereas indigenous Galapagos animals, who use vision to get food, would not be able to find them.

But an article in *New Scientist* (97: 161, 1983) told of a whole panoply of problems that are being concurrently caused by the multitude of introduced species in the islands: goats, pigs, donkeys, cattle, cats, mice, rats, fire ants — and dogs. Each of these species presents its own particular kinds of stresses for the environment. Wild goats, for instance, are very fertile and can even drink sea water. They strip all of the vegetation and much of the bark off every tree and shrub in sight. This wholesale destruction of plant life compromises the lives of competing giant tortoises and land iguanas and, by altering insect habitats, also affects its birds and bat populations.

Yet this is hardly a simple case of bad (recently arrived) guys vs. good (older resident) guys. For one thing, there are complex interrelationships among the exotic species themselves. The dogs, for instance, attack feral cattle and help keep cat populations in check. Any strategy aimed at totally wiping out feral dogs would have to take these kinds of facts into account.

Other facts complicate any attempt at an overall battle plan for reducing exotic species. Goats, for example, were formerly selected as the prime target for eradication, until hunters realized that, in the absence of goats, vegetation quickly grew back, making it extremely difficult to spot the wild pigs slated for destruction.

In fact, the problem of mass eradication of introduced species is so overwhelming that Dr. Friedemann Köster, director of the Charles Darwin Research Station, is considering calling in the Ecuadorian army, with a force of at least several hundred soldiers, to begin an attack on the whole gamut of these species. The dangers implicit in this tactic quickly come to mind, since it's hard to imagine soldiers with sufficient discriminating powers to ensure that only exotics would be killed.

Pondering the potential for disaster in Köster's plan for a second D-Day invasion, Dr. Andrew Laurie, who is currently studying iguanas on the island, wonders whether a better tactic might be to place "more emphasis on local control, and the protection of certain breeding colonies of the species we want to preserve."

The North American Black Duck (Anas rubripes): A Case Study of 28 Years of Failure in American Wildlife Management

The population of the North American black duck (*Anas rubripes*) has declined drastically and steadily since 1955 (Fig. 1). In spite of this decline, which has now reached about 60 percent of the population, the U.S. Fish and Wildlife Service has failed to take consistent and sustained regulatory action to allow restoration of the population (Table 1).

Indeed, in 1968, at the Black Duck Symposium, which convened most if not all of the then-acknowledged experts on black ducks, the participants concluded that (1) the black duck population was at its lowest level in about 20 years and (2) the FWS should undertake a program of major regulatory restrictions aimed at restoring the population (Barske, 1968; Addy, 1968a). Notwithstanding that recommendation, since 1968, regulations have, in sum, only been *liberalized* and, indeed, each year since 1970 regulations

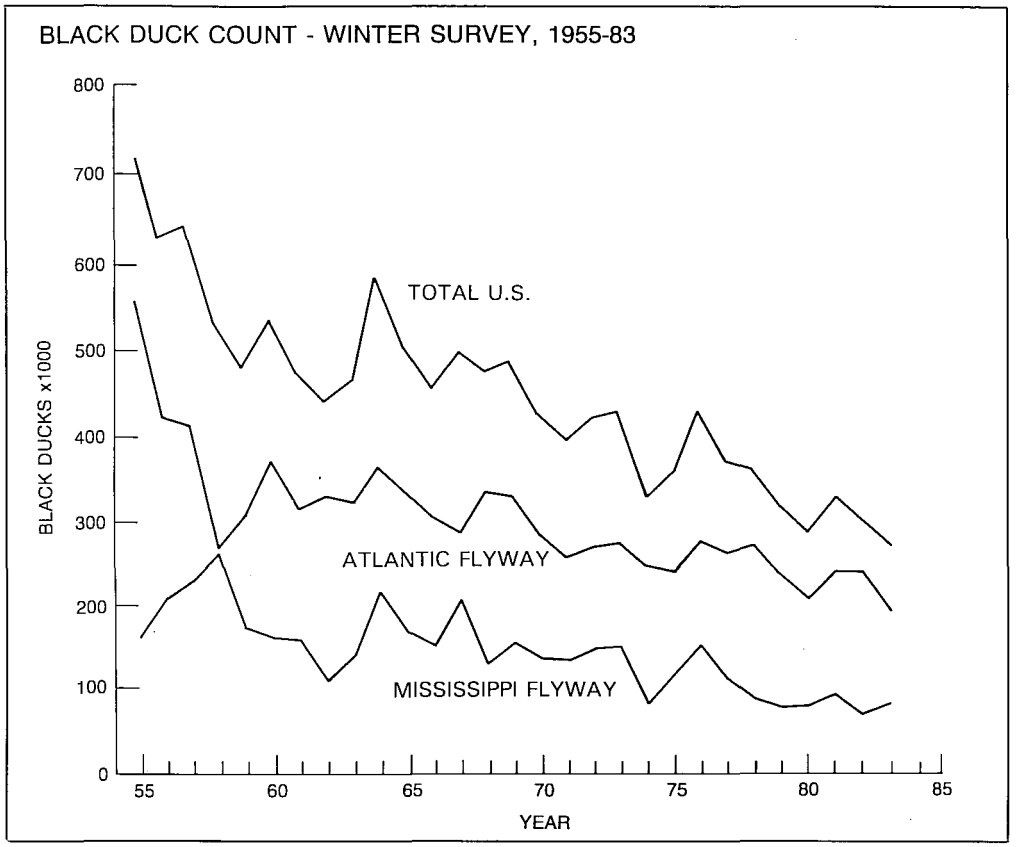

FIGURE 1 Black duck Winter Inventory, 1955-1982. (From H. Spencer, *Black Duck Management Plan,* adopted by the Atlantic Waterfowl Council, 1982.)

TABLE 1 Atlantic Flyway Hunting Regulations — 1953-1982*

		Bag				Bag				Bag			Bag		
Year	Season Length	Total	Black Duck	or	Season Length	Total	Black Duck	or	Season Length	Total	Black Duck	or	Season Length	Total	Black Duck
1953	60	4	4												
1954	60	4	4												
1955	70	4	4												
1956	70	4	4												
1957	70	4	4												
1958	60	4	4												
1959	40	4	4		50	3	3								
1960	40	4	4		50	3	3								
1961	40	3	2		50	2	2								
1962	40	3	2		50	2	2								
1963	40	4	2		50	3	2								
1964	40	4	4		50	3	3								
1965	40	4	4		50	3	3								
1966	45	4	4		55	3	3								
1967	40	4	2		50	3	2								
1968	40	4	2		50	3	2								
1969	40	4	2		50	3	2		47	4	1		57	3	1
1970	40	5	2		50	4	2		60	3	1				
1971	40	5	2		50	4	2		60	3	1				
1972	50	5	1		50	4	2		60	3	1				
1973	45	4	2		45	5	1		50	pts.	"70"				
1974	45**	4	2		45**	5	1		50†	pts.	"70"				
1975	45**	4	2		45**	5	1		45**	pts.	"70"				
1976	45**	4	2		45**	5	1		45**	pts.	"70"				
1977	45**	4	2		45**	5	1		45**	pts.	"70"				
1978	50	4	2		50	5	1		50	pts.	"70"				
1979	50	4	2		50	5	1		50	pts.	"70"				
1980	50	4	2		50	5	1		50	pts.	"70"				
1981	50	4	2		50	5	1		50	pts.	"70"				
1982	50	4	2		50	5	1		50	pts.	"70"				

*Possession limit is double the daily bag in all instances. Split season allowed with 10% penalty through 1969 and no penalty thereafter. Table 1 was provided by the U.S. Fish and Wildlife Service, 1982.

**50 Days, with Wednesday noon opening.

†55 Days, with Wednesday noon opening.

have been more liberal than they were in 1968 (Table 1). Furthermore, the numbers of hunters have increased by 45 percent in the Atlantic and Mississippi Flyways from 1968 to 1982, thus compounding the effect of the liberalized season.

In 1980, the FWS (Anon., 1980a) published the Migratory Bird Program Management Document, in which it established a goal of attaining an index level of 450,000 wintering black ducks by 1982. However, during the years 1979 to 1982, the FWS took *not one* regulatory action aimed at achieving that goal (Table 1), and the goal was never approached, much less achieved (Fig. 1).

Hunting as a Cause of Death

Since and including 1968, numerous studies have been conducted on the cause of the decline. None of these studies has proven conclusively and irrefutably that hunting is the cause or only cause of decline. However, beginning in 1968, all of those studying the black duck have noted that hunting is *the major* cause of black duck mortality, and most have concluded that overhunting is the likely cause of the black duck decline (Martinson *et al.*, 1968; Geis *et al.*, 1971; Crissey, 1976; Anon., 1980; Blandin, 1982).

Four of these studies deserve particular note. In 1976, Crissey, who had served as Chief, Migratory Bird Population Station, for 10 years, evaluated, both directly and indirectly, hunting and other causes of black duck mortality. He concluded that hunting was the likely cause of the population decline. In 1980, the FWS labeled the continuing decline of the black duck population the twentieth most important resource problem facing the United States. The FWS convened a meeting of some 19 waterfowl, coastal, and estuarine experts to examine the problems facing the black duck. These experts, after evaluating all potential hunting and non-hunting mortality factors, concluded:

> *[T]hat the declining numbers of black ducks are primarily the result of annual mortality that exceeds production. Most of that mortality is directly related to hunting.* (Anon., 1980)

Finally, in 1982, both the black duck committee of the Atlantic Waterfowl Council (Spencer, 1982a) and the doctoral dissertation of the Atlantic Flyway Council Biologist Dr. Warren W. Blandin concluded that hunting of black ducks was causing the population decline.

While even these "conclusions" are theoretically debatable in that one may never know with absolute certainty which, among many, mortality factors would have killed the ducks that would otherwise have nested, it is only reasonable to assume that hunting is the cause of the decline when, as in the instance of black ducks, hunting is the *known* cause of more than 50 percent of the total annual mortality (Blandin, 1982; Geis *et al.*, 1971), and other mortality causes have been examined and found to be within reasonable, normal limits. Furthermore, as those at the Black Duck Symposium (Addy, 1968) and others (Spencer, 1982) have noted, hunting mortality is the only mortality factor that wildlife managers can control, at least in the short run. And, all ethical arguments for and against sport killing aside, wildlife managers have long professed that their one overriding responsibility was to protect and preserve viable populations of wildlife, presumably throughout their ranges.

Other Possible Causes of Decline

But for the North American black duck, this has clearly not been done. Once, the black duck was a major breeding bird in most of the eastern one-third to one-half of the United States. Now, its only significant breeding populations in the United States are in the extreme northeast (Massachusetts, Maine, *et al.*), and even there suitable breeding habitat remains vacant (Hagar, 1982; Longcore, 1981), and overall black duck productivity (in terms of young per breeding female) remains high (Blandin, 1982; Crissey, 1976). Taken together, these facts are indicative of breeding habitat that is notably understocked relative to "carrying capacity" and where debilative factors that reduce productivity are not a serious factor. Similarly, there is no evidence that winter mortality or habitat loss is a cause

of the continuing population decline. Winter habitat has been destroyed, but fortunately not in sufficient quantities to have caused the severe and continuing population decline (see Barkske, 1968; Geis *et al.*, 1971; McGilvery, 1974; Crissey, 1976; Anon., 1980; Blandin, 1982; Grandy, 1982). Similarly, while hybridization with the similar mallard (*Anas platyrhynchos*) no doubt creates a drain on the extant black duck population, it cannot be implicated as the cause of the decline. Rather, the existence of understocked breeding habitat, the high productivity, and the analyses of Blandin (1982), Crissey (1976), Anon. (1980), and Grandy (1982) suggest that this factor, while possibly of increasing importance, is not implicated as the *cause* of the decline.

The Role of FWS

The question remains, Why has the FWS allowed this situation to develop without taking corrective action? Why has FWS ignored the guiding tenet of wildlife management, that the first duty is to preserve and protect the population base? Why has FWS consistently ignored the principle that mortality due to sport hunting is the one form of mortality that wildlife managers can control? Why has FWS consistently ignored the best recommendations and suggestions of its own experts that hunting be severely limited to allow the population to rebuild to the extent possible? Why has the FWS consistently failed to give the benefit of the doubt to the survival and welfare of the species? After all, the annual kill of black ducks is about 700,000; hunting causes between 50 and 60 percent of the total annual mortality; and the population continues its gradual decline and will undoubtedly never be able to recover its population (even if hunting mortality ends immediately) in portions of its former range from which it has been eliminated. With all this evidence, the question remains, Why has this been allowed to happen? And the answer, while it is perhaps best exemplified by the case of the black duck, is also important for many other species of American wildlife, because this case, sadly, is hardly unique.

The first analysis of the failure of the FWS regulatory system, with respect to the black duck, was conducted by Ted Williams (former Editor of the Massachusetts Fish Wildlife Agency magazine, *Massachusetts Wildlife*) in the prestigious hunting journal *Gray's Journal*. Williams concluded:

> *And indeed, it appears that the management complex has permitted the black to be sorely overshot. Since the peak in the mid-fifties, hunters have annually accounted for between 15 and 25 percent of the population, certainly a significant chunk when you consider the other pressures on the species. Furthermore, in the current black duck population there is an abnormally high percentage of juveniles — a solid indication in any species of heavy mortality among adults. Although the daily bag limit was cut from four to two quite a while after it became evident that the black duck was in serious trouble, the number of black duck hunters has since doubled. Thus, despite the attempted cutback, the rate of harvest has essentially remained constant. As one courageous federal waterfowl biologist publicly declared.... Increased hunting pressure has nullified much of the management effort. Administrators must decide on a population objective for the black duck. If they sanction a program of population increase, they must recognize that the measures necessary to achieve that objective will hurt!*
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> *Sadly, however, the management bosses who dictate fish and wildlife policy lack self-discipline. The problem is that they are funded almost entirely by sportsmen — the very party they are obligated to regulate and educate. Imagine the curriculum at a school where the children signed the teachers' paychecks. The current set-up is as unfair to sportsmen — whose long-term best interests are not being served — as it is to non-sporting conservationsists who are denied representation in conservation decision making.*

Managers have traditionally employed winter counts as a tool for setting waterfowl seasons. Yet, last year when a group of conservation organizations, calling themselves The Friends of the Black Duck, argued for a brief moratorium on black duck hunting, citing 21 years of dwindling winter counts as evidence of the need, they were informed by the management complex that the counts were unreliable. Managers can't have it both ways. Winter counts can't be effective tools for modern game management when they want to sell licenses, and worthless guesstimates when someone wants to limit immediate hunting opportunity.

When the conservation group communicated their concern over the black duck's plight to some of the fish and game departments in the Atlantic Flyway they received the most curious responses — to the effect that the black was such a popular game species that hunters couldn't be asked to refrain from shooting out the resource. Typical of this doublethink was the astonishing declaration of the Migratory Bird Research Leader of Maine. "I'm sure you're aware," said he, "that the black duck is the only significant puddle duck in most of the Northeast and to deprive Maine hunters of any chance to harvest some would create very serious sociological problems." [Emphasis added]

The trouble with fish and game departments these days is that they don't manage fish and game, they manage sportsmen; and they aren't staffed by biologists, they're staffed by sociologists. The concern is not for the problems of the black duck, or even the problems of the black duck hunter of 1980. It is for the appetites of the vociferous, atypical black duck hunter of the moment — the one breathing down the manager's neck. Such is the effect of special-interest funding on professional principles. (Williams, 1976, pp. 34-35).

Pressures on FWS to Preserve the Status Quo

While Williams' conclusion is compelling and, in my view, largely accurate, it omits, probably because of the author's familiarity with the regulatory process, substantial and critical portions of the analysis. First, the black duck is valuable: even with reduced numbers, it is still the prize duck for hunters in the New England states. Put another way, many hunters prize the black duck above all other species, because it is wary and reputedly difficult to kill (Hagar, 1982). Thus, the black duck is valuable, beyond any monetary value, to the individual hunter who esteems the black duck as a trophy or prize. For avid hunters who do not know or do not care about the decline of the black duck, there is a powerful lobby for continued or increased hunting of black ducks; even hunters who do know and do care will be intimidated from taking on their fellow hunters and changing the status quo.

Furthermore, the black duck is of critical value — or is thought to be of critical value — to the State Fish and Game (or Wildlife) Agencies of the individual states in New England. License fees largely support the operations of State Fish and Game Agencies. It is widely believed in much of New England that if hunters could not hunt black ducks, many would not hunt, thus substantially reducing the revenues that pay for salaries and programs of Fish and Game Departments.

So both of these forms of value furnish an impetus for continued black duck hunting.

Finally, the New England states are politically powerful both in the United States government and in the Atlantic Waterfowl Council, an influential organization of Fish and Game Agency officials which recommends (to FWS) waterfowl hunting seasons for each state in the Atlantic Flyway. Inevitably, there is the feeling that "I'll help you with your seasons (and license fees), if you help me with mine." And, there is the not-so-subtle fear that "professionals" will lose credibility if the FWS now, after all the years of defending the status quo, admits that the season should be closed.

But the key to the failure of the regulatory system is the value, real or perceived, to the hunter or the bureaucracy which is dependent upon hunting license fees and a hunter constituency. In case after case, to varying degrees, this pattern of yielding to vocal consumptive interests, to the detriment of wildlife, has become apparent wherever the wildlife species at issue is perceived as valuable for recreational, trophy, or commercial purposes, or is perceived as having great significance for generating hunter interest and license fees; and wherever active demand exceeds the capacity of the species for regeneration. This pattern has been apparent most recently with respect to continued excessive killing of bobcats (*Lynx rufus*) in many areas, and is becoming increasingly apparent with respect to regulations concerning other highly sought species of waterfowl such as mallards, canvasbacks (*Aythya valisineria*), and pintails (*Anas acuta acuta*), all of which are currently at or near historic low population levels, and all of which have been the subject of essentially the same regulations for many years. Moreover, the problems will increase if waterfowl and other wildlife populations decline, while hunter pressure on and demand for the species remains high.

Clearly, if wildlife and the discipline of wildlife management are to survive, wildlife managers must avoid the obvious failure of management which has been so persistently visible in the case of the black duck and assure, first and foremost, that the welfare of wildlife is insured.

(This is a synopsis of a special supplement by Dr. John W. Grandy which, along with complete reference documentation, will be published in the *Journal* in its next edition. Dr. Grandy has spent much of his life studying the black duck, and wrote his Ph.D. thesis on the subject in 1972.)