

FOURTH REPORT: CITIZEN NONGAME ADVISORY COMMITTEE¹

INTRODUCTION

The Citizen Nongame Advisory Committee (CNAC) was established in 1975 by the Director of the California Department of Fish and Game (CDFG) as an independent body to provide him with advice on the Department's rapidly expanding role in the management of nongame wildlife. The seven members of the Committee were appointed because of their expertise in biology and/or their particular interests in wildlife. Since its founding, the Committee has met monthly from September through June to discuss issues presented to it by the Director, as well as issues raised by Committee members and the public. The members serve without compensation. The membership of the Committee during that time was as follows:

Ursula Faasii, Petaluma

Dr. Robert Hassur, San Jose

Dr. Richard Martyr, Sacramento

Maxine McCloskey, Piedmont

Dr. Peter Moyle, Davis (Chairman)

Lloyd Tevis, Rancho Mirage

Dr. Rodolfo Ruibal, Riverside (Vice-Chairman)

Eldridge Hunt, Chief, Wildlife Branch, was the official CDFG advisor to the Committee and attended all meetings.

This report covers the activities of CNAC since September 1979. The first two sections are views of the effectiveness of CNAC by Director Charles Fullerton, and a statement by the Committee on their view of the role they play in assisting CDFG to manage nongame species. Following these sections are 26 brief accounts of issues discussed and acted on by CNAC.

¹June, 1982. Compiled by P. Moyle.

1. Preface

When the Citizen Nongame Advisory Committee was established in 1975, the Department of Fish and Game was seeking some needed assistance in developing its "new" and expanding nongame program. The Department had established its initial nongame project in 1968 and added a modest rare and endangered species element in 1970. Public awareness and interest in the general environment and in all types of fish and wildlife were also skyrocketing during this period. We were encouraged and excited with these new endeavors and the growing public interest, and wanted public input and guidance on program direction and balance.

No one could be more pleased than I with the contributions of the Committee. Through program review the Committee has provided valuable advice and assurance that our rare and endangered and nongame programs are headed in a positive direction and accomplishing what needs to be done for these valuable renewable resources. Our program in these areas is one of the biggest and, I believe, the best in the country.

The Committee has also been most helpful to me in dealing with the important issues encountered in the day to day operation of the Department. For example, their advice on such matters as improving law enforcement, the management of ecological reserves, and research on bighorn sheep and condors has been most useful.

The Committee has been particularly interested in the manner in which the Department deals with exotic fish and wildlife and has had considerable input in projects dealing with introduced species and the revision of Commission policy on exotics.

The Committee has also been active in legislative matters involving nongame and rare and endangered wildlife at both the federal and state levels. One of its contributions in this area involved the development of Assembly Concurrent Resolution 41 on the bighorn sheep that was passed by the Legislature last year.

It is plain to see that through these efforts and many more the Committee is making an important contribution to the management of nongame in California. In addition to these obvious accomplishments it has had subtle influences also. The Committee's stand and record on nongame matters is well known to Department employees. Our people are often influenced in their day to day planning decisions on resource management by what they would expect the nongame committee would want to see done. Thus in many respects the Committee serves as the conscience of the Department in nongame matters.

The Department's nongame and endangered species program has been steadily increasing in scope and stature over the last decade. Continued progress is warranted before these programs are adequate to fully meet the needs of these renewable resources. However, funding for these programs is being reduced now and prospects for future funding are also tentative. We are presently confronted with a loss of all federal grant-in-aid funding for endangered species and a reluctance of Congress to appropriate funds for a recently authorized nationwide nongame program. Securing needed funding entirely from the state government or other sources may also prove most difficult. I look forward to working with the Nongame Advisory Committee in meeting these and other challenges to the nongame and endangered species program. As helpful as this committee has been in the past, I see them making an even greater contribution in the future.

Charles E. Fullerton
Director

2. Role of CNAC

CNAC interacts with CDFG in a number of different ways. Most obvious is its responding to immediate issues raised by the Department or Committee members, such as the captive breeding program for the California condor, amphibian and reptile regulations, bighorn sheep management and crow hunting. Less obvious, but probably even more importantly, CNAC acts as a departmental conscience on nongame matters. The Committee sees itself as helping the Department make the transition from being an agency with a focus on

the management of exploited fish and wildlife to one whose focus is the stewardship of all fish and wildlife, regardless of a specie's economic importance. This is a difficult transition and is only just beginning, yet the very fact the Committee exists is a sign of the Department's growing concern for nongame fish and wildlife. This does not mean that Committee recommendations are always followed. The Committee is still 'at odds' with the Department on such issues as crow hunting and nongamefish poisoning operations. However, it has strongly supported the Department in such areas as its proposals for the California condor, the management of raptors, and the management of various reserves.

3. Crow Hunting

In July 1980, the Fish and Game Commission, in response to requests by a number of sportsmen's organizations, opened up a statewide, 124 day season for crow hunting, with no limit on take. This action was taken without consulting the Committee (or any other organization likely to be concerned about it), despite the fact it involved a change in status of the crow, from a nongame to a game animal. The Committee protested the action first because of the lack of consultation with people concerned with nongame wildlife (September 17, 1980) and then (November 1980) on philosophical and biological grounds (see Appendix I). Essentially the Committee can see no reason why hunting should be permitted for a species that is likely to be used as a moving target (and rarely eaten) and which can be mistaken for other nongame birds, especially ravens. Subsequently, new regulations were adopted that forbade crow hunting in regions with large raven populations and also placed a limit on the number of crows that could be taken. The Committee is on record as opposing even this half-way attempt to correct the initial error of having declared the crow a hunted animal.

4. California Condor

The Committee continued its role of oversight on the Condor program through comments and recommendations on the U.S.F.W.S. permit application. Committee suggestions for changes in the permit were advocated by the Director and accepted by the Commission. The Committee urged top priority be given to the captive breeding part of the program and questioned the value of peripheral research efforts not directly related to the immediate recovery of the condor population.

5. Falcon/Raptor Management

The CNAC attention to raptor management over the past years resulted in the formation of an advisory committee to the DFG on Raptor Research and Management. The Raptor Advisory Committee is charged with advising the Department in the review, updating, and implementation of its "Plan for California Raptors." This year the Committee provided recommendations (1) to the commission on streamlining regulations governing captive-breeding and falconry; (2) prioritization of species whose status is threatened or undetermined as well as species to be listed; (3) recommendations for increasing public awareness of raptors.

6. Seabirds in Gill Nets

Because some 22,000 seabirds washed ashore in the combined summers of 1980 and 1981 in Monterey Bay, DFG studied the cause of the mortalities and determined they were directly associated with an increasing use of entangling gill and trammel nets. In late 1981 the Committee expressed interest in resolution of the problem. It learned in January, 1982, that there will be legislation proposed to remedy the incidental taking by commercial fishermen of seabirds and marine mammals in gill nets. The Committee will review the proposed legislation when it is available.

In a related issue, the Committee also expressed interest in the wider problem of incidental taking of nongame fishes, birds and marine mammals in the commercial use of gill nets, and sought information from CDFG. The Committee will review this information when it is available.

7. Sea Otter

The Committee's long interest in endangered, threatened, and rare species within the state include concern for the southern sea otter. In earlier years the Committee made strong recommendations to DFG urging that careful research on the otters, their population dynamics, and their movements be done before significant management decisions are made. CNAC followed developments in the USFWS sea otter plan which includes a translocation plan. However, federal budgetary problems have delayed implementation of it.

8. Bighorn Management

Legislation. CNAC reviewed "Richardson Study Bill" and helped draft legislation for a new bill requesting CDFG to investigate specific problems relating to bighorns. CNAC recommended the following:

- 1) The tone of the proposed bill should differ from the Richardson bill by stating in the preamble that bighorns are an important nongame resource of high esthetic value which should be preserved for their own sake.
- 2) The Legislature should encourage the restoration and maintenance of bighorn-habitat and the perpetuation of bighorn herds at a viable level.
- 3) The most pressing topics in need of study are disease and intrusion of human activities into bighorn habitat.
- 4) Funds should be provided for bighorn research.

The bill (ACR 41) proposed by the Committee passed both houses except that CDFG eliminated funding in order not to compete with other demands of the General Fund. ACR 41 calls for a report from CDFG so CDFG is working on a general plan which will emphasize habitat preservation and research.

Research Projects. The Committee, which requested the opportunity to review all research proposals for fully protected, rare, and endangered species, was informed about three proposed bighorn research projects:

- 1) Capture and marking of bighorns at China Lake
- 2) DeForge study of disease and mortality in Santa Rosa Mountains.
- 3) Douglas study for NPS in Death Valley.

For the Douglas proposal, CNAC recommended that (1) A DFG representative should be present whenever animals are handled; (2) The number of animals to be darted and the period of time allowed for "hands-on" research should be stipulated; (3) The darting should be executed only by an expert, not by students.

For the DeForge proposal, which the Committee reviewed in detail, CNAC made the following criticisms and recommendations:

- 1) "Hands-on" research involves considerable risk to the animals because of producing stress and may be detrimental to the population.
- 2) Better data are needed to support the claim of high lamb mortality and declining population.
- 3) Captive sheep at the Living Desert Reserve should be used also for the disease study.
- 4) The distribution and health of livestock, especially cattle, in or adjacent to the study area should be investigated.
- 5) The BLM should be kept informed of all aspects of the research.
- 6) "Hands-on" research should not be undertaken in ecological reserves.
- 7) A census of bighorns should be conducted in the spring and again in the fall.

In response to comments by the Committee, DeForge submitted a revised proposal to the Fish and Game Commission.

9. Mountain Lion

In February 1982, CNAC recommended that CDFG support SB 1333 by Presley which essentially extends the hunting moratorium indefinitely. At Hunt's suggestion, the Committee agreed that it would be appropriate to exchange "nongame animal" for "fully-protected animal" in the wording of the bill as depredation permits are allowed for lions. The suggestion of a "window" clause in which other methods of control would be allowed if the lion populations got out of hand was rejected because (1) the situation was thought to be unlikely, (2) it might end up opening the "window" to lion hunting, and (3) the depredation permit system should be able to cover any problems.

10. Bobcat

CNAC has long had an interest in the welfare of the bobcat, an elusive animal whose status in the state is difficult to determine. The Committee's concern stems from the increased trapping pressure on bobcat populations that occurred because of dramatic rises in price of the pelts. For a variety of reasons they did not make any recommendations regarding proposed bobcat regulations and legislation, except to urge that CDFG should base its management policies mainly on what is best for the bobcat, rather than what is best for the fur trade.

11. Fringe-toed Lizard

The Committee asked Fullerton to recommend to the Fish and Game Commission that the lizard be given endangered status. Tevis testified before the Commission. The Committee also agreed with the DFG proposal for an ecological reserve in the Coachella Valley to protect a segment of the lizard population.

12. Captive Breeding of Reptiles and Amphibians

There has recently developed a "grass-roots" interest in the captive breeding of reptiles and amphibians throughout the United States. In California an organization known as CULEBRA and based in San Diego has proposed the establishment of regulations for captive breeding and permission for sale and transport of captive bred reptiles and amphibians. In November 1981 the organization wrote to Director Fullerton and proposed a set of regulations. In December 1981 members of CULEBRA met with representatives of the Department of Fish and Game.

The CNAC views the proposal by CULEBRA as meriting careful consideration. We recognize that there are serious problems to be resolved concerning the enforcement of such regulations. Furthermore there needs to be some procedure for establishing the competence and validity of individuals planning to embark on the captive breeding of amphibians and reptiles. The CNAC requested that it be kept informed of the developments and plans regarding the proposal by CULEBRA.

13. Anchovy Management

For the past two years the CNAC has reviewed the procedures instituted by Federal and State agencies concerning the commercial harvest of the anchovy. The primary concern of the CNAC has been the fact that the anchovy serves as the base of a large food pyramid and consequently the existence of abundant stocks of anchovy are necessary for the well being of many marine animals.

CNAC recognizes the complexity of the problem regarding the management of this vital fish resource. The position of the CNAC is that the California Department of Fish and Game should always take a conservative and cautious position in regard to the establishment of "optimum yield" quotas for the harvesting of anchovy. The "optimum yield" concept views the regulation of the fishery as necessary to "provide the greatest overall benefit to the Nation." Under this concept the primary concern must be the preservation of the species for continued use in the future. There is ample historical evidence that regulation of similar fisheries (North Sea herring, California sardine, and Peruvian anchoveta) have failed. Consequently the CNAC wishes to emphasize the fact that the theories and calculations used to determine the size of the anchovy populations are crude and

approximate measures. Therefore the most prudent procedure must be that which reduces the risk of over fishing. Consequently estimates should always be viewed as potentially erroneous and quotas established based on minimal estimates of the population. All estimates should be calculated so that a range of possible error is recognized. Present estimates normally have about a 20% (+) error. CNAC has recommended that the department carefully scrutinize the population estimates and always determine the "optimum yield" from the minimum estimate.

14. Nongamefish Poisoning Operations

The Committee has long been concerned over DCFS's use of poisons (mainly roetenone) to poison native nongame fish in order to increase the production of gamefish, particularly in streams. The Committee's position, expressed in a detailed report written in 1978, is that the use of poisons to control nongamefish (especially introduced species) is a legitimate management technique, but that it has too often been used where there was not adequate information to assess the problem. Typically, the presence of large nongamefish (especially suckers) in a stream considered to be a trout stream, has been enough evidence to warrant a poisoning operation, without any studies to demonstrate cause-and-effect. Of particular concern to the Committee have been two operations in the North Fork of the Feather River, one in 1977 and one in 1981. A report analyzing these operations was prepared by one of the Committee members (Moyle). In response to the Committee's criticisms, CDFG has issued an Environmental Analysis report to cover all future operations, which the Committee is now reviewing.

15. Red Shiner

The red shiner (Notropis lutrensis) is one of three non-native species of minnows that is legal to use and sell as bait fish in California. The Committee recommended that this species be removed from the legal bait list because (1) it is apparently capable of becoming established in northern California, where it could compete with native nongamefish; (2) it has already become established in the Colorado River where there is some evidence that it is competing for habitat with the juveniles of the native cyprinids, including two threatened species; (3) the other two species of bait minnows are already established in the wild in most of California and (4) the red shiner is the least used of the three species. In response to the Committee's recommendation, the Department conducted a survey of bait dealers in the state and conducted a literature review on the biology of the shiner. The results of this work were published as Administrative Report 82-1 (by E. V. Gleason). Although this report recommends that the use of red shiners as live freshwater bait outside of the Colorado River drainage and the Salton Sea area be discontinued, the Department only instituted a partial ban on the species because of pressure from two bait dealers who claimed they faced economic hardship if required to stop raising the shiners. The shiners are illegal in coastal areas and in the San Joaquin Valley, but legal in the Clear Lake Basin and Sacramento Valley. Fortunately, one of the bait dealers (at Clear Lake) now claims it is uneconomic for him to raise the shiners anyway, while the other claims he will be out of business in the next 5-10 years. The Department intends to discourage bait dealers not now raising the shiners from doing so (A. Cordone, pers. comm.).

16. Hydrocoral

The California hydrocoral, Allopora californica, is a colonial species that has become the subject of increasing collecting by divers along the coast of California. There has been growing concern that sport and commercial divers are jeopardizing the existence of the species. Approximately 20,000 pounds of A. californica are harvested annually in southern California with the majority of the material being collected within the 3 mile limit under the jurisdiction of the California Fish and Game Department. A recent article by Mark E. Gibson in "Sea Frontiers" (July-August 1981) details the biology of the coral and the problems associated with the uncontrolled collection of the species. The hydrocoral is in demand because of its value to jewellers and shell collectors throughout the world.

The CNAC recommended that the department undertake a study on the feasibility of regulating the take of the hydrocoral. CDFG agreed this was a problem but had insufficient funds for a study.

17. Subspecies problem

Endangered "species" in practice have to be named taxonomic units. These units are often "subspecies" but there is considerable controversy over the nature of subspecies. Therefore Ruibal developed a discussion document on the topic [and on the usefulness of subspecies as management units (Appendix II)]. The rest of the Committee was in agreement with the document and it was subsequently circulated in CDFG, provoking much interest and discussion.

18. Fish and Wildlife Plan

In 1977 the CDFG undertook an elaborate process leading toward updating the State Fish and Wildlife Plan that had been established in 1965. It was then the first such plan in the nation.

One member of the CNAC was appointed to serve on the new updating advisory committee: Maxine McCloskey. Richard Martyr, western representative of the National Audubon Society, was also asked to serve on the advisory committee. He became the second CNAC member on the fish and wildlife plan committee when he was appointed to CNAC in 1978.

The updating committee met until September, 1979. CDFG was making good progress toward an updated plan that would meet the needs of all wildlife in the state. Progress was interrupted by items with higher budgetary priorities. However, the plan is supposed to be completed by December 1982, and will have a large nongame component to it.

19. Commission Policy Statement on Depredation Control

CNAC reviewed the Fish and Game Commission policy statement on depredation and recommended it be revised as follows:

"It will be the policy of the commission that all wildlife will be maintained in harmony with existing habitat whenever possible. When depredation is viewed to be a problem, the landowner has the responsibility of taking reasonable measures, including structural deterrents and other nonlethal methods, to reduce depredation to an acceptable level prior to the issuance of a depredation permit. If, in the opinion of the Department, all reasonable methods have failed, a depredation permit may be issued. As an alternative, the Department may provide for the removal or transplanting of depredating animals, at its discretion."

20. Ecological Reserves

CNAC reviewed the Commission policy statement of ecological reserves and recommended that the following statement should be inserted after the lead paragraph which defines Ecological Reserves. The Committee also recommended the revision of item 18 of the General Rules.

"The CDFG will establish a coordinating committee for each reserve. The committee of 3-5 members will consist of one representative of the department to serve as chairman. The remaining positions will be filled by interested citizens and/or specialists from outside the department. The committee members will serve for 5 years and they may succeed themselves. The coordinating committee will be responsible for writing the management plan for the reserve.

The management plan will:

1. Define the need and purpose of the reserve.
2. Define the goals to be achieved in establishing the reserve.
3. Provide the historical background and legal boundaries of the reserve.

4. Provide an ecological description of the reserve and its setting, indicating any special areas of critical concern.
5. Provide a baseline faunal and floral list of species.
6. Determine what level of public use of the reserve will be permissible commensurate with the stated goals.
7. Describe and defend any exceptions to the general rules and regulations governing reserves.
8. Provide a list of recommendations for immediate action, i.e., fences, trails, signing, acquisition of additional land to complete the reserve and/or provide a buffer, suggesting zoning restrictions for the immediate area, safeguards to insure the water and air quality and the integrity of the water supply, etc.
9. Include a long-range plan for the reserve to include:
 - a. outline of the nature, location and level of development to occur if any.
 - b. management practices to be carried out to achieve the goals.
 - c. an evaluation scheme to assess the effects of (1) establishing the reserve; (2) management practices; and (3) public use.
10. Every 5 years the management plan is to be reviewed and the level of achievement of the stated goals assessed. The review must also include a new long-range plan including suggested changes in management operations and public use if any. The written review is to be submitted to the Commission for approval, at which time the committee will be reappointed.

The recommended change to item 18 is as follows:

- (18) Pets. Pets, including dogs and cats (except for seeing-eye dogs), are prohibited from entering a reserve except when they remain inside a motor vehicle.

21. Fitzgerald Marine Reserve

With the passage of Assembly Bill 2335, which contained a hidden, last-minute addition, it became possible for sportsmen to take rock crab, sea urchins, cabezon and kelp greenling in the Fitzgerald Marine Reserve. This action, made without the opportunity for careful scrutiny or a public hearing, further violated the sanctity and purpose for the reserve. This problem came to the attention of CNAC and after careful review it sent a recommendation to Director Fullerton to (1) support Senate Bill 1145 (Garcia) which restores protection for crabs and sea urchins; and (2) to work toward designating all or part of the area as an "Ecological Reserve" with full protection of the contained marine life. With the help of the Audubon Society and numerous concerned citizens, S.B. 1145 passed and the negotiations for an "ecological reserve" are underway.

22. Lake Matthews

Region 5 of the California Department of Fish and Game prepared a draft of management recommendations for Lake Matthews, Riverside Co., in December 1981. The CNAC reviewed these recommendations at its January 1982 meeting and supported the proposed management plan. The plan proposes to make Lake Matthews into an ecological reserve. In order to regulate access to the area the proposal suggests a cooperative agreement with the University of California Natural Lands and Water Reserve System. This could entail the University system administering the public use of the area for educational and scientific use. The CNAC supported this mechanism for allowing and regulating public use of the reserve.

The CNAC has for some time been interested in how the ecological reserves are regulated and used. The Lake Matthews reserve provides an opportunity to establish a set of well formulated plans -- between the Metropolitan Water District, the Department of Fish and Game, and the University of California -- that will produce maximal benefits for

wildlife and the public use of the reserve. Consequently the CNAC requested that it be allowed to participate in the formulation of the regulations concerning the Lake Matthews reserve.

23. Salton Sea

CNAC sent the following recommendation to Director Fullerton on 25 February 1982.

"The Citizen Nongame Advisory Committee fully supports the policy statement on the Salton Sea that has been drafted for the Fish and Game Commission. In our view it simply and clearly expresses what should be the Department's and the Commission's role in the area, to protect and enhance the fish and wildlife that depend on the sea. In our view, there is no need to insert any wording that encourages the rapid development of geothermal (or other) power in the region as such development is most likely to be harmful to the fish and wildlife of the sea."

24. Mono Lake

The progressive decline in the level of Mono Lake due to water diversions from its tributary streams continued during 1981. CNAC supported implementation of alternative P of the Mono Lake Inter Agency Task Force report which calls for stabilizing the lake level at its 1976 level. Under plan P additional water for the lake would be provided through a combination of water conservation, waste water reclamation, and reduced water diversions from lake tributaries (present level 100,000 acre ft/yr proposed level 15,000 acre ft/yr). The Committee's position provided an independent assessment of the issue for the Director and strongly supported the Department's efforts to maintain the Mono Lake resource.

25. CDFG Telephone Number

The Committee reaffirmed its long-standing recommendation that a CDFG telephone number be listed in all telephone books. This has still not been accomplished. The Caltip program should take care of part of this problem, if the Caltip number is listed in all telephone books.

26. Funding for Nongame Programs

At every meeting, CNAC was informed of the state of funding for Nongame Programs. With considerable frustration, the Committee has witnessed a deterioration in money available for nongame work, especially from federal sources. Despite this decline, CNAC has recommended against having CDFG pursue the use of a 'check-off' on the income tax form as a way of having people donate money to CDFG for nongame work. The reason for this is that CNAC feels strongly that nongame work is properly a General Fund item and that money acquired through a check-off would probably result in an equivalent reduction in general fund moneys, with no net gain. Such a system might also make it more difficult to acquire additional general fund money in the future.

Appendix I

Crow Hunting

The Citizen's Nongame Advisory Committee recommends that the hunting season on crows be removed and the crow be returned to its former semi-protected status. In making this recommendation, the Committee took into account the following facts and observations:

1. The crow hunting regulations establish a new precedent: a season for hunting an animal which is unlikely to be consumed once killed. Other animals with seasons are used for either food or fur. Animals which are legal to shoot at any time (with a hunting license) are those species widely held to be pest species (and also held to be unfit for human consumption).

2. The main reason crows are hunted is for target practice; few people are likely to eat the crows they shoot despite efforts of CDFG to publicize crow recipes. Just think of what the term 'eating crow' means in our culture! As a 'target practice' species, the crow

joins such animals as rats, ground squirrels, marmots, coyotes, weasels, skunks, opossums, moles, starlings and English sparrows. For this reason, crows are unlikely to ever have much status as game birds, so the number taken by hunters is likely to be low.

3. Studies on crow depredation indicate that it is rarely a problem to farmers; when it is, local control measures ranging from technologically sophisticated 'scarecrows' to poisons are legal under depredation permits and more effective than hunting. Certainly the shooting of crows not identified as problem birds will have little impact on bird-related crop damage. It is worth noting that the pressure to allow crow hunting did not come from farmers organizations.

4. Despite the retrieval provisions in the new regulations, it is highly unlikely that many hunters will bother to retrieve the crows they shoot or even attempt to locate wounded animals that fall in inaccessible places. What would be the motivation for doing so?

5. Hunting for crows is possible even without the new regulations, provided the hunters receive written authorization from landowners with depredation permits. The original regulations stated that "common crows may be taken only on the lands where depredations are occurring or where they constitute a health hazard or nuisance." This presumably excludes much public land. Thus it seems that the main need for the regulations is to make it more convenient for people to shoot crows on public land.

6. Hunting of crows as an activity sanctioned by the Department of Fish and Game is likely to increase conflicts between hunters and nonhunters, to the ultimate detriment of the hunters. A majority of people in California are nonhunters and most of these nonhunters are presumably not opposed to traditional hunting. This could change if crow hunting is widely publicized so that hunters are increasingly depicted as wanton killers of wildlife.

7. Crows are abundant, wary, and prolific so it is unlikely hunting will have much impact on their populations, although it could change behavior patterns, making them more wary and more inclined to concentrate in urban areas.

8. If the new regulations stimulate hunting for crows, it seems likely that many other large nongame birds will wind up being shot as well because it is unlikely that the hunters will have much training in bird identification. Particularly likely to be affected are ravens because it takes some experience to tell them from crows. Much of the 'pressure' to make crow hunting legal seems to come from Southern California hunting organizations, so it seems likely that much of the hunting for 'crows' will take place on the southern deserts, where ravens are the typical large blackbirds present.

9. Crows get mixed reviews from people who come in contact with them. In urban areas they are large visible birds that behave in seemingly intelligent ways, so are easy and fun to observe. On the other hand, they roost communally in large numbers and the roosts can be very messy places. They also eat the young of other songbirds. Their behavior in the countryside is similar but it tends to be more wary. They may play some role in controlling harmful insects, but it is unlikely that this role is significant in most situations.

From these observations, it appears to us that few benefits are derived from having a crow hunting season and that these are outweighed by the possible negative effects. Not the least among these is 'bad press' the regulations are already giving the Department of Fish and Game among the nonhunting public. It seems to us that if Department or Commission wishes to add animals to the list of those permissible to hunt it should first develop a set of criteria as to what constitutes an acceptable hunted animal. Each decision should then be made on the basis of satisfying these criteria. The criteria should reflect the fact that increasingly people who go out into the 'wild' to interact with animals, go to observe them and not to hunt them. Furthermore, it seems to us that if the decision is made to encourage the hunting of nongame birds with bad reputations, such as crows, then all hunters should be required to take a short course in ornithology, to reduce the probability of their making mistakes. Overall, the decision to have a season on crows appears to have been a poor one, made hastily in response to pressure from a few hunting

groups, without adequate consideration of its impact on the nonhunting public and on birds in general. We consequently recommend that the season be removed.

- Peter B. Moyle

Appendix II

The species, subspecies and population

There are three terms that are often used in discussion of rare or endangered wildlife: species, subspecies and population. Since these categories have biological definitions it is worth considering these terms and their relation to the goals of wildlife management.

SPECIES. The most generally accepted and useful definition states: "Species are groups of actually (or potentially) interbreeding natural populations which are reproductively isolated from other such groups."

This has been called the "biological" species definition since it emphasizes the genetic uniqueness of the organisms that results from the reproductive isolation. In practice many species are defined on the basis of their morphology or other phenotypic expressions such as biochemical or physiological characteristics. However, a morphological definition assumes that the conditions of the species definition are met. It should be recognized that the biological definition does not require or assume that there be morphological differences between species.

SUBSPECIES. This is an infraspecific term and is usually defined as: "Subspecies are geographically defined populations of a species which differ taxonomically from other populations of the species."

To "differ taxonomically" means that the populations differ substantively in its genetic composition (therefore it may differ in anatomy, color, biochemistry, etc.) from other populations. To a working taxonomist this often is considered to mean that 75% of the individuals can be distinguished. The term "race" is often synonymous with subspecies.

POPULATION. Subspecies and species are usually composed of a number of populations -- sometimes called "local populations." These populations are assumed to differ slightly in their genetic composition. Genetic theory predicts that groups of individuals (populations) that are even slightly isolated from other populations (by distance or habitat) will differ in their genetic composition. Field experiments have confirmed this prediction.

All three of these groupings represent attempts to describe the reality of nature. There may be arguments about how these categories are employed in specific cases, but there is general agreement on the concepts.

In wildlife management these terms have two different functions:

a. When studying any organism the desire of the biologist will be to provide the most accurate description possible of nature. In other words, to use the terms in the soundest scientific manner so as to best understand the biology of an organism.

b. When dealing with threatened or endangered animals the terms will assume legal connotations. Laws and regulations have been written using these terms and consequently an argument over terminology may have legal consequences.

* * * * *

The terminology seems to have important implications in respect to two animals.

1. The sea otter, Enhydra lutra has been described as consisting of three subspecies: E. lutris gracilis, the Asiatic populations; E. lutris lutris, the Aleutian, Alaskan and Canadian populations; and E. lutris nereis, the U.S. populations. Some have argued that there are only two subspecies: E. lutris gracilis, and E. lutris lutris including all the New World populations.

What difference does it make if we are interested in maintaining and protecting the species? From a biological point of view it does not matter what taxonomic conclusion is accepted. Currently, the species is distributed from Asia to California, but its distribution is discontinuous. There are separate populations in Asia, the Aleutians and Alaska, along the Canadian coast and off California. The Alaskan and California populations differ genetically (and morphologically) from each other. Whether the difference is sufficiently obvious to allow the use of taxonomic designations -- subspecies, the 75% rule -- or not, it is not pertinent. The biological fact is that there are separate populations. If the species is to be managed, each population has to be evaluated in respect to its own circumstances. Even if the populations were not known to differ, they still represent geographic entities and would have to be evaluated just-as if they were subspecifically distinct. If in the future the Alaskan and California populations became continuous, management decisions will still have to be made on the basis of the biological status of each "local" population and its relation to the rest of the populations of the species.

This is not to argue that all populations must have equal management status. But, it is an argument for not using taxonomic designations as overriding criteria in management decisions.

2. The bighorn sheep (Ovis canadensis) has been described as having three subspecies in California: O. canadensis californiana, O. canadensis cremnobates, and O. canadensis nelsoni. Currently, the bighorn sheep is a fully protected mammal in California and legally defined as Ovis canadensis -- consequently, all populations in the state are protected. Recently (March 1979), a Senate bill was introduced which listed the three subspecies. In this bill the subspecific designations would assume legal status with nelsoni, a game animal, and cremnobates and californiana fully protected.

The subspecies of bighorn were established in 1940 by Cowan. By today's standards, Cowan's work is inadequate and unacceptable. Nevertheless, since he was the last reviewer his taxonomy is used. The three subspecies intergrade, that is, there are populations that are immediate and can not be placed in a subspecific category. Furthermore, most of Cowan's diagnostic characteristics for the various subspecies were ambiguous and there is no certainty that most specimens from any of the subspecies can be correctly identified. This means that the legal use of the subspecific names will result in certain populations being in limbo. Furthermore, the department will be in a weak position if it attempts to arbitrarily provide subspecific designations to intergrade populations.

In this case there is an obvious advantage to retaining the species definition of bighorn, and referring to the various populations simply by their geographic designation. This prevents ambiguity and is better biology than continuing to use Cowan's poorly defined subspecific groupings.

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