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BIOLOGICAL RATIONALE FOR 1080 AS A PREDACIDE

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ABSTRACT: Compound 1080 (sodium monofluoroacetate) is a uniquely selective predacide for controlling coyotes, compared to other predacides. In addition to discussing the biological aspects of 1080, the reasons for the current emotional-political status of 1080 are also reviewed because the biological rationale concerning 1080 has been largely determined by a conspiracy orchestrated in 1972 by an individual of the Council on Environmental Quality but assisted by others from the U.S. Department of the Interior and the Environmental Protection Agency. Many of the distortions about 1080 can also be traced to environmental organizations which still use 1080 as an issue which they can be "anti" in order to solicit funds from the public. This paper is an attempt to clarify the true biological facts about 1080 and to expose the political conspiracies against 1080 by government and environmental organizations.

INTRODUCTION

This paper discusses the relative biological merits of Compound 1080 (sodium monofluoroacetate) as a predacide to use in baits to control the coyote (Canis latrans), which is the most serious livestock predator in the United States (Menzies et al. 1982, Wade 1982). In addition, we make a cursory review of the chief political factors which brought about the current gross misunderstanding of this compound. Also, we analyze the incorrect and emotionally charged propaganda which has been perpetrated by many environmental organizations in order to entice the public to contribute funds, since many of the distortions about 1080 can be traced to these sources (Howard 1971). Since 1080 is the most selective predacide available to use in baits to control coyotes, we endeavor to clarify the biological facts supporting this selectivity rationale about 1080 and to explain how the perpetrators of the emotional propaganda and political conspiracies against 1080 attained their objectives of banning the use of predacides in 1972.

Actually, the general public has been hoodwinked, bamboozled, duped, tricked, deluded or what have you, especially since the early 1970s, into thinking 1080, when used to control coyotes, then kills everything. When did all this start? Compound 1080 was first field tested by the U.S. Fish and Wildlife Service and the California Department of Agriculture in 1945 at the U.S. Forest Service's San Joaquin Experimental Range, Madera County, California. It proved to be a highly effective rodenticide to use against the California ground squirrel (Spermophilus beecheyi) to increase food production during World War II. However, since it was also selective for dogs, an obvious problem existed because there are always people who want to poison their neighbor's dog (e.g., Edwards et al. 1981). Also, no one wanted 1080 to get the bad name thallium sulfate had acquired in its effect on dogs in the 1930s.

Since EPA did not exist at that time, it looked like it would be a problem to get 1080 restricted so that only trained officials could use it. Therefore, the best way to achieve this restriction seemed to be to make 1080 look so dangerous that untrained people would not want to use it (personal communication to W.E.H. from the five government and state officials who conducted the 1945 tests). Robert M. Sutton, while Chief of the Branch of Animal Control in the Bureau of Sport Fisheries and Wildlife, Division of Wildlife Services, admitted that "when 1080 was discovered and brought into use, it was this agency (Division of Wildlife Services) that alerted the public and conducted a widespread educational program to point up the highly lethal nature of the compound. This is as it should be, but we actually caused alarm. Bureau literature described symptoms and lethal dosages. Bureau signs identified areas of use and pointed up hazards" (Sutton 1967:42).

The alarmist technique worked, and everyone was sufficiently frightened so that the only officials who wanted to use 1080 for rodent or predator control for many years were those who had no other toxicant available that would do the job so effectively and with so few environmental problems (Howard 1983).

Later, when individuals and organizations began to object to the killing of any animal, it was only natural that they chose 1080 as a logical target, since the Fish and Wildlife Service (FWS) of USDI had already frightened most of its own personnel about 1080. Compound 1080 has especially been exploited by the "anti" groups since the start of the strong ecology movement about 1968. For the last 30 years or so, Interior's FWS officials in Washington have not permitted their own animal control research branch, the Denver Wildlife Research Center (DWRC), to carry out research on how to use 1080 for rodent and predator control in a more efficacious and safer way. "Considering the chemical properties of 1080, its full potential as a selective pesticide has not been explored. Research into dosage rates and field application techniques is needed. ...The full potential of this material in terms of selectiveness and other use refinements has never been developed" (Berryman 1974:217). The only research on 1080 that Interior has permitted has been the "toxic collar," a device placed on sheep to control coyotes, and single lethal dose baits for coyotes.

One reason why DWRC has not done more research on 1080 is that whoever is appointed as assistant secretary of USDI responsible for animal damage control, by government statute this same person is also in charge of National Parks; hence, a hopeless conflict of interest. Many think that the only way to correct this political problem is to return the responsibility for animal damage control (ADC) and DWRC from Interior to USDA, where it was originally (Howard 1974a).

WHAT IS 1080?

According to Crabtree (1962), monofluoroacetate acid was recognized in Belgium in 1896, but it and its homologs escaped attention until about 1935, when fluoroacetates were developed into rodenticides in Germany before World War II. The major advances with fluoroacetates up to 1939 were made in Belgium, Poland and Germany. A Polish scientist who escaped informed the British in 1942 of the toxicity of methyl fluoroacetate. About 1944 the U.S. Chemical Warfare Service suggested sodium monofluoroacetate be researched as a rodenticide, and this is when Patuxent Wildlife Research Center gave it the invoice number "1080." After further testing at the Denver Wildlife Research Center, it soon became an important rodenticide and mammalian predacide (Atzert 1971).

Compound 1080 is considered practically tasteless, but it may have a faint acetate odor and a mild acid-salty taste, probably from impurities left during the manufacturing process (Atzert 1971, Rammell and Fleming 1978). A black dye (1% nigrosine black) is added so this white powder can be distinguished from sugar, flour or other substances (Clark 1975, Timm 1983). It is not an accumulative poison like arsenic and does not give off poisonous fumes (McIntosh 1958). It decomposes at approximately 200°C, which allows the destruction of unused baits by burning (Crabtree 1962, Atzert 1971).

Peters (1975) has shown that when 1080 is applied on baits in forests or pastoral lands the toxin is neither mobile nor persistent, hence exceedingly slender opportunities exist for any significant contamination of susceptible components of the environment.

Clark (1975) has reviewed important characteristics of 1080. Griffiths (1959) demonstrated that 1080 washes off grain and carrot baits readily in rain. There is a high degree of absorption to root tissues and other cellulosic materials, but it is decomposed abruptly by soil bacteria, apparently of the genus Pseudomonas. When leached into the soil, it may be translocated into plants, but most remains in the roots. Plants also decompose the compound (Hilton et al. 1969). Because soils possess a rich and diverse microfauna of organisms capable of degrading 1080, Lien et al. (1979:17) concluded that there seemed little likelihood of a long-term build-up of 1080 residues.

When Compound 1080 is ingested by coyotes, it is primarily absorbed through the gastrointestinal tract (Crabtree 1962). It is not readily absorbed through intact skin. The consumed monofluoroacetate, that is not eliminated in urine, is converted into fluorocitrate, the lethal synthesis that inhibits citrate metabolism. Some fluorocitrate is also eliminated in urine. That which remains in the body ultimately blocks the citric acid or Krebs cycle and can cause death (Atzert 1971, Kun 1982, Rammell and Fleming 1982). Applied vertebrate ecologists classify 1080 as a slow-acting toxicant in contrast to strychnine and exceptionally fast-acting cyanide.

In coyotes and other carnivores death from 1080 typically results from central nervous system disorders, with the animal presumably being unconscious prior to death, since they often run blindly into walls and fences(Batcheler 1978). Extreme pain has never been reported as a symptom in the many human suicides in Asia from drinking 1080 rat poison, but pain in animals is much more difficult to quantify (Schmidt and Bruner 1981). Just because 1080 is slow in taking effect does not mean it is inhumane like many other slow-acting poisons (e.g., thallium sulfate). In nature, of course, no animal has a nice death, including the sheep disemboweled by coyotes (Howard 1983).

Because of fears that humans might be poisoned from eating the meat of animals that had consumed 1080, a number of studies were conducted in New Zealand. One showed that with deer poisoned with 1080, an average 75-kg man would have to eat 750 g of the venison to receive any toxic effect; and to be lethal, the person would have to consume in one meal 10 kg of the venison (McIntosh and Staples 1959). In other studies it was shown that a 75-kg man would need to consume about 15 geese poisoned with 1080 to receive a lethal dose; if a sheep consumed 5 times its lethal dose of 1080, a person would have to eat about 150 kg of this meat in 24 hours to commit suicide (Rammell and Fleming 1978, Nelson 1980).

In the late 1940s, one of us (W.E.H.) discovered a group of people who were picking up 1080-poisoned ground squirrels for food (Howard 1960). He was able to stop the practice, but the individuals involved claimed no one had ever had any ill effects from eating the squirrels.

There are no really good antidotes for 1080 or any of the poisons used to control wildlife except for anticoagulant rodenticides where vitamin K_1 is effective. However, since 1080 is slow acting, veterinarians have been able to save many dogs poisoned with 1080 with symptomatic treatment (Clark 1975, Egekeze and Oehme 1979).

For wolf control in British Columbia, horses were butchered into 6 or 7 large pieces and, as with coyotes, injected with a solution of 1.6 g 1080 per 100 lbs of meat (West 1962). Two instances of theft from storage depots occurred where the thieves ate the poisoned meat. As West points out: "Fortunately all of the stolen baits had been impregnated with Compound 1080 and not strychnine. Otherwise, instead of mild symptoms, deaths might have occurred" (page 65).

Hazard--not toxicity--is the important consideration when evaluating environmental consequences of poisons. Compound 1080 is not the most toxic chemical known. Some of the most toxic pesticides, such as the rodenticide warfarin—which in the pure form is as or more toxic than 1080--may be actually one of the safest rodenticides as used. Since 1080 is used in such small amounts after the powder is dissolved in water and diluted, its hazard, especially in baits, is even less than many other pesticides used to control vertebrate and invertebrate pests. No human death has resulted from using 1080 as a predacide in North America since the 1940s (Nissen 1982:37).

RATIONALE OF 1080 AS A PREDACIDE

Compound 1080 was considered especially suited for coyote control on some remote livestock ranges of the West because of its unique specificity (compared to other toxicants) for canids and minimum danger to other wildlife (Sutton 1967, Atzert 1971). Large impregnated carcasses could be located away from human habitation, in open areas away from timber, lakes and streams to protect furbearers, and in winter when some species would be in hibernation and the bait would be frozen. A syringe was used to inject the carcasses with 1.6 g of 1080 per 100 lbs of meat. One to two ounces was lethal to a coyote, but much larger amounts were required to fatally poison more resistant species such as badger (Taxbea taxus), raccoon (Procyon lotor), hawks (Buteo spp., Falco mexicanus, and Circus cyaneus), and eagles (Aquila chrysaetos) (Robinson 1962). The "Leopold Report" (Leopold 1964) stated that 1080 was a relatively humane and effective method of coyote damage control and when used in a bait station has very little damaging effect on other wildlife, and that it is perhaps the most efficient and one of the least damaging methods of coyote control in open lands of the western United States (Howard 1972).

In Australia, meat baits weighing about 190 g each, injected to contain about 0.03% 1080 and placed around water holes for pig control, resulted in known deaths of one feral cat (Felis catus), three foxes (Vulpes vulpes), five corvids (Corvus spp.), two black kites (Milvus migrans), and one magpie lark (Grallina cyanoleuca) (Hone and Pederson 1980). This shows that with high enough concentrations of 1080 and high exposure of baits, some nontarget species are vulnerable.

Many incorrectly claim, but do not document, that 1080 is an indiscriminate toxicant that magnifies or concentrates in the environment like DDT, and that its use has slaughtered large numbers of nontarget species and endangered species by either direct or secondary poisoning (e.g., Anonymous 1982, 1982/83, 1984) Sibbison 1984). It is possible to cause secondary poisoning with many toxicants, but there is no bona fide evidence of endangered species being killed by 1080, yet congressmen were falsely told by personnel from CEO and USDI that 1080 had even exterminated a number of species in the U.S. (personal communication to W.E.H., Congressman John Dingell, 3/21/73).

Depending on how 1080 was used, there have been some other carnivores (but not populations) killed from eating 1080 bait (Berryman 1974:207). When all civilians in an Asian country had to use 1080 each year in rat campaigns, many dogs and cats were killed as a result of the public being issued 1080 concentrate (Howard et al. 1975). The hazard of 1080, when used as a rodenticide or predacide, is minor with birds, as they are much more resistant to 1080 than the target mammals (Atzert 1971). No endangered bald eagles have been killed by 1080; the 20 eagles killed in Wyoming were poisoned with thallium sulfate. It is practically impossible for another animal to be killed by feeding on the carcass of a coyote killed with 1080 unless it is another coyote cannibalizing it. In the proposed uses of 1080 (Thomas 1983), it is very unlikely that any coyote could ingest so much 1080 that it would vomit, with the vomitus then being hazardous to another animal that might eat it.

The claim was made that continued use of 1080 would result in irremediable and incorrectable losses, particularly of endangered species (Ruckelshaus 1972). No evidence was offered as to how this might happen. Of course, with high enough concentrations of 1080, it is possible to kill anything. The point is that, as used for coyote control, this claim cannot be substantiated. EPA's 1982 hearings exposed the falseness of the many charges the environmental organizations had made against 1080. For example, Thomas (1983:20) concluded "It now appears that the potential hazard from secondary poisoning from Compound 1080 was overstated in 1972."

Many different methods of coyote control are needed, including 1080, because of the great diversity in coyotes and in the physical environment (Wade 1982). The ecology of coyote depredations to livestock is highly variable in different situations. Control methods that offer varying degrees of predator protection include herders, corraling at night, improved husbandry techniques, guard dogs, llamas, repellents, frightening devices, aversive conditioning with lithium chloride or other agents, electric fencing, gassing pups in dens, trapping, shooting from the ground or aircraft, hunting with dogs, snaring, and M-44s that eject cyanide. So far, at least in many parts of the West, no single or combination of these methods have been able to adequately protect livestock from coyotes (Wade 1980, 1982). It is in these situations where 1080 is still biologically the most desirable approach because it can be used without adversely affecting the environment or creating much hazard to man and other nontarget species.

Dogs are the principal nontarget hazard that must be considered when using 1080 to control coyotes, but other carnivores such as badgers, skunks, and foxes, are vulnerable to 1080 and losses have occurred, so care must be exercised. Nontarget animals *&re* largely protected by the way baits are formulated, lure used, season of baiting, and the manner in which baits are exposed in the field.

No one knowledgeable about 1080 denies that if it is used carelessly, 1080 can become lethal to all species, but there are no data to show that the proposed future uses of 1080 to control coyotes will pose any significant effects on the environment, other than removing individual and highly localized populations of troublesome coyotes. There is no field evidence indicating that animals which consume a sublethal dose of 1080 may suffer deleterious effects such as occurred with thallium sulfate, which is now banned; and when 1080 is used as a rodenticide, it has been shown that bait shyness develops in the survivors of a sublethal feeding, thus inhibiting any chance of an accumulative effect (Crabtree 1962).

Many of the charges about the killing of nontarget species when poisoning coyotes with 1080 are biological impossibilities. Some people fail to recognize that the very principles of natural survival in wildlife populations, which enable them to escape the numerous dangers they constantly encounter, often makes their intentional control very difficult. Even if the objective was to poison all these other species, it couldn't be done. There are no recent data whatsoever showing that current animal damage methodologies cause mass slaughtering of beneficial wildlife (Berryman 1974:207), but improper live-trapping and other problems by researchers and collectors have killed more rare and endangered wildlife than the combination of all recent predator control practices.

If a chemical is to be used for coyote control, we contend that 1080 is by far the best chemical to use from the point of view of the welfare of the environment and safety. To oppose the consideration of new registrations of 1080, with adequate use restrictions that will be required before registration is granted, means you may be encouraging increased use of less-selective poisons to protect livestock (Howard 1983a).

THE 1080 CONSPIRACY

Many people wonder how Administrator William D. Ruckelshaus of the Environmental Protection Agency (EPA) could suddenly ban 1080 in 1972 without holding public hearings or having any data that indicated there would be a sudden and great imminent hazard to wildlife and people if use of predacides was allowed to continue. It had been used for 27 years without such hazard, and nothing new had occurred except the formation of EPA and the appearance of environmental lawyers. EPA acted so fast that the livestock industry and scientists alike hardly knew what was going on. We have already explained in the Introduction how 1080 was intentionally given a bad reputation in the beginning so its use could be restricted to protect it from getting a bad reputation as an unenforceable dog poison. Now the rest of the pieces of the puzzle will be put together.

Ten years after President Nixon's Executive Order No. 11643, "Environmental safeguards on activities for animal damage control on federal lands" (February 8, 1972; Nixon 1972) canceling the use of predacides on federal lands and all federal control programs, and the subsequent cancellation of the registrations for predacides (Pesticide Notice 72-2) by EPA on March 9, 1972 (Ruckelshaus 1972), a scholarly thesis based on taped interviews with the participants has revealed the inner workings and improper application of the political process that occurred. In his copyrighted Ph.D. thesis, Dr. Angus A. MacIntyre (1982) carefully documents how a select group of biologists and lawyers acted in secret to manipulate both the White House and the EPA, forcing a biased decision favoring the predacide ban. The coyote-predacide conspiracy was primarily orchestrated by Dr. Lee M. Talbot, who, as Senior Scientist, was an assistant to Russell Train. Train was Chairman of the Council on Environmental Quality (CEQ), which was created by President Nixon on January 1, 1970. Regarding this policy reversal, MacIntyre states: "Whatever its merits, the policy reversal was adopted secretly in a manner which violated due process" (p. 341), and that Talbot could not have halted the use of the predacides "if he had not employed secretive methods" (p. 394) because he had no data to justify banning the predacides on the basis of imminent hazard (c.f. Richardson 1983, Schmidt 1983).

Talbot realized he could exploit President Nixon's closed-decision process (MacIntyre 1982: 342). But until Nathaniel P. Reed became Assistant Secretary for Fish and Wildlife and Parks in May 1971, which placed him in charge of Interior's Animal Damage Control, then called the Division of Wildlife Services (DWS), Interior's animal control staff had been able to block Talbot. Reed's Special Assistant, James B. Ruch, also played a major role in the conspiracy (Howard 1974b). It was when Reed arrived in May that the 22 or so bald and golden eagles were poisoned with thallium sulfate (not 1080) in Wyoming (Cain et al. 1972:71). It is important to note that the eagles were not killed as a result of normal predator control practices by Interior's DWS personnel, but by frustrated ranchers illegally using antelope carcasses as bait.

Before Reed had arrived, Defenders of Wildlife and the Sierra Club (March 16, 1971) and then The Humane Society of the United States (April 28, 1971) brought civil actions against Interior, requiring the animal control section (DWS) of Interior to halt or restrain the control program because, among other matters, an environmental impact statement (EIS), as required by the 1969 National Environmental Policy Act (NEPA) had not been prepared. Both suits alleged violation of NEPA, tried to halt the control program, and claimed a number of groups of animals had been needless victims of the program. Interior filed an affidavit October 28, 1971, indicating that the preliminary draft of the EIS regarding Interior's animal damage control activities had been started in September 1970 and a preliminary administrative draft was prepared on October 12, 1970 (Berryman 1974, p. 220). All comments of outside reviewers were incorporated in a "Final" draft statement on February 8, 1971, which was before Reed arrived in May. On October 20, 1971, after the "conspiracy" was well along, the EIS was returned by the Acting Bureau Director to Division of Wildlife Services for a complete rewrite, but Reed never released it to David D. Dominick, then Assistant Administrator for Categorical Programs of EPA. The summary of an affidavit Interior filed December 6, 1971, regarding the impact of their control programs on wildlife, follows (Berryman 1973, pp. 207 and 227):

> "1. The Bureau program is not responsible for measurable population declines of any nontarget animal including those listed in the allegations. In fact, many are sustaining a hunter and fur harvest.
>
> "2. The numbers taken by the Bureau represent those problem animals or populations that are not being taken by normal hunter and/or fur harvest.

"3. There is not a single species that is declining or has become rare and/or endangered as a result of the Bureau's control program. There is not a single rare and/or endangered species whose numbers have been adversely affected by the Bureau's control program. On the contrary, protective measures built into the program are intended to increase the numbers of threatened animals.

"4. The methods and chemicals, as used by the Bureau, do not pose a threat to humans, to wildlife resources or to the integrity of the environment.

"The information was factual and authenticated at the time it was prepared."

There will be more on these civil suits against Interior later on. But first, in July 1971, Reed approved Talbot's "Cain Committee" task force where, according to Maclntyre (1982:344), Talbot chose on the committee only those who were a priori in favor of banning predacides. Interior cooperated with CEQ concerning the task force's assignment, but the National Academy of Sciences - National Research Council withdrew joint sponsorship of the Cain Report with CEQ because Talbot insisted on selecting the participants (Howard 1983). Ironically, in the preface of the Cain Report, Secretary of the Interior Rogers Morton and CEQ Chairman Russell Train state that "The panel has provided a completely independent appraisal and the findings, conclusions and recommendations expressed in no way imply endorsement by the Council on Environmental Quality or the Department of the Interior (Cain et al. 1972:iii; emphasis ours). In addition, a disclaimer at the beginning of the Cain Report states "The Council on Environmental Quality and the Department of the Interior had no control over the preparation or the contents..." (Cain et al. 1972:vi; emphasis ours). Yet to this day none of the authors have stated that they helped write the 15 recommendations at the front of the Cain Report, which we discuss below.

Actually, the only really damaging statements to animal damage control are in some of the 15 recommendations (the only part of the report most people read) which appear at the front of the Cain Report (Cain et al. 1972). The text of the Cain Report does not establish any valid basis for suspension of 1080. Even though it was these recommendations which Talbot, Reed, Ruch and Dominick used to help justify banning 1080, the recommendations were not supported by the contents of the report (Howard 1972) or written by the authors. But, according to Dr. Frederick H. Wagner (personal communication to W.E.H.), Dr. Cain did show them to the Committee. Apparently, by then the authors were so entrapped by Reed and Talbot that they could not prevent such a blatant distortion of facts bearing their names.

Note the following statements, which we consider to be irresponsible and false, that David D. Dominick of EPA made at House Hearings (March 19, 1973), a year after he had recommended to Administrator Ruckelshaus that the predacides be banned. He claimed, as facts taken from the Cain Report, "that (1) the effectiveness of predator control by poisoning is unproved and extremely dubious [ridiculous]; and (2) that conversely the effects of poisoning on a wide range of wildlife species--some whose survival is endangered [no endangered species was affected], and many of which are significant to the ecological balance of the West--are widespread and devastating [no species is named because statement is false]. According to the report, losses of non-target animals are frequent, and the benefit of poisons is largely speculative and based on a minimal evaluation of the total ecological effects [he did not insist on seeing Interior's EIS on the subject]. Losses to such species as grizzly bears, mountain lions, and red wolves, as well as both golden and bald eagles, have reduced their numbers to such an extent that their decline may be irreversible [no data provided]--an affront to our natural heritage which must be halted" (Dominick 1975:89). As stated earlier, Talbot and Reed/Ruch had convinced congressmen before the ban that Interior's use of 1080 had actually exterminated a number of species in the United States (Howard 1983a).

The main conspiracy occurred in November 1971, when a stipulation regarding the civil actions discussed above was filed under seal in the U.S. District Court, D.C. In this conspiracy Interior agreed to_ end the use of_ chemicals for predator damage control prior to_ February 15, 1972, if the plaintiffs of the civil actions (the environmental organizations) would agree not to pursue the injunction; and the above underlined stipulation was signed by counsel for the plaintiffs and the defendants (Wade 1980). This means that in November 1971 the Talbot-Reed/Ruch/Dominick team were so confident that they would be able to get President Nixon to ban the use of predacides on federal lands in his environmental message (a campaign plug for re-election) scheduled for February 8, 1972, that they could guarantee that the Administration would ban the predacides by February 15, 1972 (Wade 1980).

According to Reed, he assigned his Special Assistant Ruch to work on the Administration's in-house review of the predator control program with Talbot, Dominick, and Dr. Ted Byerly of USDA (Berryman 1974, p. 316). By January 1, 1972, after the Cain Report [and its 15 recommendations] had been printed but not released, Interior's Secretary Morton, EPA's Administrator Ruckelshaus, CEQ's Administrator Train, and Undersecretary of Agriculture J. Phil Campbell "were briefed on the contents and recommendations of the Cain Report and on the Administrative review. This is when it was decided that the Administration should proceed with an executive order limiting poisons" (Maclntyre 1982:350), which, of course. President Nixon did.

The Cain Report was published by Interior in December 1971, but kept secret and not released to the public until February 9, 1972. Even the Chief of the Division of Wildlife Services did not see a draft copy of the report until January 26, 1972 (Berryman 1974:211). And, as mentioned above, shortly thereafter, on March 9, 1972, EPA issued cancellation and suspension notices (Pesticide Notice 72-2) for 1080 and the other predacides (Ruckelshaus 1972).

EPA regulations state that after 30 days it is impossible to appeal the Administrator's ban of the predacides unless overwhelming new information is developed. Most of us did not know about the appeal

limitations, and so little 1080 was used in predator control that the manufacturers of 1080 were not about to pay the expenses of the appeal process. The animal damage control (DWS) people in USDI were muzzled by Reed.

MacIntyre (1982) states that Russell Train, Chairman of CEQ, allowed Talbot to use a secretive and closed process to gather support for the predacide ban, even though the information available on the pros and cons of using toxicants to control predators was equivocal. President Nixon was not made aware of any serious objections from his staff, administration, or the livestock industry. Talbot answered most of the mail addressed to the White House on this subject. MacIntyre faults the EPA with: 1) not providing livestock growers with advance notice of the impending action as required by FIFRA and as Secretary Morton (USDI) had promised [On July 9, 1971, Secretary Rogers C. B. Morton stated: "Let me add that I absolutely guarantee that the findings of these experts [Cain Committee] will be given a full hearing and review by wool growers and cattlemen, as well as wildlife interests." [Berryman 1974, p. 261]; 2) relying on known inadequate data, and EPA's Assistant Administrator for Categorical Programs, David D. Dominick, another lawyer, knowingly did not insist that Secretary Reed expose the environmental impact statement files which Interior's animal control staff had assembled in response to civil suits filed against USDI in 1971 by Defenders of Wildlife, Sierra Club, and The Humane Society of the United States [the EIS did not appear until 1979, c.f. USFWS 1979]; 3) using a discredited cancellation criterion to ban the predacides; 4) using EPA's most extreme sanction even though no imminent hazard to the public was demonstrated; and 5) failing to prosecute predacides and rodenticides equally (e.g., calling for public hearings before proceeding as was done with rodenticides) [a public hearing would not have supported CEQ's claim].

MacIntyre (1982) concludes his discussion on the predacide ban explaining "In this instance the policy preferences (and biases) of the livestock interest, the DWS [Division of Wildlife Services in USDI] and their congressional supporters were successfully circumvented. But in so doing the procedural rights of those least able to bear the cost of appeal were violated. This leads me to conclude that together with the ranching community's inability to challenge these administrative orders, the 'closed process' used in reaching them resulted in a breakdown of the democratic process by which issues are aired through adversary or participatory confrontation" (p. 388). In all fairness to the main perpetrator (Dr. Talbot), MacIntyre writes: "...we must acknowledge that the use of the predacides...would not have been halted if he had not employed secretive methods" (p. 394).

EPA was the final conspirator, for its cancellation by Ruckelshaus was clearly unjust and done without adequate or proper analysis or any substantiated data to support his claim, and by not insisting that Reed release the environmental impact statement and other Interior records concerning 1080 and coyote control as required by NEPA. All the incriminating evidence against 1080 used by the EPA Administrator has since proved to have been false or based only on hearsay without direct evidence (Howard 1983).

Whether or not 1080 will eventually become an EPA-registered predacide probably depends upon politics rather than the biological rationale about 1080. After the State of Wyoming et al. submitted substantial new evidence, EPA held public hearings in 1982 on "Applications to use sodium fluoroacetate (Compound 1080) to control predators," FIFRA Docket No. 502. The hearings provided a good opportunity to expose the weaknesses of the arguments presented by Defenders of Wildlife, et al.

As a consequence of the national 1080 hearings, which ended August 6, 1982, Administrative Law Judge Spencer T. Nissen ruled on October 22, 1982, that EPA should reconsider use of 1080 in toxic collars and single lethal dose baits, but not in large bait stations (Nissen 1982). Both parties immediately filed exceptions to the decisions. One year later (October 31, 1983), EPA finally approved Judge Nissen's decision to permit the use of 1080 in toxic collars and in single lethal dose (SLD) baits (Thomas 1983). EPA Assistant Administrator Lee Thomas, who made the final decision, stated "...the real concern to me regarding predation losses is whether Compound 1080 can be safely used to control predation losses of those ranchers who are suffering losses to coyotes, assuming no feasible alternative control measures are available" (Thomas 1983:11). His conclusion was in the affirmative.

On November 21, 1983, the U.S. Fish and Wildlife Service was granted Experimental Use Permits (EUP) to use 1080 in toxic collars and single lethal dose (SLD) baits, and on the same date one of us (W.E.H.) also received an EUP to use 1080 as a single lethal bait device where syrup rather than meat is the bait (Marsh et al. 1982). The University of California EUP request, incidentally, had been submitted to EPA about two years earlier (December 17, 1981).

In summary, it should now be very clear to all that the use of 1080 to control coyotes does not present an imminent hazard, and that the undocumented petitions submitted to EPA by the Natural Resources Defense Council, Defenders of Wildlife, Friends of the Earth, The Humane Society of the United States, National Audubon Society, the Sierra Club and the National Parks and Conservation Association were comprised of material which, at least for the most part, has been shown to be incorrect.

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