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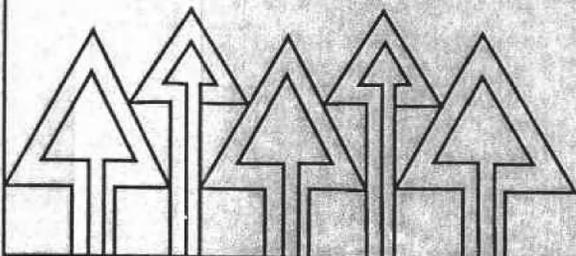
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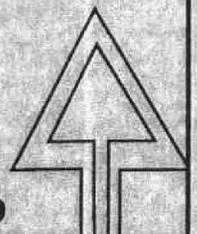
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The Market for Waterfowl Hunting on Private Agricultural Land in Western Oregon

Raymond Rasker
Rebecca L. Johnson
David Cleaves



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Contents

- 1 Executive Summary**
- 1 Introduction**
- 2 Objectives**
- 2 Background**
 - 2 Trends**
 - 2 Fee Hunting in Oregon**
 - 3 Issues**
- 3 Study Areas and Rationale**
- 5 Study Methods**
- 5 Results**
 - 5 Development of Habitat and Hunting Opportunities**
 - 6 Access Fees and Access Policies**
 - 7 Fees Charged and Quality Characteristics**
 - 8 Characteristics of Hunt Management**
 - 9 Trespass/Liability**
 - 9 Damage from Waterfowl**
- 11 Summary and Conclusions**
- 12 Literature Cited**

Executive Summary

Two trends have increased interest among farmers in managing land for wildlife and thereby creating recreational opportunities: (1) an increased demand for outdoor recreation and (2) changing economic conditions that call for a diversification of farm enterprises. One way to diversify a farm operation is to charge hunters a fee for access to the land (a practice referred to as *fee hunting*). Some farmers and ranchers are beginning to view wildlife as one of the products of farming and are devoting resources to develop and manage wildlife habitat.

Fish and wildlife agencies throughout the West are investigating whether financial incentives work as a means to promote management of wildlife habitat. In Oregon, fee hunting is growing in popularity. However, it is controversial, and recent interest in this enterprise by farmers and ranchers has been criticized by some wildlife enthusiasts, wildlife agency personnel, and local politicians.

The objective of this study was to investigate an existing market for wildlife-related recreation in Oregon with the purpose of (1) describing how the market operates, (2) identifying problems and benefits associated with management of wildlife habitat by private landowners, and (3) addressing some of the concerns raised during the ongoing debate over fee hunting.

Two areas in western Oregon where waterfowl hunting is concentrated were surveyed as a case study—farmland around Sauvie Island, 15 miles west

of Portland, and farmland adjacent to three wildlife refuges in the Willamette Valley. In each area, farmers having waterfowl habitat or the potential to develop such habitat were interviewed. Of the respondents, 87 percent allowed hunters on their land; of these, 54 percent charged an access fee and 46 percent allowed free hunting. Survey results indicated that the two areas constitute distinct markets for waterfowl hunting. Fees charges for this activity on the two areas were disparate, reflecting differing demands for access and differing qualities of the lands for hunting (size of waterfowl populations and level of habitat improvements).

Over half of the survey respondents invested in habitat improvements. Incentives listed for such activity included financial returns from hunting leases, aesthetic appreciation, and personal enjoyment from waterfowl hunting. Deterrents listed by landowners were negative attitudes toward hunters and concern about being sued by hunters who use their land. Although damage to crops from waterfowl, particularly from geese, was perceived as substantial, there was no evidence that such damage deters farmers from habitat management. It does, however, lead to friction between wildlife agencies and private landowners. Thus, policies designed to stimulate habitat improvement by farmers should address the issues of wildlife damage and landowner liability. Nevertheless, largely because of the potential restrictions on waterfowl hunting in Oregon, wildlife agencies should not rely on fee hunting as the only driving force behind habitat management on private land.

Introduction

Of the 2.4 billion acres in the United States, over 60 percent is privately owned. Of this land, about 421 million acres are used for cropland, 394 million are classified as forest land, and 539 million are used for pasture and rangeland (USDA Forest Service 1980; USDA Soil Conservation Service 1984). It is not surprising, therefore, that much of the wildlife-related recreation takes place on private farms, ranches, and forests (Carlson 1985; Tomlinson 1985). The 1975 National Survey of Hunting, Fishing and Wildlife Associated Recreation revealed that hunters in the United States participated in 395 million days of recreation, of which 67 percent, or 265 million days, occurred on private land (USDI Fish and Wildlife Service 1977a, b). A similar survey in 1985 revealed that about 82 per-

cent of all hunting occurred on private land and that hunters paid landowners \$77.8 million in access fees (USDI Fish and Wildlife Service 1988).

Because wildlife is largely dependent on private land, an investigation of the market for wildlife-related recreation and of farmers' attitudes, motives, and behavior toward wildlife is important. In Oregon no such formal studies have been made. This study attempts to help fill that need. Along the way, it probes the issue of fee hunting, a topic that has become increasingly controversial in the state and has resulted in friction among landowners, hunters, and fish and wildlife agencies.

Objectives

This study had two objectives: first, to review briefly the topic of fee hunting in Oregon and to highlight the issues that have been raised about managing for wildlife habitat on private land; second, to report on a case study in which farmers who engage or might engage in managing waterfowl habitat in western Oregon were surveyed. The purpose of the survey was to determine not only the potential and actual involvement of farmers in managing for waterfowl habitat but also how these individuals influence opportunities for waterfowl hunting.

This study was designed to help highlight some of the benefits and problems that arise when private landowners are involved in habitat management. By looking at one type of fee hunting, we may learn what form of cooperation between landowners and hunters benefits both groups while ensuring that the goals of state and federal fish and game agencies are met. Such positive cooperation is increasingly important if high-quality wildlife habitat is to be developed on private land.

Background

Trends

In the last 10 years two concurrent trends have led to active participation by some private landowners in habitat management and propagation of wildlife. The first is an increased demand for outdoor recreation (Jahn 1986; President's Commission on Americans Outdoors 1987). In 1962, the Outdoor Recreational Resources Review Commission predicted that the demand for outdoor recreation would triple by the year 2000. That prediction was realized by 1983 (Doig 1986). One of the recommendations of the President's Commission on Americans Outdoors (1987) was that ways be found to stimulate the private sector to provide recreational opportunities.

The second (long-term) trend is an overall slowing down of the agricultural sector. Compared with the rise in agricultural production and prices after World War II, the farm economy of the 1980's has frequently been characterized by low agricultural prices, which result from surpluses, high costs of production, and increased international competition. Although the vigor of the farming sector is cyclical, long-term trends indicate that there is no longer the same high rate of agricultural expansion seen between the mid-1950's and the mid-1970's (McCorkle 1981).

Many farmers whose land values are depreciating and whose profits from farming are declining now seek alternative uses of their land. Stated differently, they are searching for ways to enhance the marketing possibilities of all resources available on the land. The definition of "marketable resources" now extends beyond traditional agricultural products to include recreation. The current demand for outdoor leisure activities, particularly hunting, can provide an alternative source of revenue and simultaneously provide the incentive

for active management of land resources for the benefit of wildlife.

Fee Hunting in Oregon

Fee hunting is becoming increasingly popular in Oregon, as it is in much of the West. It reflects a growing emphasis on tourism and outdoor recreation, it can provide income for ranchers and farmers, and it also provokes some controversy among hunters, landowners, and wildlife agency personnel. Recent interest in a short course entitled *Developing Profitable Resource-Based Recreation on Private Land*, as well as increasing requests for information from Oregon State University's Cooperative Extension Service by landowners, indicate a need for understanding the market for wildlife-related recreation (see Rasker and Bedell 1987).

Many western states, through their fish and game agencies, now provide incentives for landowners to manage land for the benefit of game species. One example is California's Ranch for Wildlife Program, under which agricultural landowners can, after approval by the Fish and Game Commission, increase the bag limit on their land beyond that imposed on the rest of the state and sell tags or permits directly to hunters (Long 1987; J.D. Massie, personal communication, Calif. Dep. Fish and Game, Sacramento, 1988).¹ Compared to other states, however, Oregon has taken a relatively passive role in establishing incentive programs.

¹ Also see Wyoming Game and Fish Department, *Biological Services* (1986) and Pineo (1985) for reviews of state incentive programs for wildlife management and hunter access on private land.

In the fall of 1987, the Oregon Fish and Wildlife Commission appointed an eight-member task force to investigate approaches to fee hunting in other states and to conduct public hearings on whether a change in policy on this issue is acceptable in Oregon. This task force was appointed, in part, because of a growing debate over fee hunting involving the legislature, hunting groups, wildlife enthusiasts, and private landowners. At this writing, the task force's recommendations are being evaluated by the Fish and Wildlife Commission, the Oregon Department of Fish and Wildlife, other interested agencies, special-interest groups, and citizens.

Much of the controversy over incentive programs for wildlife management on private land arises because the term *fee hunting* is not understood. For some it brings to mind the introduction of exotic game (Geist 1987), the privatization or *de-facto* privatization of wildlife (Griffith 1987; Geist 1988, 1989), or restricted access to publicly owned grazing lands by hunters and other recreationists (Ernst 1987). To others it means nothing more than the practice of charging a fee for access to private land (Benson 1987; Pineo 1987). In this study, landowners were surveyed who, because waterfowl are present on their land, have the opportunity to charge hunters an access fee. In this paper, therefore, the term *fee hunting* refers to charging (or paying) such a fee.

Issues

During the ongoing debate over fee hunting in Oregon, some important issues have been raised. Although this case study was not designed to investigate all of these issues, it may shed light on some of the more pressing ones:

(1) Do land managers who charge access fees use these revenues to develop and improve wildlife habitat and hunting opportunities?

(2) What are the benefits, if any, to wildlife populations when land managers become involved in managing land for hunting?

(3) Are concerns over trespass and liability a major deterrent to land managers developing habitat and allowing hunters on their land?

(4) Is crop damage from wildlife a major deterrent to such management?

As in many other states in the West, there is also a concern that hunting may become available only to those able to pay an access fee, a practice that would exclude people with low incomes (Burger and Teer 1981; Geist 1987). Although this case study does not directly address the equity issue from the hunters' point of view, it does provide some information on that issue in the analysis of prices and hunting quality in the markets investigated.

Study Areas and Rationale

The study areas selected in western Oregon consist of farms adjacent to the Sauvie Island Wildlife Management Area (WMA) and those adjacent to the William L. Finley National Wildlife Refuge (NWR), the Ankeny NWR, and the Baskett Slough NWR (Figure 1). The Sauvie Island WMA, located 15 miles northwest of Portland at the confluence of the Columbia and Willamette Rivers, is operated by the Oregon Department of Fish and Wildlife. The three National Wildlife Refuges, managed by the U.S. Fish and Wildlife Service, are in the Willamette Valley.

These areas were selected for several reasons. The first criterion was similarity to other regions of the state in the following respects: (1) A public resource (wild animals) is present on private land; (2) publicly owned wildlife habitat is adjacent to private agricultural land; (3) farmers face a market where they must

weigh the returns, monetary or otherwise, from the production of wildlife habitat against those from agricultural production; and (4) a market for wildlife-related recreation exists.

All four of the refuges are known for their abundance of migratory waterfowl in the winter months. The proximity to the refuges provides local farmers the opportunity to market access to their land for hunting wild ducks and geese. The Willamette Valley and Sauvie Island, long used for waterfowl hunting, have an estimated 200 to 500 duck clubs on private land (R.L. Jarvis, personal communication, Dep. Fisheries and Wildlife, OSU, Corvallis, 1987).

The second criterion for selecting these areas is their importance to the management of wintering waterfowl. Western Oregon is important to the Pacific

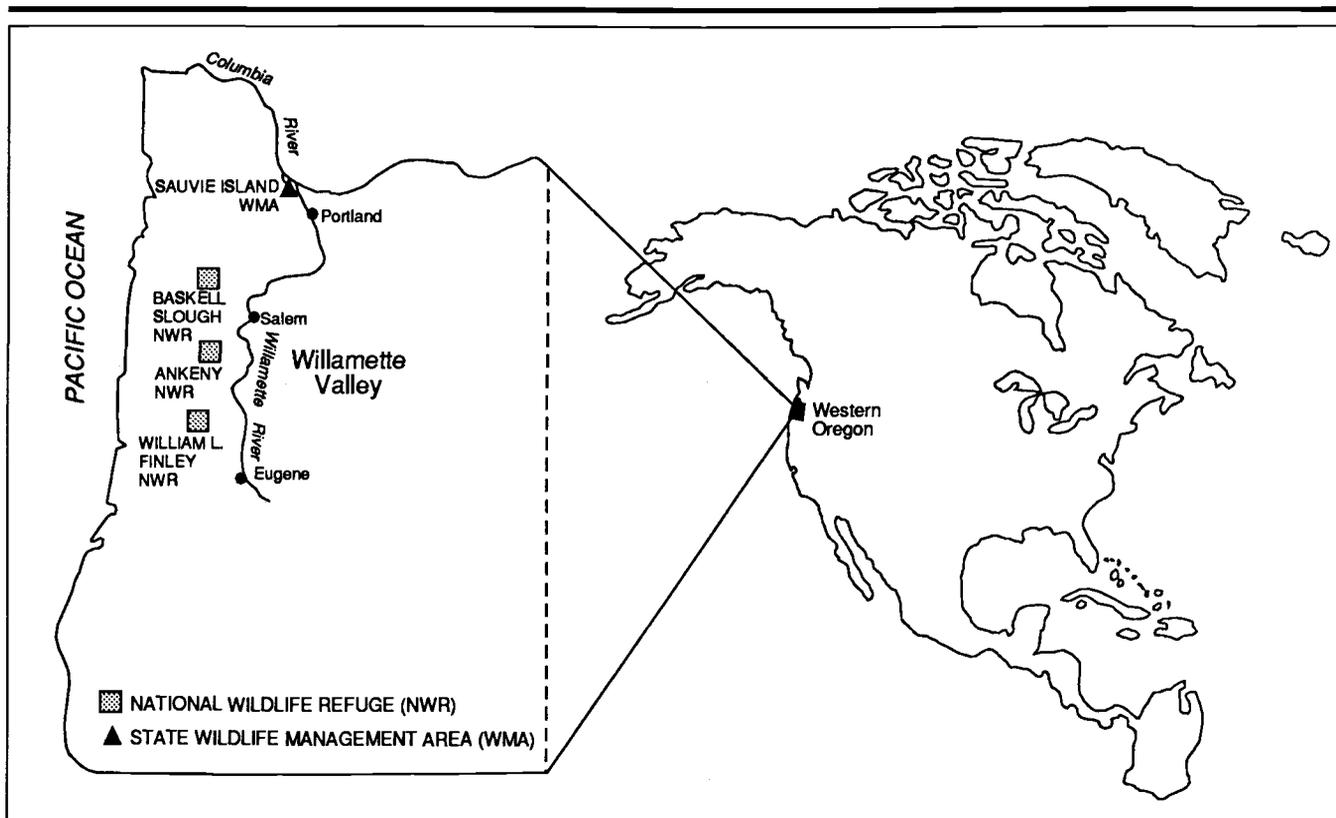


Figure 1. The study areas.

Flyway. The refuges and the surrounding private lands serve as a stopover for ducks and geese migrating to the wintering grounds of California and Mexico. They also serve as the primary wintering grounds of the dusky Canada goose (*Branta canadensis occidentalis*), whose declining population is a principal management concern on the flyway. The population of the dusky Canada goose has declined from 25,000 in the 1970's to 10,000 in 1984 (Jarvis and Cornely 1988). This decline is due to a combination of depressed recruitment² in the summer and high mortality, particularly from hunting, during the winter (Chapman *et al.* 1969; Jarvis and Cornely 1988). The decline in recruitment is largely due to an earthquake in Alaska in 1964, which resulted in the flooding of nesting habitat.

In response, the USDI Fish and Wildlife Service (1980, p. 13) has declared that the primary role of the three refuges in the Willamette Valley is "to provide suitable wintering habitat for the dusky Canada goose population." One element of the habitat provided by the refuges is protection from hunting. The refuges

are also planted with crops, which are left unharvested to provide waterfowl feed.

Until recently, much of the research on waterfowl by wildlife managers has focused on the nesting habitat of wild ducks and geese. The most dramatic losses in such habitat have occurred in the north, and it was long believed that these areas were the critical link in the management of wild populations (Weller and Batt 1988). An over-emphasis on breeding habitat has caused some researchers to undervalue the importance of wintering areas (Fretwell 1972; Heitmeyer and Fredrickson 1981; Weller and Batt 1988). One of the alarming trends in wintering areas is the elimination of seasonal and permanent wetlands.

It is estimated that, nation-wide, wetlands are disappearing at a rate of 300,000 to 450,000 acres per year. From the mid-1950's to the mid-1970's, 87 percent of all wetland losses were due to agricultural development (Tiner 1984). Current research has identified the West Coast as a major problem area in the loss of wetlands for wintering waterfowl (Tiner 1984; Stewart *et al.* 1988). In the Willamette Valley, an estimated half-million acres of marshes, shallow ponds,

² *Recruitment*—The recently mature, breeding-age animals added to this year's population.

potholes, and wet meadows have been lost as waterfowl habitat because of agricultural development (USDI Fish and Wildlife Service 1980).

At a recent workshop entitled "Waterfowl in Winter," wildlife biologists concerned with habitat

management were urged to "become more involved with extension activities for the private landowner" (Pederson *et al.* 1988, p. 463). Analyzing western Oregon landowners with existing, or potential, waterfowl habitat is consistent with the spirit of this recommendation.

Study Methods

A questionnaire was designed, pre-tested, and administered as an in-person interview to farmers managing land next to each of the four wildlife refuges in western Oregon (Figure 1). One hundred and three individuals were identified as suitable.³ Each of these was sent a letter outlining the purpose of the research and later contacted by telephone to establish an interview date.⁴ Of the 103 possible interviews, 87 were completed between November 1988 and February 1989. One individual refused to participate in the

³ Only crop and livestock farmers were interviewed because their lands have the potential to be converted to waterfowl habitat. Woodlots and Christmas tree farms are predominantly located on hillsides and therefore are not suitable.

⁴ Some individuals were contacted without appointment. All interviews were conducted by the senior author.

study, five had moved or retired, three were no longer farming, and seven could not be located.

Respondents were asked questions about their farming practices and activities related to waterfowl and waterfowl hunting for the 1987-88 season (October 17-January 10). They were asked to describe the characteristics of their farms, their attitude toward hunting on their land, their investments in improving waterfowl habitat, costs related to waterfowl damage, their beliefs about how refuges are managed by state and federal agencies, and their concerns about trespass and liability. Respondents were also asked how closely they agreed with statements designed to measure their attitudes toward waterfowl and hunting.⁵

⁵ For full details of the questionnaire and responses to all survey questions, see Rasker (1989).

Results

Analysis of the survey responses revealed that there are distinct differences between the farms adjacent to the Sauvie Island WMA and those neighboring the three NWR's in the Willamette Valley. Farms in the two areas differ in size and in the types of crops produced. The average Willamette Valley farm surveyed was 890 acres, whereas the average Sauvie Island farm was 570 acres. The Willamette Valley farmers interviewed grow predominantly grass seed and winter grains. The Sauvie Island farms consist largely of a mixture of row crops and pasture.

The farms next to Sauvie Island WMA offer a recreational opportunity distinctly different from that offered by the Willamette Valley farms. Duck populations on Sauvie Island are approximately double those of the three national wildlife refuges combined (USDI Fish and Wildlife Service 1987/1988). Sauvie Island is

also close to the large metropolitan area of Portland, while the three refuges are more rural and require comparatively more travel time to reach. Because of these differences, the following discussion of the survey results will include, where possible, a distinction between the two areas.

Development of Habitat and Hunting Opportunities

Page 12
Survey respondents were asked whether they had "participated in any activities that were intended to be for the benefit of waterfowl or for the management of the hunting operation." These activities included planting food and cover crops for waterfowl, building ponds or wetlands to attract wild ducks and

geese, constructing water-control structures such as dams or levees, regulating water levels, and taking land out of agricultural production to establish wetlands or hunting areas.⁶

Of the 87 individuals interviewed, 52 percent invested in developing waterfowl habitat.⁷ Figure 2 shows the percentage of total respondents who did or did not invest in improving waterfowl habitat near each refuge. The annual costs per farmer for planting waterfowl food and cover and controlling the water level in ponds or wetlands averaged \$1,366.49, ranging from zero to a maximum of \$6,000. Annual costs per farm for the Sauvie Island area averaged \$2,857.22 and, for the Willamette Valley area, \$422.17.

Five individuals built waterfowl hunting areas, or "duck ponds," at an average cost of \$1,570, and 16 invested in water-control structures to retain water in ponds at an average cost of \$623.13.

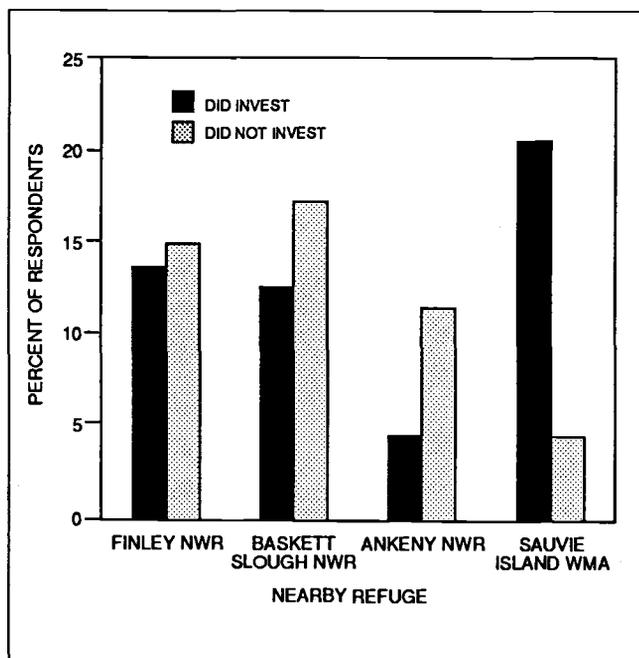


Figure 2. Percentages of total respondents (87) who did and did not invest in benefiting waterfowl and waterfowl hunting near each refuge.

⁶ In this study, wetland is defined as in Cowardin *et al.* (1979, p. 3): an area which is "saturated with water or covered by shallow water at some time during the growing season of each year."

⁷ The term waterfowl habitat refers to any area where a wild duck or goose will land to seek food, water, or refuge. This definition includes wetlands but is not limited to land that is submerged or seasonally flooded. For instance, it includes grass and corn fields where geese may land to rest and feed.

Slightly more than half (52%) of the interviewees were aware of government programs aimed at preserving wetlands and those helping pay for the costs of developing waterfowl habitat or wildlife food plots. Over 40 percent (44%) were familiar with Agricultural Stabilization and Conservation Service programs that pay part of the costs of establishing shallow-water areas and food plots; 7 percent were familiar with the "Swampbuster" (a provision of the 1985 Food Security Act; it restricts access to federal farm-support programs if wetlands on farms are deliberately destroyed); and one was aware of a state-implemented program that pays for seed for wildlife food. Less than 6 percent of the farmers interviewed participated in any of these programs.

Access Fees and Access Policies

Twenty-two percent of the farmers interviewed did not allow people other than their immediate families to hunt on their land, 42 percent allowed hunting but charged an access fee, and 36 percent allowed hunting without charge.

Figure 3 shows the percentages of total respondents who did and did not charge an access fee for hunting near each refuge. Note that the majority of the farmers adjacent to the Sauvie Island WMA charged hunters an access fee. In contrast, less than half of the farmers in the Willamette Valley charged a fee.

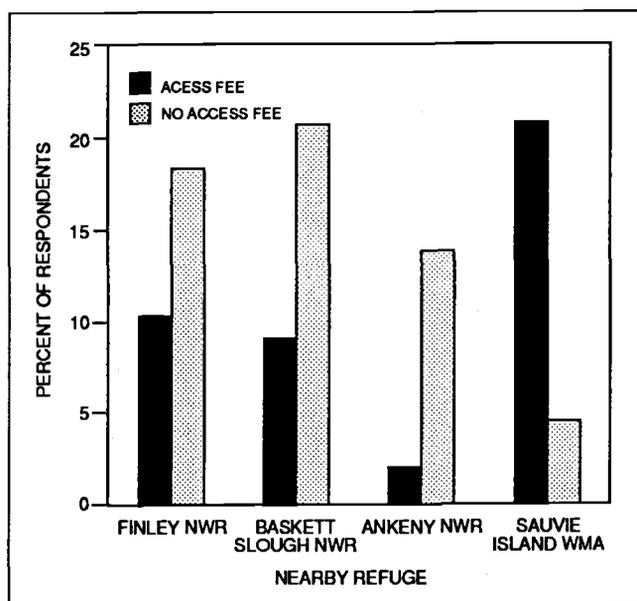


Figure 3. Percentages of total respondents (87) who did and did not charge waterfowl hunters an access fee for hunting near each refuge.

One of the questions we hoped to address was whether landowners who charge a fee also invest in habitat development and improvement. Of those who charged an access fee, 92 percent invested in waterfowl habitat improvements, such as planting food crops or creating shallow-water areas. Figure 4 shows the percentage of respondents who invested in habitat improvements (45) and who did or did not charge hunters an access fee for hunting near each refuge. Of the total respondents, 48 percent did not invest in habitat improvements, 12 percent invested but charged no access fee, and 40 percent invested and charged a fee.

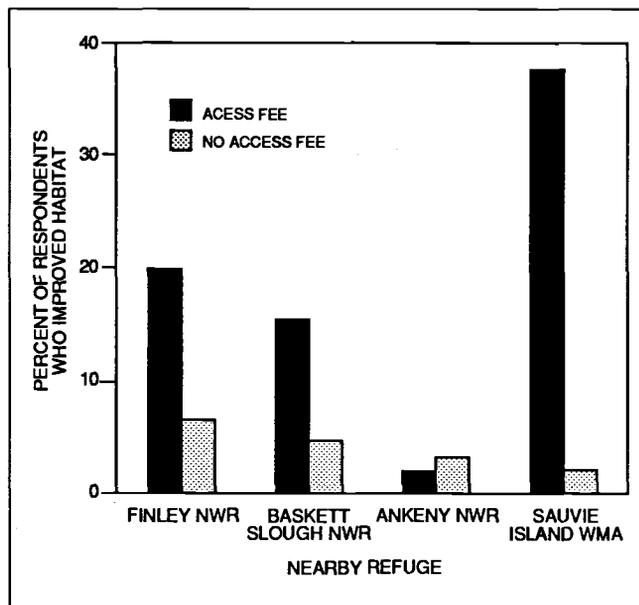


Figure 4. Percentages of total respondents who invested in habitat improvements (45) and who did and did not charge hunters an access fee for hunting near each refuge.

From these data it appears that the financial incentive is closely tied with habitat developments, particularly in the Sauvie Island area and on farms adjacent to the Finley NWR. When asked about the financial prospects of leasing hunting rights, 83 percent of all respondents agreed with the statement, "Waterfowl hunting on my land could increase my income." Almost three-fourths (74%) also agreed that "Having good waterfowl hunting on my land could increase the value of my land." However, these data must be investigated more closely before concluding that financial gain is the only motive for improving habitat.

Of the farmers who invested labor, capital, or machinery to develop or improve waterfowl habitat,

24 percent did not charge an access fee. Therefore, there may also be motives besides financial gain at work.

We hypothesized that one of the factors affecting investments in habitat is the land manager's participation in waterfowl hunting. Of the total respondents, 37 percent invested in habitat improvement and were themselves waterfowl hunters, whereas only 15 percent invested in habitat but were not waterfowl hunters. One drawback to hunting as a motive for habitat improvements was noted. Eleven (13%) of the respondents mentioned that they were formerly involved in habitat developments to attract ducks and geese. All claimed that because of increased restrictions against hunting certain races of Canada goose,⁸ they no longer invested in such developments. Their reaction points to one of the problems when an animal, previously considered a game species, requires protection.⁹ If pleasure derived from hunting is one of the motives for habitat developments, then further species, bag, or season restrictions may erode landowners' incentives for such developments.

A second important factor to consider is landowners' attitudes toward waterfowl. Nearly three-fourths of the respondents (72%) agreed that, even if hunting waterfowl were illegal, having them on one's property would be enjoyable "just for their beauty." As will be seen later, however, many farmers appreciated the presence of wild ducks but not large flocks of geese, mainly because of the costs incurred from damage by geese to crops (i.e., depredation) or from trying to prevent such damage by hazing (scaring the geese away).

Fees Charged and Quality Characteristics

The average fee charged per person for seasonal hunting rights was \$628, ranging from \$100 to \$1,700. Higher fees have been reported in a study of water-

⁸ The 1987 and 1988 Oregon Game Bird Regulations issued by the Oregon Department of Fish and Wildlife restrict the bag limit to one cackling Canada goose or one dusky Canada goose per person per season. To be eligible for a special goose-hunt permit, hunters must attend a goose identification class. They must also register at U.S. Fish and Wildlife Service or Oregon Department of Fish and Wildlife check stations prior to hunting and check out after the hunt.

⁹ See Chapman *et al.* (1969) for an account of the status of the dusky Canada goose at a time when excessive harvests threatened the population.

fowl leases in Missouri, where the price of seasonal hunting rights ranged from \$300 to \$3,000 per person (Schenck *et al.* 1987). In a study of Texas rice growers who marketed waterfowl hunting, Willis and Mertes (1979) found that prices were based on a combination of management practices, including the presence or absence of water and waterfowl food and hunter amenities supplied by the farmer. A similar conclusion can be drawn here. The range of prices found in this study largely reflects differences in hunt "quality" and in local demand for waterfowl hunting. These factors vary considerably between the Willamette Valley and Sauvie Island (Table 1).

Table 1. Averages per farm for quality characteristics and seasonal access fees in the Sauvie Island and Willamette Valley areas, 1987-88 waterfowl hunting season.¹

Quality characteristic or fee	Sauvie Island	Willamette Valley
Travel distance (mi) ²	11.00 (0.65)	20.00 (0.47)
Investments in planting food and regulating water (\$)	2,857.22 (1,314.47)	481.57 (65.05)
Ducks harvested per season (No.) ³	712.53 (179.25)	63.17 (12.66)
Geese harvested per season (No.) ³	76.00 (33.15)	6.14 (1.37)
Seasonal fees per person (\$)	1,015.50 (82.77)	191.34 (23.18)

¹ These averages are only for those farms at which a fee was charged. Standard errors are in parentheses.

² To the nearest city with population >40,000.

³ Total reported duck harvests were 13,538 for the Sauvie Island farms and 2,652 for the Willamette Valley farms; total numbers of geese harvested were 1,445 and 258, respectively. These numbers are underestimates as three individuals on Sauvie Island and six in the Willamette Valley were unable to estimate the number of birds harvested.

For the Sauvie Island area, the average seasonal fee was \$1,015 per person for the season, ranging from \$500 to \$1,700.¹⁰ For the Willamette Valley region, the average seasonal charge per person was \$191. The lowest seasonal fee per person was \$100,

and the highest was \$436. Most farmers leased land for hunting to a group of individuals, generally called a "duck club," who received exclusive hunting rights.

Only two respondents actively pursued "clients." All others let the hunters contact them. The marketing, or advertisement, of opportunities for waterfowl hunting, therefore, was not necessary to attract hunters.

Annual profits (calculated from survey responses as revenues minus variable costs, not including opportunity costs—cost of next best alternative forgone—or depreciation costs) were as varied as the range in fees and quality characteristics. For the Sauvie Island area, annual profits per farm ranged from \$1,300 to \$61,670. In the Willamette Valley, annual profits were substantially lower, ranging from \$300 to \$2,820. Three individuals broke even, and one operated at a net loss.

The difference in access fees between Sauvie Island and the Willamette Valley reflects a difference in hunt quality on the two areas. The latter difference is reflected in three characteristics: the travel distance required for the hunters, the level of habitat investments by farmers, and the waterfowl populations present as reflected in the number of ducks and geese harvested. Hunter amenities such as a clubhouse, freezer, and decoys were difficult to quantify accurately and are therefore omitted from the discussion. From casual observation it appeared that, in many instances, amenities such as blinds, decoys, and clubhouses were provided by the hunters themselves and not by the landowner.

It is also important to mention that Sauvie Island is close to the Portland metropolitan area, with over half a million inhabitants. In comparison, the Willamette Valley farms surveyed are located near Salem and Corvallis, with populations of 90,000 and 40,000, respectively. Therefore, the demand for waterfowl hunting is probably greater for Sauvie Island than for the rural areas of the Willamette Valley. Consequently, landowners on Sauvie Island are able to charge higher prices.

Characteristics of Hunt Management

One of the concerns identified in this study is whether land developed for waterfowl hunting also serves as a benefit to the wintering waterfowl population. In all but two of the hunting-lease operations

¹⁰ The length of the Oregon waterfowl season varies from 73 to 93 days, depending on federal regulation of the Pacific Flyway. The season generally begins October 10 and ends January 14.

studied, the amount of hunting was regulated, either by the landowner or by the duck club, to certain days of the week and, in some cases, also to certain times of day. These regulations were in addition to legal hunting restrictions. On Sauvie Island, for example, the norm was to hunt 3 days of the week and holidays. The effect of these regulations was twofold: first, they apparently resulted in higher-quality hunting (i.e., more opportunities for harvest); second, they allowed for rest periods. During the off days, the land had the characteristics of habitat for wintering waterfowl: food, water, and rest from hunting (P.C. Sekora 1989, personal communication, U.S. Fish and Wildlife Service, Corvallis). Furthermore, these characteristics are present before and after the legal hunting period.

The 37 farms where fees were charged provided, on the average, 48.35 days each for hunting during the 1987-88 season. In total, they supplied 1,789 days for hunting. Multiplying this figure by the number of people hunting on each farm yields a total of 15,413 Hunter Days (HD). This amounts to an average of 416.57 HD supplied per farm.¹¹

Trespass/Liability

In previous research, landowner concerns over trespass and liability have been identified whenever hunters use private land and as deterrents to managing wildlife habitat (Horvath 1976; Webster 1980; Burger and Teer 1981; Shelton 1981; Jahn 1986). In this study, over one-third (36%) of the respondents agreed with the statement, "In general, I consider hunters on my land to be a nuisance and a bother." Close to three-fourths (70%) of the people who responded this way did not allow hunters on their land, and 74 percent did not invest in development of habitat or hunting opportunities.

When asked about their concerns over being sued when hunters use their land, 55 percent of those who invested in habitat and 45 percent of those who did not invest agreed that this possibility worried them.

It was noteworthy that trespass was not a problem for over a third (37%) of the survey respondents and only "sometimes" a problem for a little less than half (46%). Twenty-six of the 37 (70%) farmers who charged a fee for hunting said that duck club members helped protect against trespassers.

Damage from Waterfowl

The issue of crop damage by migratory waterfowl provoked the most ardent reactions from the farmers interviewed. Many distinguished between their attitudes toward ducks and toward geese.

Almost three-fourths (74%) of the respondents reported having incurred goose-related costs during the winter of 1987-88, either from damage to crops (depredation) or from having to scare birds away from crops (hazing). The average annual costs estimated by the 64 individuals who reported goose-related damage were \$5,162 per farm, ranging from \$50 to as high as \$29,625. The sum of all costs, as seen in Table 2, was \$336,191.36.

Table 2. Estimated costs of goose-related damage on the 64 affected farms during the winter of 1987-88.

Problem or activity caused by damage or prevention	Number who incurred costs	Total cost (\$)
Decrease in crop yield	47	283,752.00
Replanting	8	6,360.00
Spraying ¹	2	1,150.00
Hazing equipment	40	6,091.00
Hazing labor ²	38	30,352.00
Transportation	20	8,487.00
Total		336,191.36

¹ Spraying against weeds spread in goose manure.

² Costs are those of hired labor. When hazing is conducted by the landowner or manager, this cost is probably higher. Therefore, the figure given represents a minimum.

Figure 5 shows the crop types for which there was depredation by geese. The crops most frequently grazed on by geese were grass seed, hay, and grain. As mentioned previously, the farmers in the Willamette Valley predominantly grow grass seed and winter grains. The majority of the costs (86%) related to goose depredation and hazing were incurred on the farms in the Willamette Valley.

There are several difficulties associated with measuring the costs of waterfowl damage by a questionnaire, and results should be interpreted cautiously. One of the problems is determining such costs. Most survey respondents had little trouble itemizing hazing costs, and many had them documented. The costs resulting from decreases in crop yield and from weeds spread in goose manure, however, are more difficult to estimate.

¹¹ This figure assumes that all people who have the right to hunt on the farm actually do so on every available day. Hunter Days, therefore, are a measure of recreational opportunities supplied, not necessarily a measure of use.

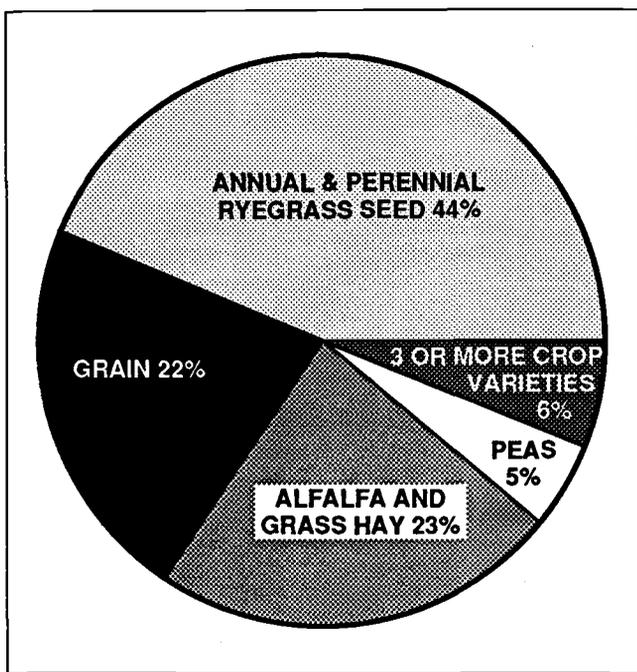


Figure 5. Percentage of the 64 affected farms on which goose depredation was reported, by crop type.

Costs related to hazing are easier to estimate when they are an integral component of the farm's winter activities. Over 60 percent of all respondents who reported having goose-related damage regularly conducted hazing, usually on a daily basis. There were several individuals who hired a full-time "hazer" for 2 to 3 months, who each day drove from one field to another, chasing geese.

A second measurement problem was farmers' inability to recall the costs of hazing and goose damage from the previous year. In February 1988, the Animal Damage Control Division of the U.S. Department of Agriculture implemented a mail survey with the objective of measuring costs of waterfowl damage in the Willamette Valley and Columbia River Basin. The response rate was poor (less than 10%). One of the reasons was believed to be people's inability to accurately measure and recall these costs (T. Hall 1988, personal communication, USDA Animal Damage Control, Portland).

A third difficulty with measuring damage costs is the potential for bias. Land managers may be tempted to exaggerate costs if they believe results of the survey may lead to policies that benefit them, such as compensation or increased government assistance in hazing. For this reason, survey participants

were specifically requested to list minimum cost estimates.

Although this study was not conducted to obtain a precise measure of all costs related to the presence of waterfowl on agricultural fields, one conclusion that can be drawn is that damage from geese is perceived to be a major problem. It is not clear, however, whether damage serves as a deterrent to farmers' decisions to manage land for the benefit of waterfowl or for a hunting operation. Almost half (49%) of the people who incurred damage from waterfowl also invested in habitat improvements.

When asked whether they believed that "hunting helps reduce damage to my crops by scaring waterfowl," 64 percent agreed. The hazing effect of hunting, therefore, may be one of the factors farmers consider when allowing hunters on their land. More than 80 percent of the farmers who incurred goose damage allowed hunting.

Over half (60%) of those who incurred goose damage believed leasing hunting rights could help pay for the costs of this damage. However, 24 percent disagreed and did not believe damage costs could be recovered through hunting fees.

The most important consequence of goose damage on farm crops is the strain it causes between refuge managers and landowners. When asked whether they believed the wildlife refuges helped reduce goose damage to crops on neighboring farms, over half of the respondents (53%) disagreed. Of the 34 individuals who did believe the refuge helped reduce damage, almost half (48%) were adjacent to the Sauvie Island WMA. In other words, of the 22 farmers interviewed on Sauvie Island, about three-fourths agreed that current refuge management helped reduce depredation. Again, there is evidence that the waterfowl situation on Sauvie Island is distinct from that in the Willamette Valley. There were 10 positive comments about refuge management's ability to plant crops that alleviate crop depredations on neighboring farms. All but one were directed toward the Sauvie Island WMA. In contrast, there were 24 negative comments concerning this issue, all directed at the management of the three refuges in the Willamette Valley. It is probable that refuge management is not the only factor influencing cooperation between public and private interests. However, the evidence presented does suggest a need for close inspection of the variation among management strategies and the relationships that exist between refuges and neighboring farmers.

Summary and Conclusions

One objective of this study was to identify, by means of a case study, the benefits and problems associated with managing wintering waterfowl on private land. Along the way, some of the issues surrounding the controversy of the growth in fee hunting in Oregon were also addressed.

The most obvious conclusion from the study is that there is potential for mutual benefit if hunters and wildlife enthusiasts cooperate with fish and game agencies to encourage management for wildlife habitat on private land. The landowners' proximity to the refuges is similar to the position of many farmers and ranchers elsewhere in the state: by being next to a publicly managed area, the farmer receives additional benefits, such as, in this example, large concentrations of wild ducks and geese. For a rancher in eastern Oregon, the additional benefits might be elk or deer that migrate between public and private land. Whether the presence of wildlife on private land is considered a benefit depends on many factors, including whether there is damage to crops and whether the landowner personally gains, financially or otherwise, from providing for wildlife on the farm or ranch. Hunters and fish and game agencies are in a position to influence landowners' behavior toward wildlife in such a way that both wildlife and the public benefit.

It appears from this case study that landowners' incentives for improving waterfowl habitat included financial returns from hunting leases, aesthetic appreciation, and personal enjoyment from hunting waterfowl. The attitudes of these landowners were generally positive toward waterfowl and hunters. Given this scenario, it is easy to envision a mutually beneficial attitude between the managers of waterfowl refuges and neighboring farmers. In the same way that the farmers can gain from their proximity to the refuge, the refuge managers gain from habitat developments on private land. As demonstrated earlier, although the primary purpose of the waterfowl areas on private land is for hunting, they do provide important aspects of waterfowl habitat—such as food, water, and cover—during most of the winter. Private landowners, therefore, provide benefits for both wildlife and the public.

If we consider the issue of waterfowl damage, however, this win-win situation for waterfowl and waterfowl hunters becomes clouded. Although it was not conclusive that damage to crops by geese is a deterrent to habitat development, it was apparent that relations between refuge management in the Willamette Valley and the farmers who incur goose-related costs were strained. Given that there is a potential for mutual cooperation and mutual benefit, it

is to the advantage of refuge managers to promote a closer working relationship with neighboring farmers. Such a relationship must include, as a starting point, the understanding that goose depredation is perceived as a major issue by most of the farmers involved.

One of the most controversial issues related to fee hunting in Oregon is the question of whether increasing use by landowners of access fees will lead to hunters being excluded from hunting opportunities because they cannot pay for them. This is a complicated issue and cannot be fully investigated by this case study. The market for waterfowl hunting in western Oregon does, however, shed light on some of the possible trends in fee hunting for the rest of the state. The first observation is that the price of hunting on private lands appears to reflect the demand for hunting and the quality of the hunting area. In this study, the range of prices varied enormously, as did the degree of investments in habitat improvements and the location. The price to hunt on a farm next to the Sauvie Island WMA, on a pond that has been well planted to attract waterfowl, is much different from that on a farm adjacent to one of the Willamette Valley refuges, where landowner investments in habitat improvements are correspondingly smaller and waterfowl populations are lower. Almost half of the farmers investigated in this study did not charge a fee, and there is a perception on the part of some landowners that the presence of hunters helps reduce damage to crops by geese. For those willing to pay for the right to hunt on private land, access is available for a variety of prices. As in the marketing of most products and services, the price serves as a signal that reflects relative value.

An important observation that is often forgotten in the fee-hunting debate in Oregon is the challenge of convincing landowners to open their land to hunters and other wildlife-related recreation and finding ways to convince them to manage their land for wildlife habitat. The first step in achieving this goal is to identify deterrents to managing land for the benefit of wildlife and hunters. Of those individuals who did not allow hunting and did not invest in habitat improvements, many considered hunters to be "a nuisance and a bother." Of all people interviewed, including those who did and those who did not invest in habitat improvements, there was concern over the possibility of being sued by hunters. This is an issue that has been identified by many authors as a significant deterrent to habitat developments, and should be treated in Oregon as a priority issue.

It should be stressed that there appeared to be several motives for developing waterfowl habitat and hunting areas. The financial incentive is the most obvious, but it is undoubtedly shaped by attitudes and personal enjoyment of waterfowl. A question must be asked, however: what would happen if there were no financial incentive? Would altruistic and nonfinancial motives be sufficient to provide the amount of habitat that currently exists? In a time when farmers must seriously evaluate every possible use of their land for economic returns, such a prospect is unlikely.

Finally, there is one important observation worth exploring in further detail. In this study, the development of habitat and hunting opportunities by farmers was financed primarily by the hunter. While government cost-share programs designed to help provide waterfowl habitat do exist, and awareness of these programs was relatively high among the landowners surveyed, participation in them was low. The hunters, therefore, are paying the bill. This is an important

factor, and it points to a potential problem. What would happen if it is necessary to further restrict hunters of waterfowl? For example, what would happen if poor recruitment resulting from a severe drought forces the cessation of waterfowl hunting for a season? Will hunters continue to pay for the development of habitat for wintering ducks and geese? Will farmer's non-financial motives be sufficient to induce them to plant crops for waterfowl to eat and to fill duck ponds with water? These are difficult questions to answer.

Further research should investigate why few farmers participated in cost-share programs for developing waterfowl habitat, and there should be a search for additional sources of capital for developing such habitat. In years when hunting is severely restricted, or in the event that the demand for waterfowl hunting in western Oregon decreases, programs should be developed to induce the private agricultural landowner to manage land resources for the benefit of waterfowl.

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Trends in fee hunting in Oregon are examined, with particular emphasis on waterfowl in the western part of the state. Farmers with potential or existing waterfowl habitat in western Oregon were surveyed about their views on managing their lands for waterfowl. As incentives to such practices, they listed the financial returns from leasing access to hunting, aesthetic appreciation of waterfowl, and personal enjoyment from waterfowl hunting. As deterrents, they listed negative attitudes toward hunters and concerns over lawsuits by hunters. They also identified damage to crops by waterfowl as a source of friction between wildlife agencies and landowners.

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