

patterns similar to sucrose in plants, phenoxy herbicides such as 2,4-D and picloram differ from sucrose in both rate and pattern of movement (Martin and Edgington 1981).

Optimum timing of picloram application for maximum translocation to the roots is during the true-flower growth stage and to a lesser degree during fall regrowth. Within these growth stages picloram should be applied during periods of high humidity. Air temperature is less important than relative humidity in determining picloram translocation to the roots. Research has shown that application during cool weather immediately following several days of hot weather may increase picloram translocation to the roots and thus increase control slightly (Lym and Messersmith 1990).

Literature Cited

- Alley, H.P., N.E. Humburg, J.K. Fornstrom, and M. Ferrell. 1984. Leafy spurge control with repetitive herbicide treatments. Res. Weed Sci., Wyo. Agr. Exp. Sta., Res. J. 192:90-93.
- Bakke, A.L. 1936. Leafy spurge, *Euphorbia esula* L. Iowa Agr. Exp. Sta. Res. Bull. 198.
- Crafts, A.S., and W.W. Robbins. 1962. Weed Control. Third Edition. McGraw-Hill Book Co., New York.
- Lym, R.G., and C.G. Messersmith. 1985. Leafy spurge control with herbicides in North Dakota: 20-year summary. J. Range Manage. 38:149-154.
- Lym, R.G., and C.G. Messersmith. 1990. Effect of temperature on ^{14}C -picloram absorption in leafy spurge (*Euphorbia esula*). Weed Sci. 38:471-474.
- Martin, R.A., and L.V. Edgington. 1981. Comparative systemic translocation of several xenobiotics and sucrose. Pestic. Biochem. Physiol. 16:87-96.
- Reilly, W., and K.R. Kaufman. 1979. The social and economic impact of leafy spurge in Montana. pp. 21-24 In: Proceedings: Leafy Spurge Symposium. N.D. State Univ. Coop. Ext. Serv., Unnumbered publication.

Wildlife Depredation Policy Development

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Historical Setting

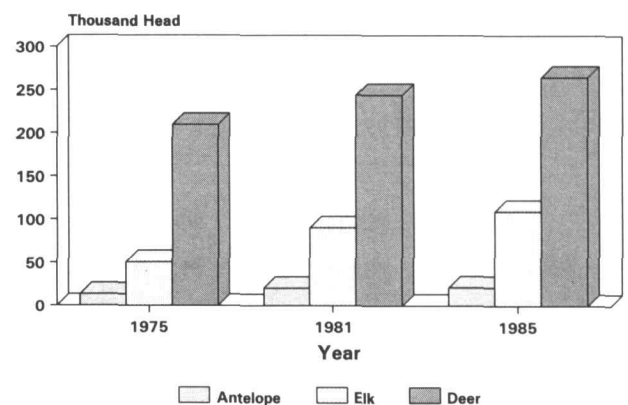
In most areas of the western United States, big game animals migrate between winter and summer use areas. Snowfall at higher elevations and the relative availability of forage, water and shelter at lower elevations lead to herd concentrations in specific areas during the winter. Prime winter wildlife habitat may be a traditional "wild" range setting or privately owned cropland, pasture, or haystacks.

In many western states, public lands are often intermingled with private lands, creating a "checkerboard" pattern of ownership. Frequently, there are no definitive boundaries, such as fences or differences in vegetation patterns, to distinguish the lands. Wildlife do not recognize these boundaries in their migration routes.

The Idaho National Engineering Laboratory (INEL) is a large tract of land (570,000 acres) in southeastern Idaho controlled by the United States Department of Energy for nuclear research. Except for corridors along several state highways, it is essentially closed to public access with no hunting. Antelope, the primary big game species in the area, have access to this refuge or "safe area". As a result, attempts to control herd numbers by public hunting in the

surrounding area by the Idaho Department of Fish and Game (IDFG) have been largely unsuccessful.

Irrigation development in arid southern Idaho began in the early 1900's and resulted in over 3.4 million acres of rangeland and marginal dry cropland being converted to irrigated agricultural production. These developments removed "native" big game habitat and replaced them with newly preferred foods of hay, grain, irrigated pasture, and other crops. New wildlife migration patterns developed to access these abundant forage sources.



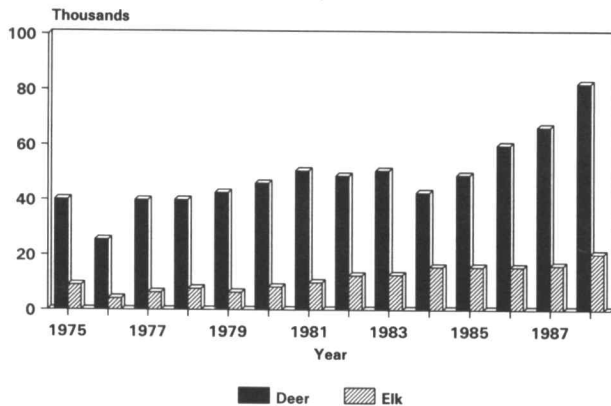
Source: IDFG

Fig. 1. Idaho big game population estimates, 1975-1985.

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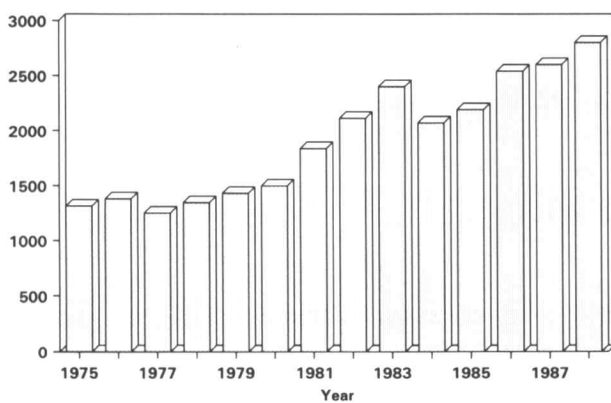
Big game population trends in the area have shown steady increases over the last 15 years (Fig. 1). Along with the increases in big game populations, harvest by sportsmen has fluctuated over time but shown steady increases over the past 15 years (Figures 2 and 3). Idaho Fish and Game policies on enforcement and hunting regulations are largely responsible for these increases. The wildlife resource is publicly owned, with IF&G the trustee. In contrast to land management agencies like BLM and the Forest Service, IF&G manages game and not habitat.



Source: IDF&G

Fig. 2. Big game harvest estimates—deer, 1975–1988.

Weather has played a key role in recent wildlife management decisions. Severe winters hit the state during the early 1980's. Emergency wildlife feeding programs were implemented. Hay stacks were fenced to restrict wildlife use and special hunts were conducted to reduce herds. In 1984, IF&G was authorized to use \$1.50 from each deer, elk, and antelope tag sold to help pay for winter feeding programs to maintain big game numbers. Over \$1 million was spent for winter feeding programs that year (Conley 1990). Because of winter feeding programs and heavy snows, antelope crossed fences, interstate highways and other barriers to "new" ranges. The massive die-off of wildlife that normally takes place during hard winters did not occur. In addition, the public appears to have accepted



Source: IDF&G

Fig. 3. Idaho big game harvest estimates — Antelope 1975–1988.

supplemental feeding as a viable winter range alternative to maintain wildlife numbers.

Drought conditions struck Idaho during 1987 and 1988, reducing available water and habitat for both wildlife and livestock. Big game use shifted from traditional range settings to the "oases" created by irrigated agriculture. Elk, deer, and antelope began extensively consuming and damaging growing crops during the summer of 1988. One of the areas with the heaviest influx of game was in agricultural areas near INEL. IF&G received a total of 1,957 depredation complaints from landowners between 1985 and 1989. Also, 43 Utah operators reported an annual loss of \$250,000 (Nielsen and McBride 1989), during the same time period. One can conclude that the issue was not just centered in Idaho.

Agricultural producers began expressing concern about wildlife numbers and the resulting damage to crops. Financial stress during the mid-1980's was an additional motivator for many producers (Gardner et al. 1986). Farmers and ranchers also expressed concerns that IF&G personnel appeared insensitive to the economic hardship imposed by wildlife on agricultural landowners. In contrast wildlife supporters countered that overgrazing on public lands was causing the migrations to private lands, and that agriculture had no "conservation ethic" and generally favored the demise of wildlife.

Short-Term Solution

In the 1989 session of the Idaho Legislature, a bill (HB288) which would have mandated the use of license fees to compensate farmers for wildlife depredation was vetoed by Governor Cecil Andrus. A second bill (HB416) was approved which mandated a one-time appropriation of \$500,000 from IF&G license funds to pay for damages to crops during the period spanning from July 1, 1988 through June 30, 1989. This appropriation provided for review of farmer claims by an impartial party and a further audit by the Board of Examiners prior to payment. The appropriation also stated that damages were limited to "growing crops, stored commodities, and fixed assets." In addition, House Concurrent Resolution 31 provided for a negotiation committee, with legislative oversight and a professional mediator to look for long-term solutions to wildlife depredation on private lands.

The State Board of Examiners developed claim forms and placed the program under IF&G jurisdiction. The number of claims submitted by landowners surpassed most expectations. One hundred eleven claims for a total of \$1.3 million were filed for 1988 damages, with an additional 93 claims totaling \$450,000 for 1989 damages. However, minimal guidelines accompanied the claim forms, so that damage estimates followed no consistent methodology and varied widely. Maximum yields, peak prices for most commodities damaged, and damages to items not covered in the legislation (shrubby, dog food, machinery, etc.) were included in many of the claims. Little or no evidence to substantiate validity was included with the claims.

Analysis of Claims

The claims, greatly exceeding the \$500,000 appropriation, were initially forwarded to IF&G, who hired an independent crop insurance adjuster to analyze them. The adjuster reviewed approximately 60 percent of the claims and recommended using a **forage consumption method** developed in Utah for calculating wildlife damages. The remaining claims were reviewed by local IF&G personnel, using the same Utah approach. Under this method, estimates of numbers of big game animals using a farm or ranch were multiplied by daily forage requirements (lbs. per head per day) and the period of time that wildlife were using the private forage sources to derive forage losses. Assuming accurate counts are made daily, this method could provide a reasonable lower-bound estimate of damages.

However, the **forage consumption method** ignores damages from trampling (especially of small grains), defecation, and broken hay bales and relies upon some degree of subjectivity on herd numbers and period of depredation. Using this procedure IF&G recommended paying less than 10 cents on the dollar (\$113,000) of the claimed amount, on a statewide basis. At this point the issue received a great deal of media attention and became highly emotional and political. There were allegations of intentional fraud and calls for criminal charges against some of the farmers who filed claims (Steubner 1989).

An Idaho court decision provided a precedent that crop damages be computed based upon the difference between expected yield and actual yield, with deductions made for costs not incurred (reduced harvest, irrigation, and labor). The Board of Examiners felt that IF&G's analysis did not adhere to this recommendation. The Board requested personnel at the University of Idaho to review several of the claims, make recommendations on an evaluation process, and provide commodity prices, cost adjustments, and other factors relative to the process.

The University of Idaho study recommended a **yield decrement** approach to estimate the change in net farm income from wildlife depredation, and that ASCS proven yields or historic crop sales records from individual claimants be used to compare with actual yields or sales from 1988 to develop estimates of yield decrements. Average crop year prices for most commodities were developed from USDA data and regional commodity markets. These prices were recommended for use in valuing yield decrement losses and were significantly lower than the drought and seasonally induced peak prices used by many claimants. Custom rates for agricultural operations (Withers and Sadeghi 1987) were used to estimate costs not incurred if harvest was reduced or not undertaken. Drought impacts were separated from wildlife impacts by arbitrarily assigning half of the yield decrement to drought. The Board was advised to derive similar "drought" factors on a county basis, through consultation with ASCS offices. Using these procedures, four "hardship" claims were reduced from \$330,000 to \$100,000 but were still well above the IF&G recommendations of \$13,657

(Rimbey and Rimbey and Patterson 1989).

The State Auditor was charged with analyzing individual claims and relied on the yield decrement approach. His analysis resulted in all of the \$500,000 appropriation being recommended for payment for the 1988 damages (Williams 1989).

Long-Term Solution

A twelve-member negotiating committee was established by the Idaho Legislature (HCR31) to devise a program to handle wildlife depredation problems in the future. The directors of the departments of IF&G and Agriculture each selected six members to provide equal representation of opposing interests. A professional mediator was hired to help the committee seek a consensus on critical issues relating to depredation. Twelve public hearings were held in various sections of the state, with numerous meetings by the committee to work toward resolution of the problem.

After 16 days of meetings, a consensus was reached on several critical factors relating to wildlife depredation (Gaffney 1989). First, the committee came to the conclusion that depredation had the potential to be a long-term problem/issue for the state. The threshold question then became "at what point does the impact of the publicly owned wildlife resource exceed a reasonable amount for a landowner to bear and thus deserve compensation?" Second, there was agreement that prevention, both in terms of habitat improvement and depredation damage, was preferable to compensation for damages. There was no consensus on controlling animal numbers to match habitat availability. This is not to imply that IF&G was doing nothing about depredation. Paneling of stored crops, increased hunting seasons, permits and harvest, habitat improvements, and harassment of animals were all used by the department to minimize damages during 1989. Expenditures for the winter feeding program and mitigation measures amounted to \$850,000 during FY 1989 (IF&G 1989).

The committee recommended that funding for the damage payment program would be derived from two sources. The IF&G operating budget would be the source of a maximum of \$200,000 per year that would go into a fund known as the Idaho Fish and Game Wildlife Depredation Account. This fund would be used to cover damage claims for amounts less than \$10,000. Landowners with damages that fit into this category would carry a \$1,000 "deductible" for claims filed. In other words, a landowner retained the liability for damages less than \$1,000. A second fund was called the Wildlife Depredation Trust Fund Account. Only the interest from this account would be used to pay for damages exceeding \$10,000 per claim. The fund would be created from a one-time appropriation of \$1 million from the State's General Account, with the addition of \$250,000 annually for five years from the interest earned on IF&G's dedicated funds. When the trust fund reaches \$3 million, additional earnings will be available for "wildlife habitat

enhancement projects or the planting of diversion crops to minimize depredation." Thus, the state would limit depredation payments in any year to \$200,000 plus the interest (\$180,000 to \$300,000) from the trust fund.

The committee's final report detailed other key points concerning the agreement and continually stated that the pact was forged through a consensus process. In announcing the agreement, committee members stressed that the proposed program was very "fragile" and if the legislature attempted changes, it was null and void from the committee's perspective.

Public Perceptions of Depredation

During the development of the proposal, statewide public testimony was heard by the committee and revealed several common threads that have a bearing on the problem. First, wildlife enthusiasts did not realize the extent that game used private land resources, the amount of loss experienced by agriculture during "normal" years, or the pride or conservation ethic expressed by many farmers and ranchers toward game. Many sportsmen assumed that the public had a right of access to private land, confusing public ownership of wildlife with the landowner's right to control access. In contrast, it sometimes appeared that agricultural interests felt public lands were under their control, and access by the public was discouraged by grazing permit holders. Both viewpoints are accentuated in "checkerboard" land ownership states such as Idaho.

Second, agriculture's perception was that IF&G had been insensitive in administering wildlife programs in the state. It appeared to some agricultural interests that IF&G had pursued the single objective of increasing wildlife populations without regard for private land impacts. These people also asserted that production of crops, grazing carrying capacities on public and private lands, and other factors had been overlooked by the department in their attempts to maximize game numbers. In the extreme, this resentment toward IF&G appeared to surface as a desire to punish the department through adverse publicity, re-directing resources, and limiting their authority.

Conclusions

Wildlife depredation is an extremely complex issue. At the root of the issue are property rights disputes relating to the publicly owned wildlife resource and public and private land resources. Resolution of the issue rests with determining the appropriate mix of multiple uses and users of these various resources. Conflicts and tensions will likely increase with the trend toward urbanization coupled with the amenity and recreational values that society is placing on these resources. To that extent, wildlife depredation is similar to other public concern about agricultural production and resource use (water quality, chemical usage, food safety, and a few others).

Idaho needs to determine "optimum" big game numbers within the state. Hopefully, these decisions will be based upon physical, biological, and financial constraints. It appears the state can no longer afford to allow IF&G to

maximize game populations without regard to constraints such as carrying capacity of winter ranges and financial burdens on private landowners.

Analysis of the situation may show that from an efficiency perspective, optimal game numbers may be higher than current levels. However, many of the distributional impacts will come to bear on landowners. Provisions should also be made to mitigate landowner impacts.

The wildlife depredation story in Idaho is not complete. Annual cycles of increasing wildlife numbers, drought, and other factors may lead again to depredation damages to agriculture. Costs will vary cyclically with the development of these specific situations. The 1990 Idaho Legislature acted upon the recommendations of the negotiating committee providing the mechanism for developing a depredation program (SB1515). A funding mechanism (SCR135) to fully implement the program failed to pass during the 1990 session. The 1991 session appropriated monies to establish both funds recommended by the negotiating committee (SB1231). With this action, the Idaho Wildlife Depredation program is established and appears ready to handle wildlife damages in the future. Finally, the recommendations and solutions proposed by the negotiating committee and adopted by the legislation, appear to be a positive first step in the process. However, specification of filing procedures, information that claimants need to provide to validate claims and responsibilities of landowners prior to filing claims still need to be refined.

References

- Conley, Jerry.** 1990. Personal communication on winter feeding activities of Idaho Department Fish and Game.
- Gaffney, Frank.** 1989. Final agreement and recommendations to implement a policy regarding wildlife depredation for the State of Idaho. Northwest Renewable Resources Center, Seattle, Wash. 11 p.
- Gardner, Richard, Neil Meyer, and David Walker.** 1986. Financial condition of Idaho farmers: Deterioration in 1986. University of Idaho Ext. Bulletin No. 663.
- Idaho Department of Fish and Game.** 1989. Big Game Depredation Program.
- Nielsen, D.B., and K. McBride.** 1989. Losses on private land due to big-game animals. pp. 78-87. *In: Utah Science. Utah Agr. Exp. Station.* Summer, 1989.
- Power, Gary.** 1987. Written correspondence on State on Idaho big game population trends.
- Rimbey, Neil.** 1989. Wildlife depredation issues: Review and evaluation. Report prepared for the State of Idaho Board of Examiners.
- Rimbey, Neil, and Paul Patterson.** 1989. An evaluation of hardship cases from wildlife depredation. Report prepared for the State of Idaho Board of Examiners.
- Stuebner, Stephen.** 1989. "Depredation claims inflated, panel says." *Idaho Statesman.* June 1, 1989.
- Williams, J.D.** 1989. "Statement on the procedures used to review big game predation losses". Office of State Auditor, depredation report.
- Withers, R.V., and Maria Sadeghi.** 1987. Custom rates for Idaho agricultural operations-1986. University of Idaho Misc. Series 67.