

# **Yakama Nation's Wetlands and Riparian Restoration Project**

**Project Number 1992-06200**

**Fiscal Year 2008 Annual Report Part 1**



**Submitted to:  
Bonneville Power Administration**

**Tracy Hames  
Katrina Strathmann  
Nathan Burkepile  
Jon Shellenberger**



**Hen Mallard at the South Lateral A Wildlife Area**

# **Table of Contents**

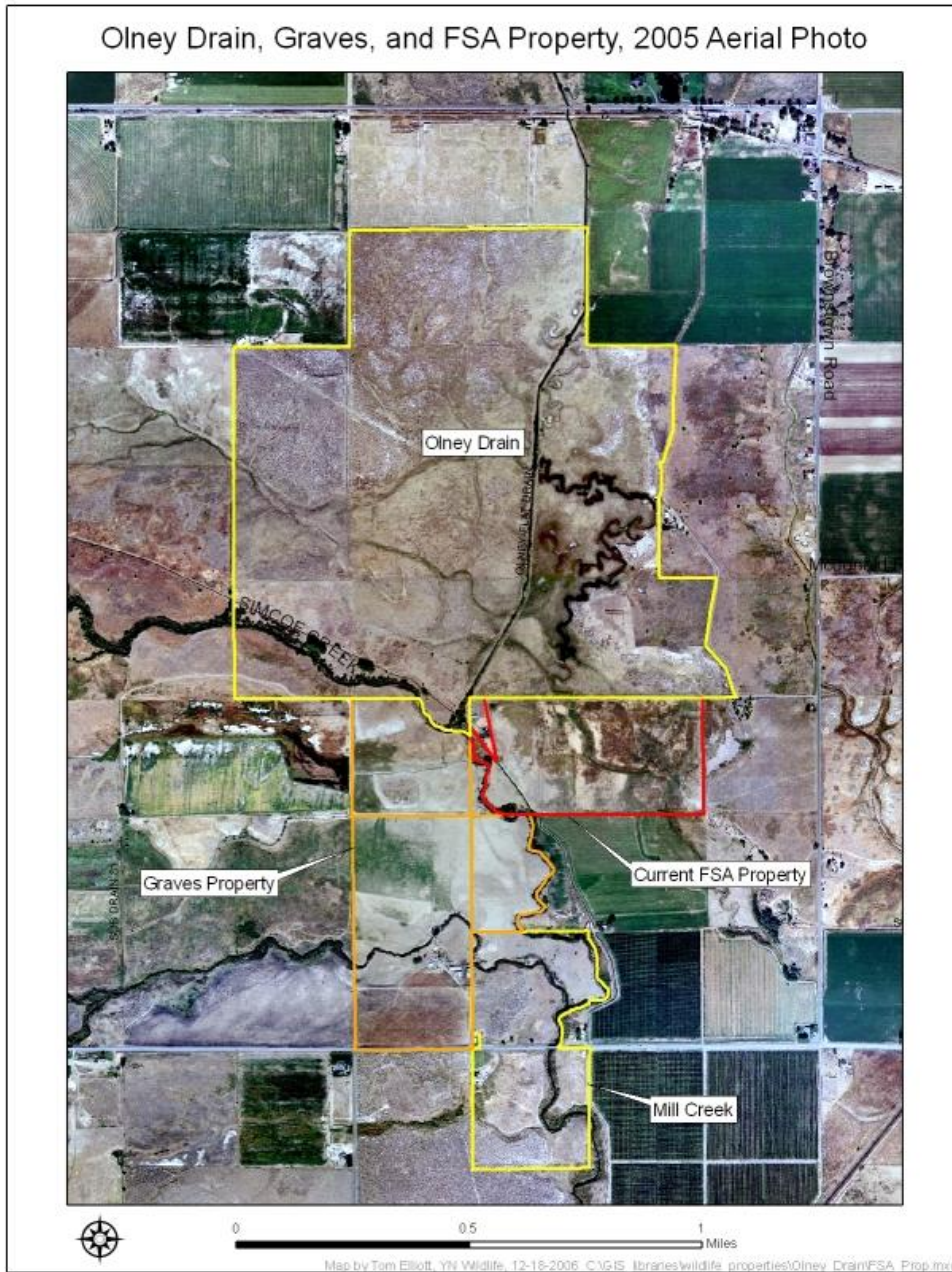
## **Part 1**

<b>Land Securing Activities</b>	<b>3</b>
<b>Restoration Activities</b>	<b>4</b>
<b>Property Management Plans</b>	<b>4</b>
<b>Outreach and Education</b>	<b>4</b>
<b>Wildlife Surveys</b>	<b>6</b>
<b>Cultural and Archaeological Report</b>	<b>32</b>
<b>Floodplain Terrace Restoration and Vegetation Management</b>	<b>38</b>
<b>Monitoring Vegetation Restoration Sites</b>	<b>47</b>

## Land Securing Activities

In fiscal year 2008 the project's land acquisition funding was reinstated. These funds were used to purchase the Graves Property described below.

**Graves Property** This 120 acre parcel was purchased by the Yakama Nation for inclusion into this project in February of 2006. Negotiations between the Yakama Nation and Bonneville Power Administration were ongoing during FY2007 to reimburse the purchase of this property. Successful negotiations resulted in the reimbursement of this purchase in FY2008.



**Graves Property outlined in orange.**

## **Restoration Activities**

### North American Wetlands Conservation Act (NAWCA)

In Fiscal Year 2006 funding was secured through the North American Wetlands Conservation Act (NAWCA) for restoration activities on Project lands and on the adjacent Toppenish National Wildlife Refuge (US Fish and Wildlife Service) and Sunnyside Wildlife Area (Washington Department of Fish and Wildlife). Restoration activities began in Fiscal Year 2007. A report summarizing the 2008 activities is included at the end of this annual report.

### Natural Resources Conservation Service – Environmental Quality Enhancement Program (EQIP)

Planning activities began for the Teal Lake and McBrides Slough repairs at the Satus Wildlife Area. This project will be funded by the Natural Resources Conservation Service (NRCS) under the Environmental Quality Incentives Program (EQIP). Repairs will occur in the summer of 2009.

## **Property Management Plans**

Plans were completed for the Toppenish Creek Pumphouse and Olney Drain Wildlife Areas. These plans have been attached to the FY2008 Pisces contract.

## **Outreach and Education**

April 26, 2008 Eastern Washington University. 18 adults (16 students, 2 teachers).

April 29, 2008 White Swan High School. Student interview for class project.

May 20-21, 2008 Native American Fish and Wildlife Society Annual Conference. Presentation (May 20) and tour (May 21) of project activities, Yakima, Washington. 50 adults.

June 17, 2008 University of Washington. Faculty tour of project restoration sites. 34 adults.

June 28-29, 2008 Washington Waterfowl Association. Tour of project activities and volunteer work weekend. 9 adults, 2 youth Saturday, 7 adults, 2 youth Sunday.

June 2008 Yakima Basin Science Conference. Presented weed management conceptual plan, survey and inventory data, and weed treatment efforts. 50 adults.

July through August 2008 Various volunteers. Daily waterfowl banding activities.

July 7, 2008 Intermountain West Joint Venture. Tour of project activities. 12 adults.

July 26-27, 2008 Washington Waterfowl Association. Tour of project activities and volunteer work weekend. 14 adults, 4 youth Saturday, 14 adults, 4 youth Sunday.

August 6 and 13, 2008 Yakama Nation Youth Wildlife Camp. Tour of project activities and duck banding. 25 youth each day.

August 23, 2008 Quail Forever and Pheasants Forever volunteers. Tour of project activities and duck banding. 15 adults, 2 youth.

September 24, 2008 Heritage College. Tour of restoration activities. 16 adults (1 faculty, 15 students)

September 25, 2008 Washington Waterfowl Association, Sumner, Washington. Presentation of project activities. 25 adults, 5 youth.

Fall 2008 Biology classes, North White Swan High School. Led shrub-steppe educational program to understand floodplain shrub-steppe ecology on the Tule Road property. Approximately 40 students.

October 16, 2008 University of Washington. Restoration tour. 27 adults (2 faculty, 25 students)

October 17, 2008 Earthcorps. Tour of project activities. 29 adults (2 teachers, 27 students)

October 24, 2008 Toppenish High School. Job shadow tour of project activities. 2 students

November 3, 2008 NW Power and Conservation Council Independent Science Review Panel. Project activities tour. 12 adults

December 12, 2008 Mabton High School. Project activities presentation. 1 teacher, 75 students

February 3, 2009 White Swan High School. Student tour of project activities. 1 student



**Washington Waterfowl Association volunteers.**

## Wildlife Surveys

The Yakama Nation Wildlife Resource Management Program (YNWRMP) conducts wildlife surveys in the valley portion of the Yakama Reservation. These surveys provide an index to wildlife populations. They also provide information on wildlife responses to our restoration efforts. Although most surveys are conducted through the whole valley, wildlife trends on or near properties managed by the YNWRMP show a positive trend in wildlife numbers.

### Waterfowl Breeding Pair Counts

We conduct waterfowl breeding pair annually during the second week of May. These counts are conducted at 14 different sites. These counts allow us to monitor duck responses to our restoration efforts and make proper management decisions. Results from these counts indicate that the total number of breeding pairs of dabbling ducks has increased since 1955 (Figure 6). This increase has been evident in teal (Figure 2) and Gadwall (Figure 3). Wood Ducks (Figure 1) and Mallard (Figure 5) numbers have remained relatively constant.

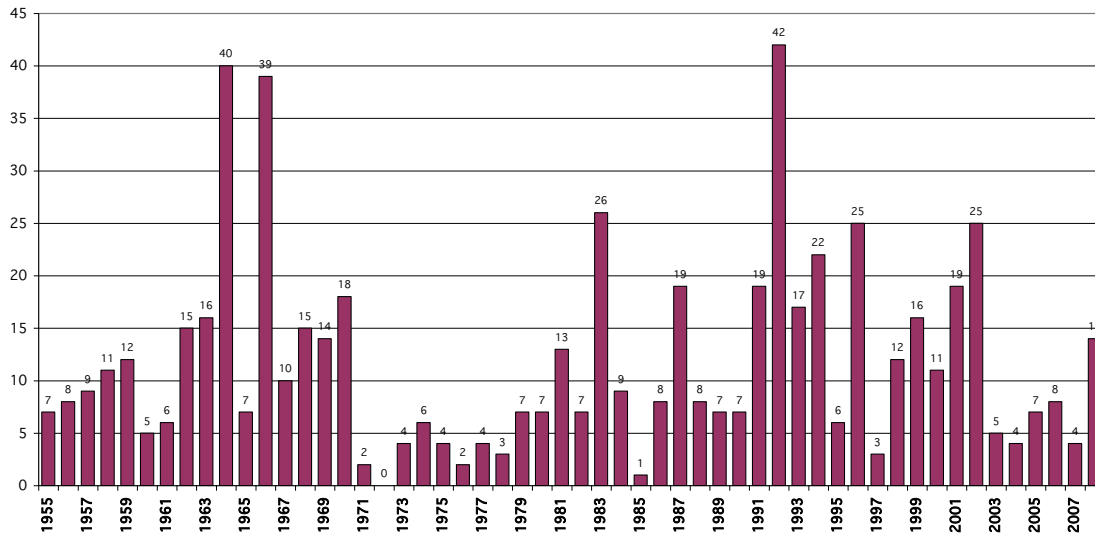


Figure 1: Number of breeding pairs of Wood Duck observed during counts conducted from 1955-2008 on the Yakama Reservation.

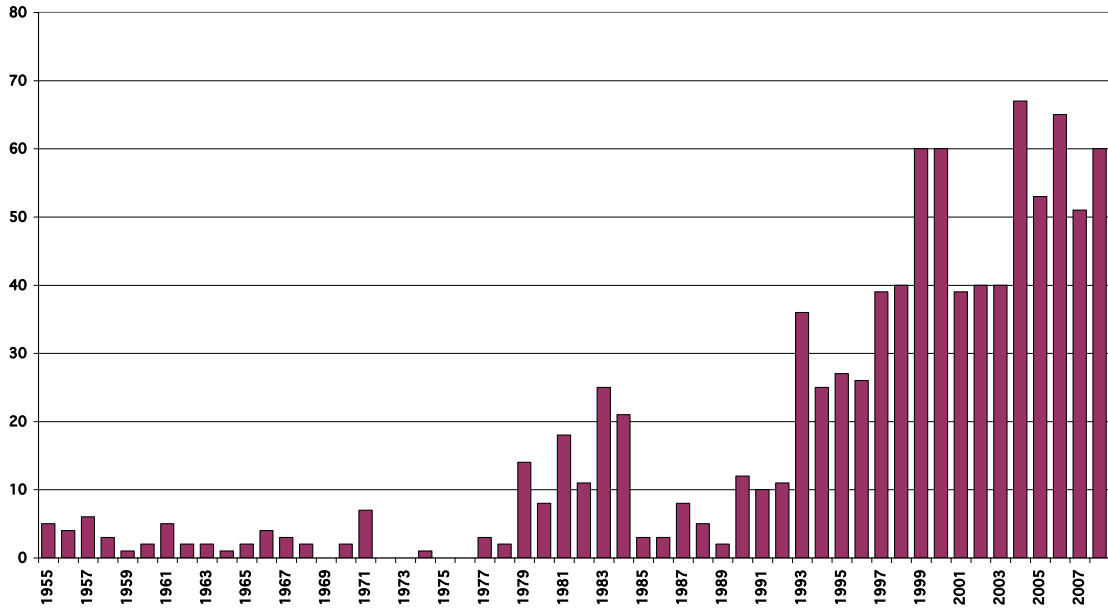


Figure 2: Number of breeding pairs of Gadwall observed during counts conducted from 1955-2008 on the Yakama Reservation

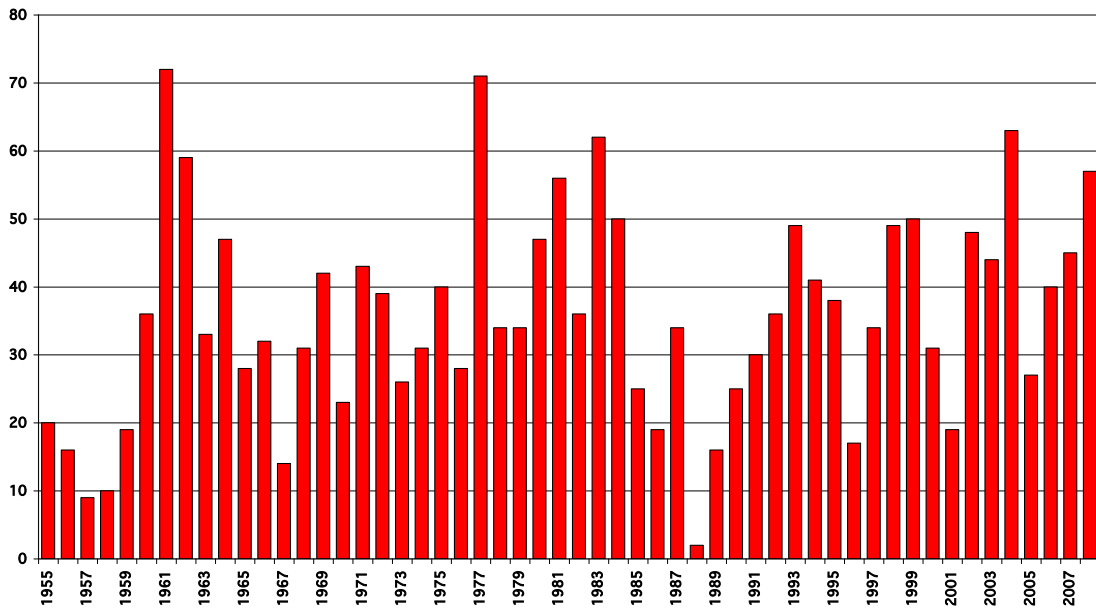


Figure 3: Number of breeding pairs of BW/Cinn. Teal observed during counts conducted from 1955-2008 on the Yakama Reservation

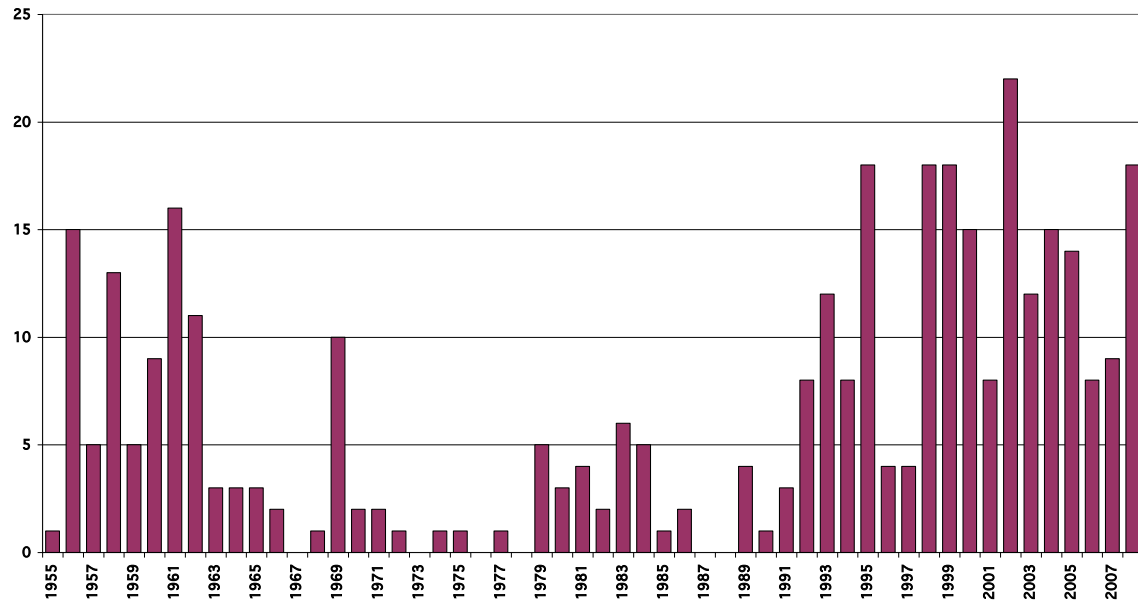


Figure 4: Number of breeding pairs of Northern Shovelers observed during counts conducted from 1955-2008 on the Yakama Reservation

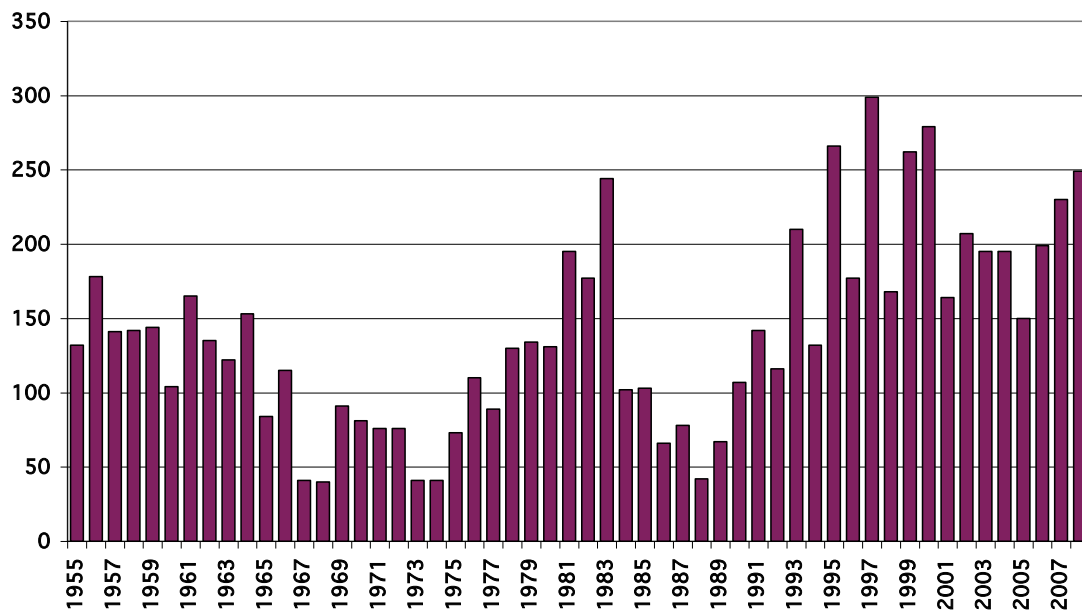


Figure 5: Number of breeding pairs of Mallards observed during counts conducted from 1955-2008 on the Yakama Reservation



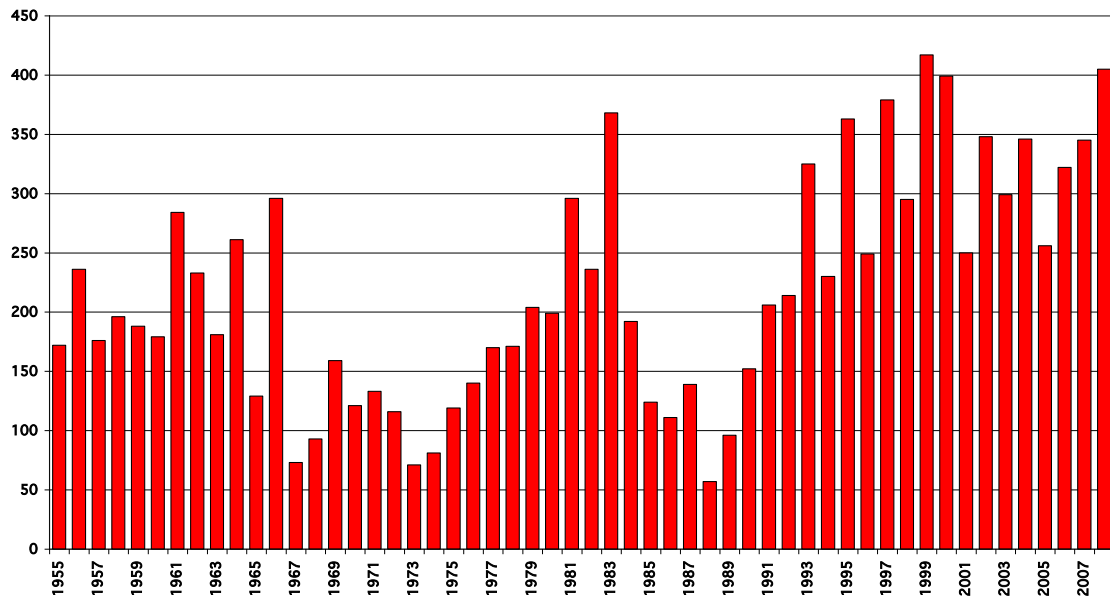


Figure 6: Number of breeding pairs of dabbling ducks observed during counts conducted from 1955-2008 on the Yakama Reservation

### Mourning Dove Coo-Counts

In conjunction with the United States Fish and Wildlife Services Webless Migratory Game Bird Program, we conduct mourning dove call-counts to estimate the number of breeding mourning doves. Protocol and routes are chosen by the USFWS. These routes do not change and provide continental population estimates. The population estimates are used to set dove seasons and bag limits. On the Yakama Reservation these counts are conducted annually on 2 routes the last full week in May. Since 2000, the number of breeding pairs has increased (Figure 7 & 8). The increase is greater on the Pumphouse route which follows Toppenish Creek where the YNWRMP and Toppenish National Wildlife Refuge manage a significant portion of the land. However there was a slight decline in 2008, which may have been weather related.

Total Number of Doves Heard During Call Counts

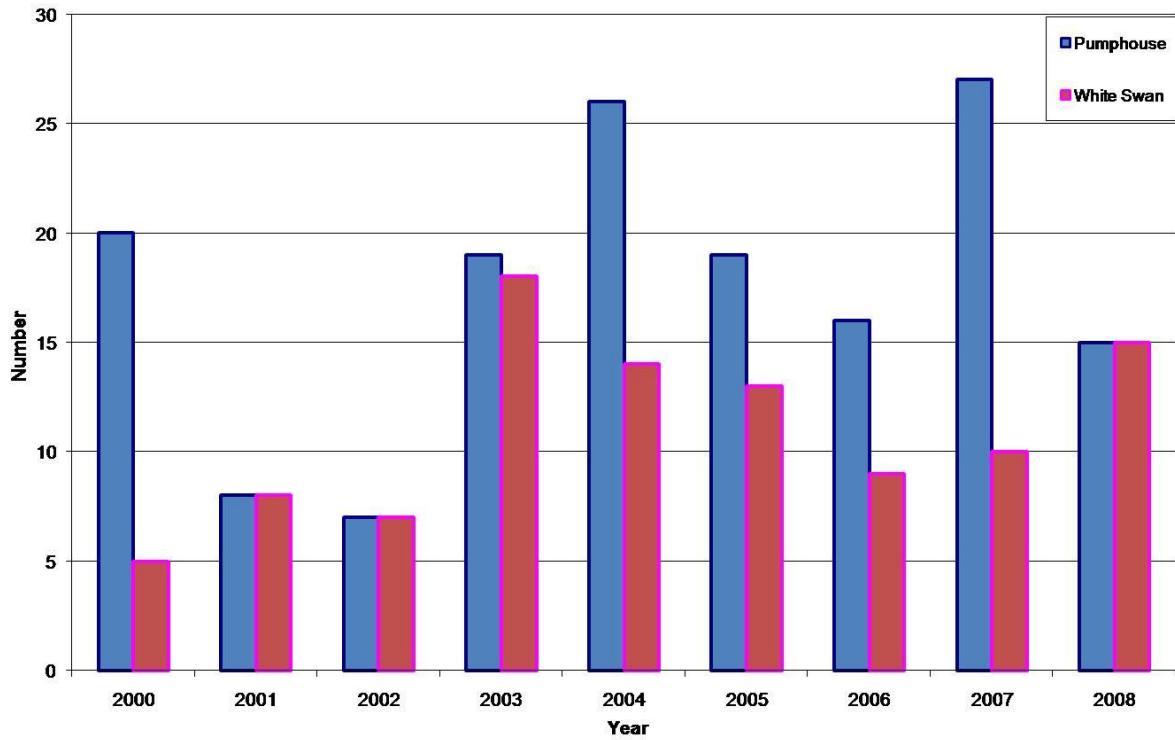


Figure 7: Number of calling doves heard on dove call count routes on the Yakama Reservation from 2000 - 2008.

**Total Number of Mourning Doves Seen and Heard During Call Counts on the Yakama Nation**

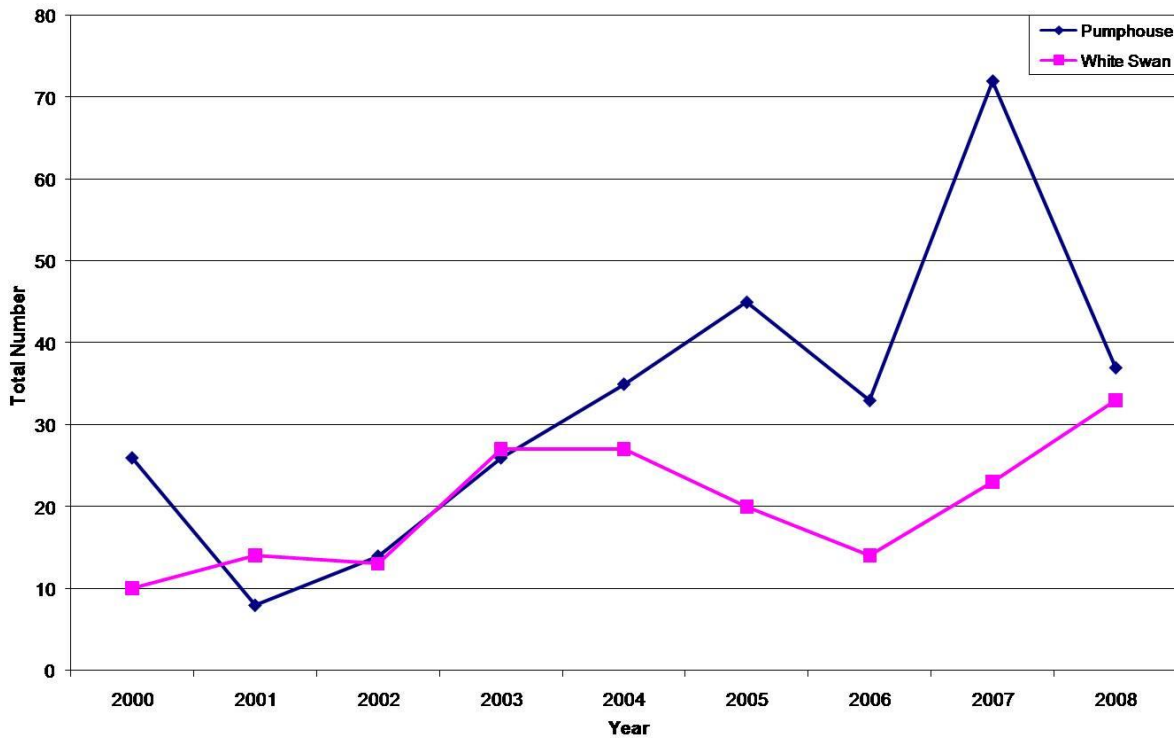


Figure 8: Total number of mourning doves seen and heard on the Pumphouse and White Swan dove call count routes on the Yakama Reservation from 2000 through 2008.

### Upland Game Bird Brood Counts

During the last 2 weeks of July and the first week of August, we conduct annual counts of ring-necked pheasant, and California quail broods to index population levels. These counts are done on 4 standardized routes once a week. Quail counts indicate that populations dropped from the highs of the previous years; however the population estimate is still higher than the 1990's (Figure 9). The number of doves seen per mile also dropped from the previous year but still numbers are relatively high (Figure 10). The number of pheasants seen per mile have remained relatively stable (Figure 11). Pheasant population estimates have been declining since we began monitoring the populations. Reasons for the decline are unclear however changes in agricultural practices may have detrimental impacts on pheasant populations.

**Average number of quail per mile observed during brood counts on the Yakama Reservation**

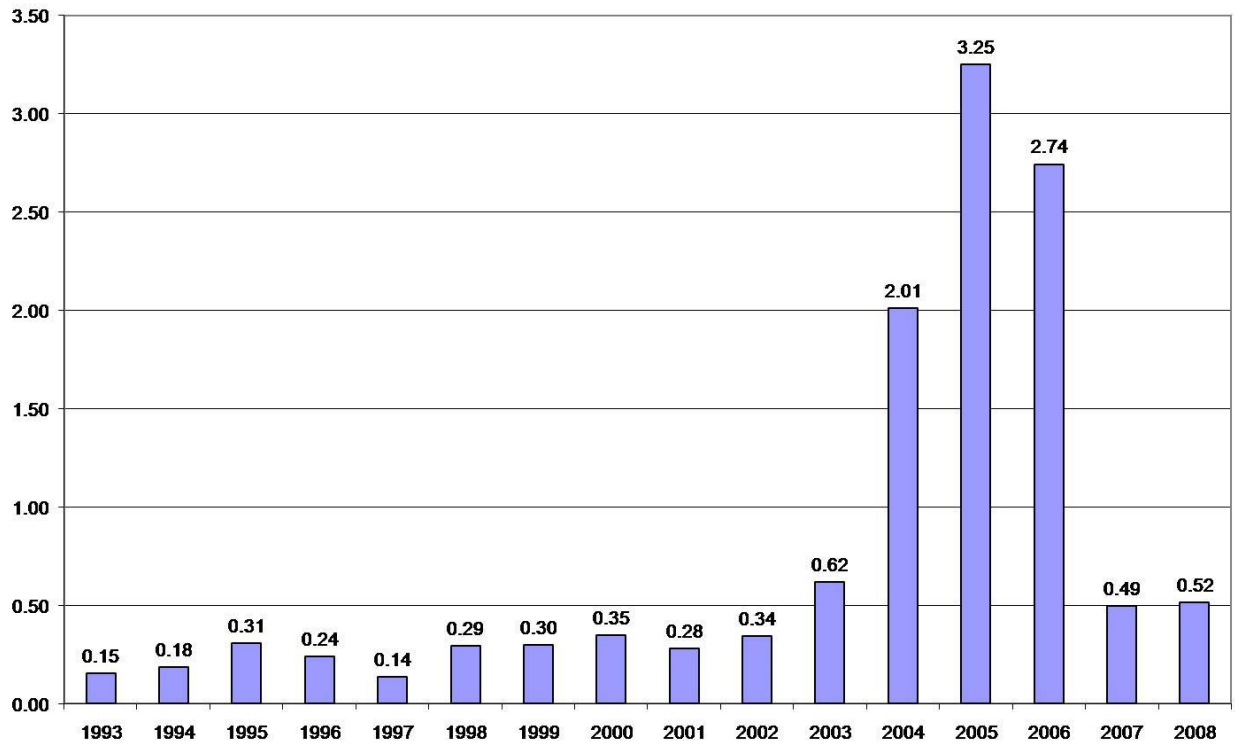


Figure 9: Average number of California Quail seen per mile on the Yakama Reservation in Washington from 1993 through 2008.

**Average number of doves per mile observed during brood route counts on the Yakama Reservation**

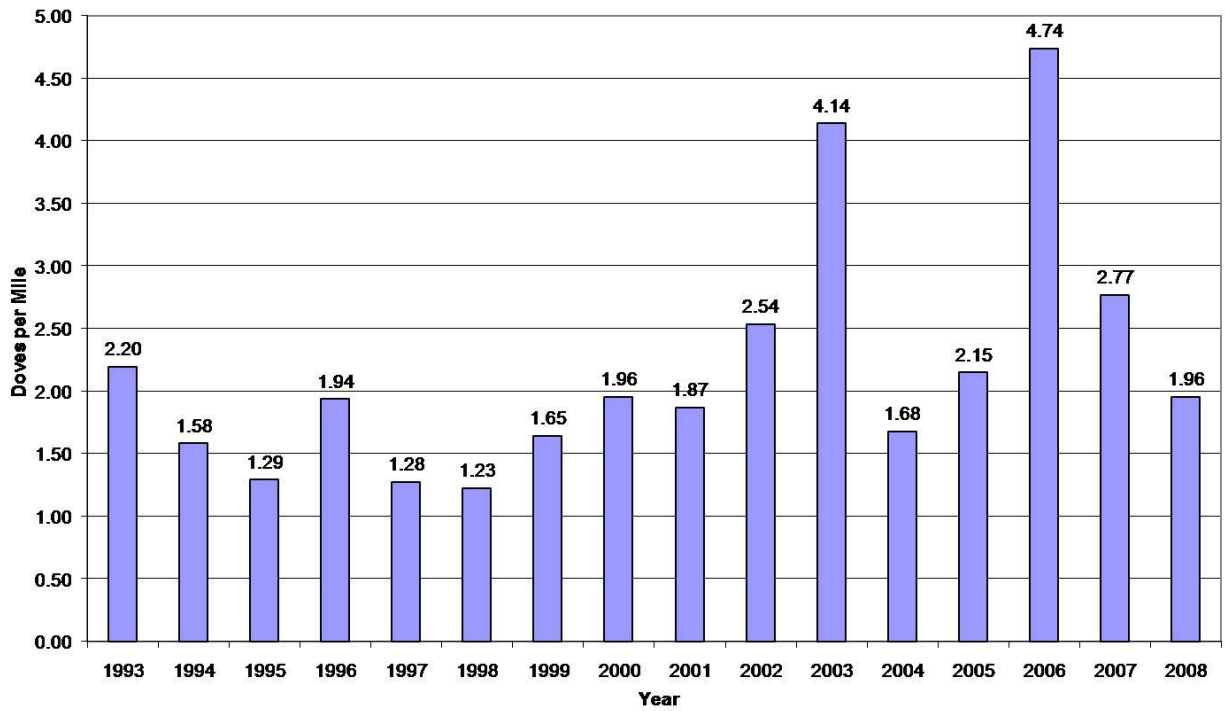


Figure 10: Average number of mourning doves seen per mile on the Yakama Reservation in Washington from 1993 through 2008.

**Average number of pheasants per mile observed during brood counts on the Yakama Reservation**

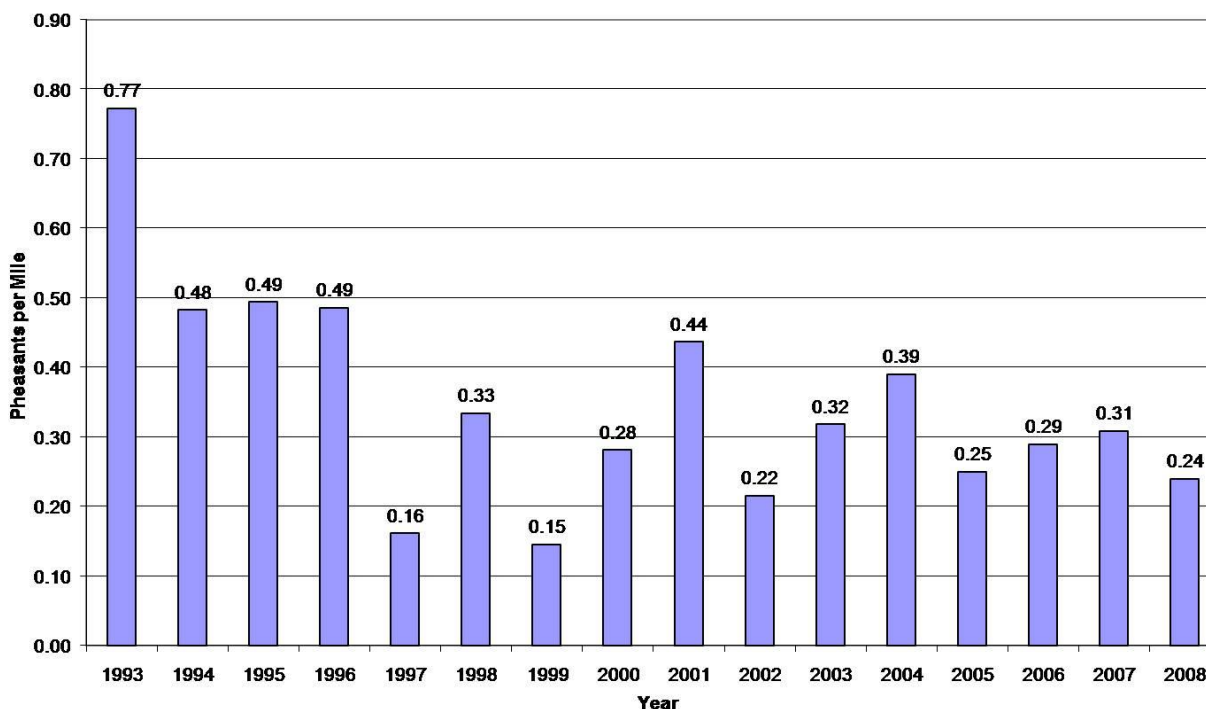


Figure 11: Average number of pheasants seen per mile on the Yakama Reservation in Washington from 1993 through 2008.

### Opening Day Hunter Success Surveys

During the opening weekend of the Yakama Nation hunting season, we conduct bag checks to determine hunter success rates. We record the number of hunters and birds harvested. Opening weekend harvest of pheasants was slightly below the long term average with the hunters averaging 0.43 birds/day (Figure 12). On Satus Wildlife Management Area, opening weekend harvest of waterfowl was higher than the previous year with the average of 3.6 ducks/hunter/day (Figure 13). The dominant species harvested opening day were mallards (45%), green-winged teal (18%) and wood ducks (8%, Figure 15). The percentage of mallard harvested (Figure 16) has been increasing on the Satus Wildlife Area. On the South Lateral A Property, we monitor harvest through the whole season. Results from this monitoring show mallards (59%), green-winged teal (14%), American wigeon (13%) and northern pintails (9%) are the largest percentage of the harvest during the 2008 hunting season (Figure 16). Trends over the last three years show little fluctuations in the composition of harvest on South Lateral A. (Figure 18). These counts allow us to monitor our restoration efforts and allow us to make proper management decisions.

**Number of Pheasants per Hunter Harvested Opening Weekend on the Yakama Reservation  
From 1988 through 2008**

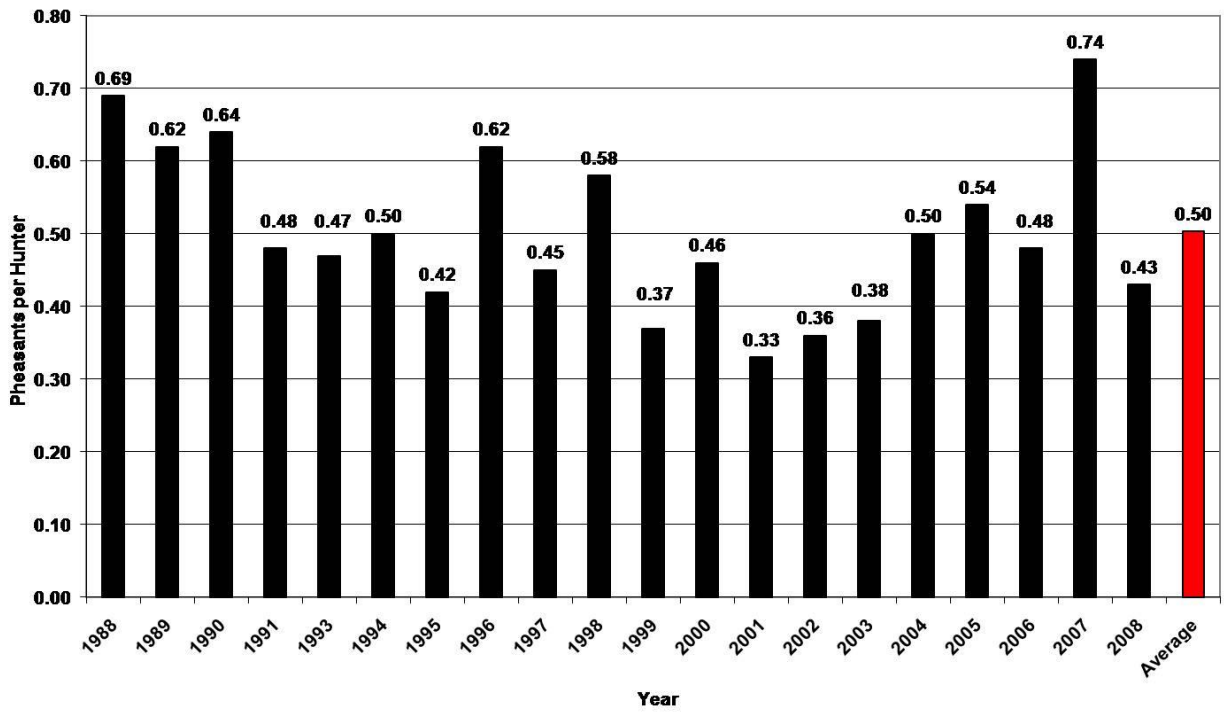


Figure12: Daily number of pheasants harvested per hunter opening weekend on the Yakima Reservation from 1993 through 2008.

**Number of Ducks per Hunter Harvested on the Satus Wildlife Area Opening Day  
From 1990 through 2008**

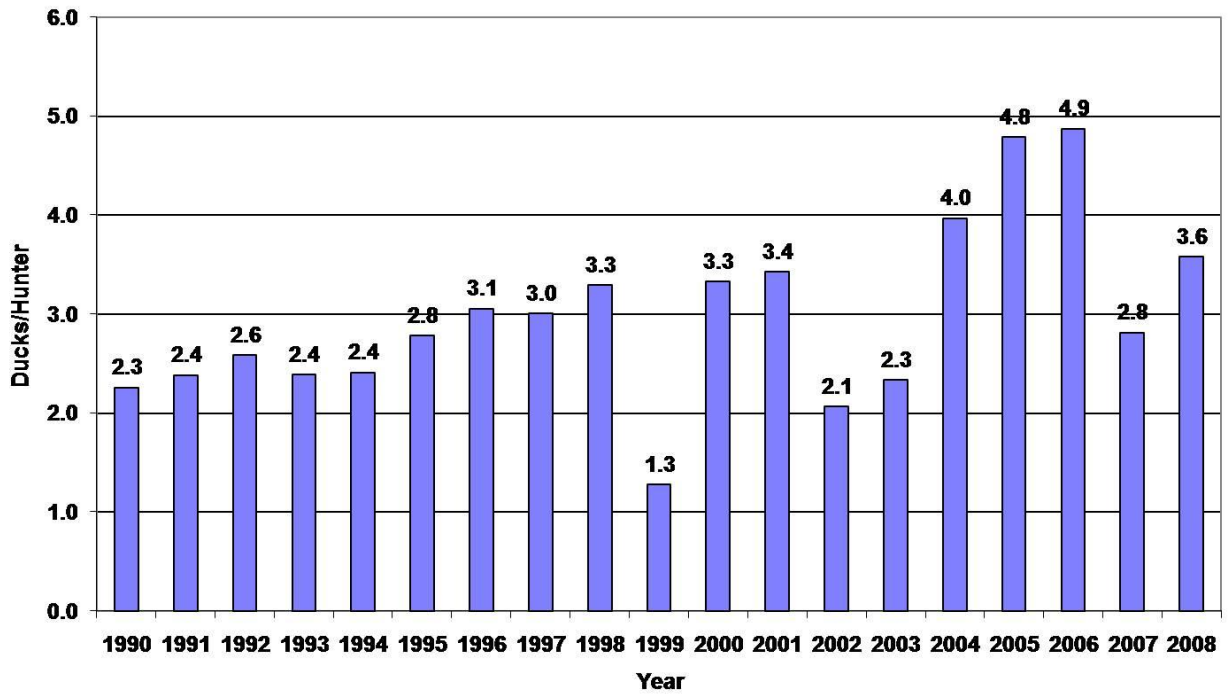


Figure13: The number of ducks harvested per hunter on the Satus Wildlife Area from 1981 through 2008.



**Total Number of Ducks Harvested and Waterfowl Hunters Opening Day on the Satus Wildlife Area From 1990 through 2008**

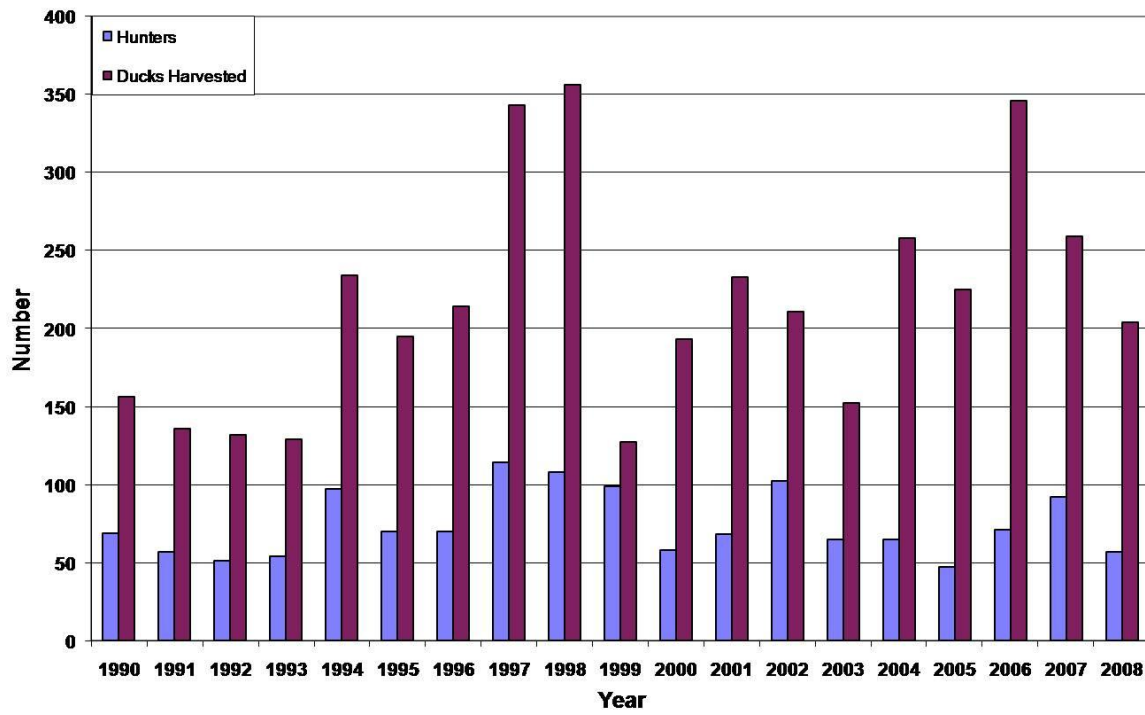


Figure14: The total number of ducks harvested and number of hunters opening day on the Satus Wildlife Area from 1990 through 2008.

**Species Composition of Waterfowl Harvested Opening Day on the Satus Wildlife Area during the 2008 Hunting Season**

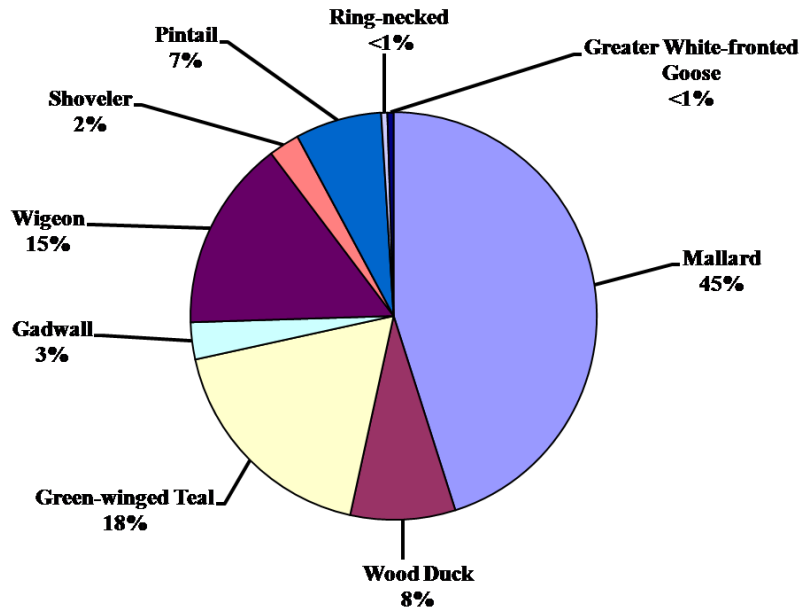


Figure15: Species composition of Waterfowl Harvested on Opening Day on the Satus Wildlife Area during the 2008 Hunting Season

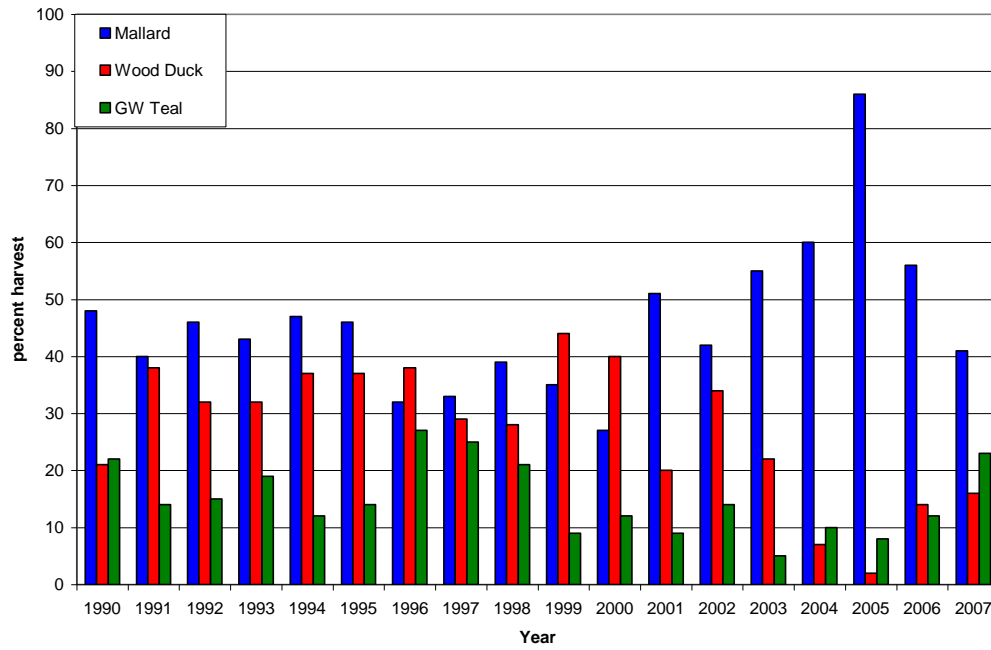


Figure16: The percent harvest of mallards, wood ducks, and green-winged teal on opening day at the Satus Wildlife Area from 1990 through 2007.

**Composition of Waterfowl Harvest on South Lateral A During the 2008 Hunting Season**

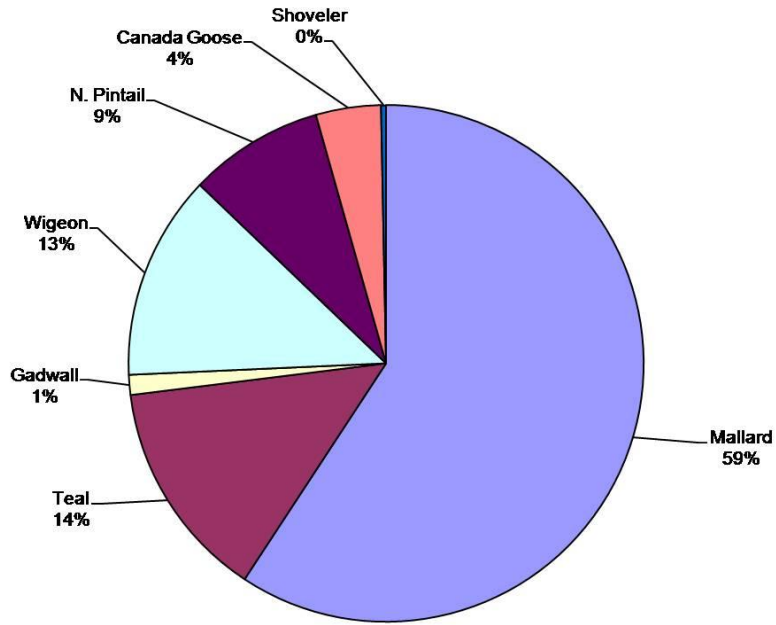


Figure17: The composition of waterfowl harvested on South Lateral A during the 2008 hunting season.

**Species Composition of Waterfowl Harvested on South Lateral A. During the 2006-2008 Hunting Seasons**

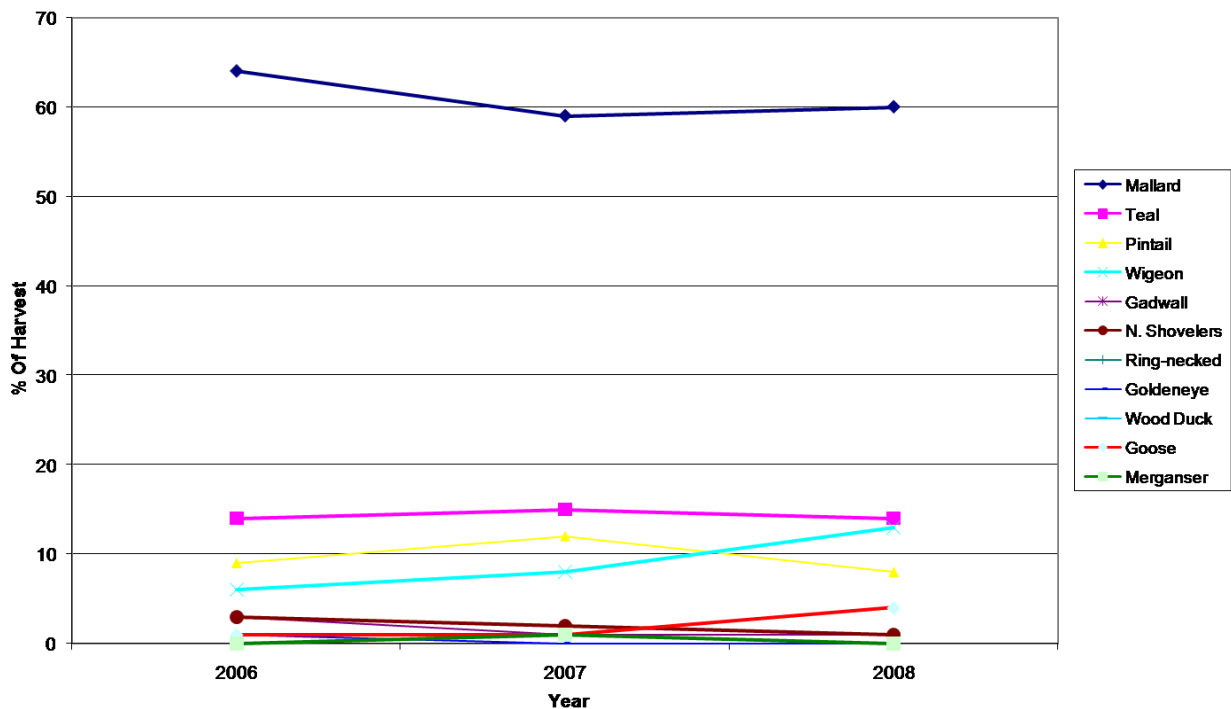


Figure 18: Changes in the composition of waterfowl harvested on South Lateral A from 2006 – 2008.

### **Inventorying Birds**

With the help of the Yakima Audubon Society, we began inventorying birds found on 5 properties managed by the Yakama Nation Wildlife Resource Management Program. Volunteers visit these properties at least once during each season and record the species and numbers of each species seen during the visit. The number of bird seen ranged between 6 and 66 per visit. The highest total number of species observed is found on the South Lateral A property (Figure 19). This is probably a result of the diverse habitat found on this property and this property has had more restoration efforts than the other properties. The lowest number of species observed occurred on Campbell Road property. Currently, we are analyzing data and attempting to modify protocol to provide the most reliable data to monitor our restoration efforts. Results from these surveys will allow us to make better management decisions on lands managed by the Yakama Nation Wildlife Resource Management Program. Appendix A – E list the species observed on each property.

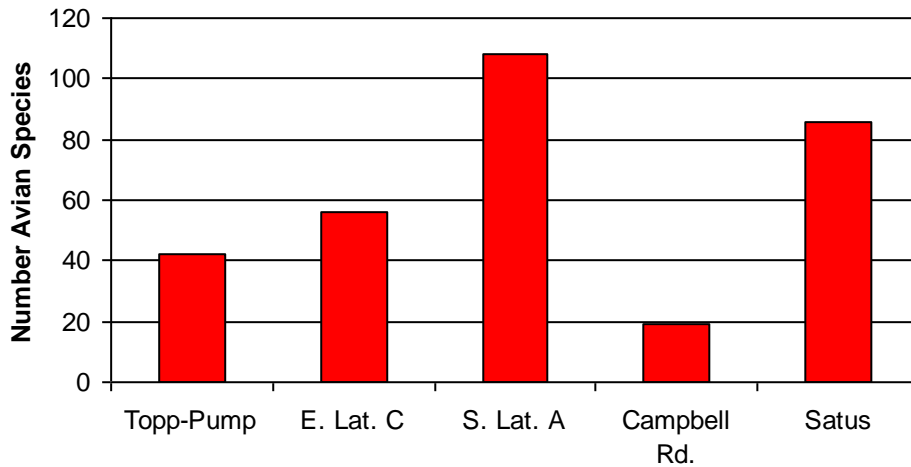


Figure 19: Number of species found on Toppenish-Pumphouse (Topp-Pump), East Lateral C (E. Lat. C), South Lateral A (S. Lat. A), Campbell Road (Campbell Rd.) and Satus Wildlife Area (Satus) properties

Appendix A: List of the species observed on the Toppenish-Pumphouse Management unit on the Yakama Reservation by Yakima Audubon Society volunteers.

Species	Scientific Name
Mallard	<i>Anas platyrhynchos</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
California Quail	<i>Callipepla californica</i>
Great Blue Heron	<i>Ardea herodias</i>
Turkey Vulture	<i>Cathartes aura</i>
Northern Harrier	<i>Circus cyaneus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>
Sora	<i>Porzana carolina</i>
Killdeer	<i>Charadrius vociferus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Rock Pigeon	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Barn Owl	<i>Tyto alba</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Northern Flicker	<i>Colaptes auratus</i>
Say's Phoebe	
Western Kingbird	<i>Tyrannus verticalis</i>
Black-billed magpie	<i>Pica pica</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>

Black-capped Chickadee	<i>Poecile atricapillus</i>
House Wren	<i>Thryomanes</i>
Bewick's Wren	<i>Thryomanes</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
American Robin	<i>Turdus migratorius</i>
European Starling	<i>Sturnus vulgaris</i>
Yellow Warbler	
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Song Sparrow	<i>Melospiza melodia</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
House Finch	<i>Carpodacus mexicanus</i>
American Goldfinch	<i>Carduelis tristis</i>

Appendix B: List of the species observed on the East Lateral C Management unit on the Yakama Reservation by Yakima Audubon Society volunteers.

Species	Scientific Name
Wood Duck	<i>Aix sponsa</i>
Mallard	<i>Anas platyrhynchos</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Northern Pintail	<i>Anas acuta</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
California Quail	<i>Callipepla californica</i>
Great Blue Heron	<i>Ardea herodias</i>
Turkey Vulture	<i>Cathartes aura</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Killdeer	<i>Charadrius vociferus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Mourning Dove	<i>Zenaida macroura</i>
Great Horned Owl	<i>Bubo virginianus</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Northern Flicker	<i>Colaptes auratus</i>
Western Wood-Pewee	
Pacific-slope Flycatcher	
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Black-billed magpie	<i>Pica pica</i>
Common Raven	<i>Corvus corax</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
House Wren	
Bewick's Wren	<i>Thryomanes bewickii</i>
Marsh Wren	<i>Cistothorus palustris</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
American Robin	<i>Turdus migratorius</i>
European Starling	<i>Sturnus vulgaris</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Townsend's Warbler	
Spotted Towhee	<i>Pipilo maculatus</i>
Chipping Sparrow	
Lark Sparrow	
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Fox Sparrow	



Song Sparrow	<i>Melospiza melodia</i>
Lincoln's Sparrow	
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Lazuli Bunting	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Brown-headed Cowbird	<i>Molothrus alter</i>
Bullock's Oriole	
House Finch	<i>Carpodacus mexicanus</i>
American Goldfinch	<i>Carduelis tristis</i>

Appendix C: List of the species observed on the South Lateral A Management unit on the Yakama Reservation by Yakima Audubon Society volunteers.  
116 species

Species	Scientific Name
Greater-White Fronted	<i>Anser albifrons</i>
Snow Goose	<i>Chen caerulescens</i>
Canada Goose	<i>Branta canadensis</i>
Cackling Canada Goose	
Mute Swan	<i>Cygnus Olor</i>
Trumpeter Swans	<i>Cygnus buccinator</i>
Tundra Swan	<i>Cygnus columbianus</i>
Wood Duck	<i>Aix sponsa</i>
Gadwall	<i>Anas strepa</i>
American Wigeon	<i>Anas americanus</i>
Mallard	<i>Anas platyrhynchos</i>
Blue-winged Teal	<i>Anas discors</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Northern Shovler	<i>Anas clypeata</i>
Northern Pintail	<i>Anas acuta</i>
Green-winged Teal	<i>Anas crecca</i>
Ring-necked Duck	<i>Aythya collaris</i>
Greater Scaup	<i>Aythya marila</i>
Lesser Scaup	<i>Aythya affinis</i>
Bufflehead	<i>Bucephala albeola</i>
Common Goldeneye	<i>Bucephala clangula</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Common Merganser	<i>Mergus merganser</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
California Quail	<i>Callipepla californica</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Horned Grebe	<i>Podiceps auritus</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
American Bittern	<i>Botaurus lentiginosus</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Egret	<i>Ardea alba</i>
Black-Crowned Night-heron	<i>Nycticorax nycticorax</i>
White-faced Ibis	<i>Plegadis chihi</i>
Turkey Vulture	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Northern Harrier	<i>Circus cyaneus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>

Cooper's Hawk	<i>Accipiter cooperii</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
American Kestrel	<i>Falco sparverius</i>
Peregrin Falcon	<i>Falco peregrinus</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
American Coot	<i>Fulica Americana</i>
Sandhill Crane	<i>Grus canadensis</i>
Killdeer	<i>Charadrius vociferus</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>
American Avocet	<i>Recurvirostra americana</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Dunlin	<i>Calidris alpina</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Black Tern	<i>Chlidonias niger</i>
Rock Pigeon	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Barn Owl	<i>Tyto alba</i>
Great Horned Owl	<i>Bubo virginianus</i>
Long-eared Owl	<i>Asio otus</i>
Short-eared Owl	<i>Asio flammeus</i>
Common Nighthawk	<i>Chordeiles minor</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Northern Flicker	<i>Colaptes auratus</i>
Western Kingbird	<i>Tyrannus verticalis</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Black-billed magpie	<i>Pica pica</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Violet-green Swallows	<i>Tachycineta thalassina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Marsh Wren	<i>Cistothorus palustris</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
American Robin	<i>Turdus migratorius</i>
European Starling	<i>Sturnus vulgaris</i>
American Pipit	<i>Anthus rubescens</i>

Orange-crowned Warbler	<i>Vermivora celata</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Western Tanager	<i>Piranga ludoviciana</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Song Sparrow	<i>Melospiza melodia</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Brewer's Blackbird	<i>Euphagus carolinus</i>
Brown-headed Cowbird	<i>Molothrus alter</i>
House Finch	<i>Carpodacus mexicanus</i>
American Goldfinch	<i>Carduelis tristis</i>
House Sparrow	<i>Passer domesticus</i>

Appendix D: List of the species observed on the Campbell Road Management unit on the Yakama Reservation by Yakima Audubon Society volunteers.

Species	Scientific Name
Gadwall	<i>Anas strepera</i>
Mallard	<i>Anas platyrhynchos</i>
Northern Harrier	<i>Circus cyaneus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Rock Pigeon	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Vaux's Swift	
Black-billed magpie	<i>Pica pica</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
N. Rough-winged Swallow	<i>Tachycineta</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
American Robin	<i>Turdus migratorius</i>
European Starling	<i>Sturnus vulgaris</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brown-headed Cowbird	<i>Molothrus alter</i>

Appendix E: List of the species observed on the Satus Management unit on the Yakama Reservation by Yakima Audubon Society volunteers.

Species	Scientific Name
Canada Goose	<i>Branta canadensis</i>
Wood Duck	<i>Aix sponsa</i>
Gadwall	<i>Anas strepa</i>
Mallard	<i>Anas platyrhynchos</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Northern Shovler	<i>Anas clypeata</i>
Green-winged Teal	<i>Anas crecca</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
California Quail	<i>Callipepla californica</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
American Bittern	<i>Botaurus lentiginosus</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Egret	<i>Ardea alba</i>
Black-Crowned Night-heron	<i>Nycticorax nycticorax</i>
Turkey Vulture	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Northern Harrier	<i>Circus cyaneus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>
Virginia Rail	<i>Rallus limicola</i>
American Coot	<i>Fulica Americana</i>
Sandhill Crane	<i>Grus canadensis</i>
Killdeer	<i>Charadrius vociferus</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>
American Avocet	<i>Recurvirostra americana</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Least Sandpiper	<i>Calidris minutilla</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Mourning Dove	<i>Zenaida macroura</i>
Great Horned Owl	<i>Bubo virginianus</i>
Vaux's Swift	<i>Chaetura vauxi</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Downy Woodpecker	<i>Picoides pubescens</i>

Northern Flicker	<i>Colaptes auratus</i>
Western Wood-pewee	<i>Contopus sordidulus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Western Kingbird	<i>Tyrannus verticalis</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Cassin's Vireo	<i>Vireo cassinii</i>
Warbling Vireo	<i>Vireo gilvus</i>
Black-billed magpie	<i>Pica pica</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Tree Swallow	<i>Tachycineta bicolor</i>
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Bank Swallow	<i>Riparia riparia</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
House Wren	<i>Troglodytes aedon</i>
Marsh Wren	<i>Cistothorus palustris</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
American Robin	<i>Turdus migratorius</i>
Gray Catbird	<i>Dumetella carolinensis</i>
European Starling	<i>Sturnus vulgaris</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Nashville Warbler	<i>Vermivora ruficapilla</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
MacGillivray's Warbler	<i>Oporomis tolniei</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Western Tanager	<i>Piranga ludoviciana</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Song Sparrow	<i>Melospiza melodia</i>
Lincoln's Sparrow	<i>Melospiza lincolnii</i>
White-throated Sparrow	<i>Zonotrichia albicollis</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Brown-headed Cowbird	<i>Molothrus alter</i>
House Finch	<i>Carpodacus mexicanus</i>
American Goldfinch	<i>Carduelis tristis</i>

**Cultural and Archaeological Resources Report**  
**By**  
**Jon D. Shellenberger, M.S.**  
**YN Wildlife Archaeologist**

The Yakama Nation Wetlands and Riparian Restoration Project in FY 2008 continued to acquire new land holdings. In order to achieve the required ecological benefits of wetlands restoration on these land holdings all ground disturbing project activities utilizing federal funding require Section 106 compliance under the National Historic Preservation Act of 1966 (NHPA) as amended and the National Environmental Policy Act (NEPA) of 1971. The Yakama Nation has passed similar Tribal resolutions (T-66-84 & T-92-87) for the protection of its archaeological and cultural resources within the Yakama Nation's Reservation boundaries. The primary goal in protecting these properties has been one of assessing all land holdings in terms of the cultural and archaeological resources they contain and monitoring any impacts restoration activities will have on these irreplaceable resources of the Yakama Nation. As mandated by Tribal Council resolution, one goal of this project is to preserve and protect in perpetuity the culture and history of the Yakama people for future generations. The Yakama Nation Natural Resources Policies plan requires the identification of cultural resources and recommends a three-phase approach including identification, protection, and preservation. In the case of Traditional Cultural Properties (TCP's) it further recommends protection and preservation of this type of cultural resource through enhancement of its natural resources. This compliance requires a professional archaeologist meeting the qualifications of the Secretary of the Interior's professional standards.

Archaeological field investigations FY 2009 were conducted on the Mill Creek North, Mill Creek, Olney Drain, Lower Satus, Satus Wildlife Area, Satus Corridor, Old Goldendale, Tillman and Parker properties. Field investigations were for either the purpose of monitoring, cultural resource inventory, or special project NHPA compliance. Reports for each investigation are filed with the YN Wildlife Archaeologist. All special projects requiring section 106 compliance are submitted to the Yakama Nation Tribal Historic Office and the Yakama Nation Cultural Resource Program. The cultural resource work



performed by Mr. Shellenberger continues to include Yakama Nation Cultural Specialists to help identify Traditional Cultural Properties present on project properties.

### **Mill Creek North**



### **Fire Modified Rock**

The cultural resource inventory and survey of the Mill Creek North Property

was completed this year. We performed an extensive pedestrian survey of the property using a professional survey methodology that included transect intervals of three meters or ten feet between crew members over 100% percent

of the property. All exposed ground was carefully examined for evidence of past human modification and included all areas of ground disturbance and wherever visibility afforded us an unobstructed view of the ground. This includes animal burrows, and cutbank surfaces. The property had been surveyed in the 1980s when a prehistoric village was recorded by former YN Archaeologists. This property has undergone serious effects from grazing and introduction of noxious weeds. It has been recommended that no grazing take place within the vicinity of the village site, as there has been noticeable erosion throughout the cultural features.

### **Mill Creek**

The cultural resource inventory and survey of the Mill Creek Property was completed this year. We performed an extensive pedestrian survey of the property using a professional survey methodology that included transect intervals of three meters or ten feet between crew members over 100 percent of the property. All exposed ground was carefully examined for evidence of past human modification and included all areas of ground disturbance and wherever visibility afforded us an unobstructed view of the ground. As a result of this cultural resource inventory and survey we have found evidence of prehistoric utilization of the property in the form of a prehistoric lithic scatter. A site form was filled out, GPS points and photographs were taken of the site and filed with the YN Wildlife Archaeologist. As is the policy of the

Yakama Nation, avoidance is the best possible management strategy for project planning. Any future projects within the subject parcel should take into consideration this site. Grazing within the vicinity of the site is not recommended as the area is severely denuded and cultural artifacts are exposed.



**1930s Gum Machine**

**Olney Drain**

The cultural resource

inventory and survey of the Mill Creek Property was completed this year. We performed an extensive pedestrian survey of the property using a professional survey methodology that included transect intervals of three meters or ten feet

between crew members over 100 percent of the property. All exposed ground was carefully examined for evidence of past human modification and included all areas of ground disturbance and wherever visibility afforded us an unobstructed view of the ground. As a result of this cultural resource inventory and survey we have found evidence of historic and prehistoric utilization of the property in the form of a two prehistoric lithic scatters, one prehistoric housepit, a historic refuse scatter, and historic agriculture-irrigation system. A site form was filled out, GPS points and photographs were taken of the sites and filed with the YN Wildlife Archaeologist. As is the policy of the Yakama Nation, avoidance is the best possible management strategy for project planning. Any future projects within the subject parcel should take into consideration these sites. The soil within the vicinity of the prehistoric lithic scatters, housepit and historic refuse scatter is noticeably denuded with little to no vegetation. Cultural properties are exposed and vulnerable to wind and water erosion. All soil disturbing activities should be monitored by a person trained in the field of cultural resources.



**Fire hearth**

**Lower Satus Wildlife Area**

Wetland Restoration continued on the

Lower Satus Wildlife Area with the Tule Road Restoration Project where several grade control structures were installed to prevent further erosion and headcutting of Satus Creek. Jon Shellenberger,

YN Wildlife Archaeologist, and Casey Barney, YN Cultural Specialist, surveyed 100% of the project area in October 2008 to identify present cultural resources that could potentially effected by the special project. One prehistoric feature was identified in the form of a subterranean house pit with an associated fire hearth. The site was on the project area boundary, however a buffer was established to further protect any associated subsurface artifacts that were not visible in our inventory.

**Satus Wildlife Area**

Restoration continued on the Satus Wildlife Area in the form of the McBride Slough Blowout Repair and Satus Barb

Installation. The McBride Slough Blowout Repair Project was surveyed by Jon Shellenberger and Casey Barney in Fall 2008. No cultural properties were identified within the project area. The Satus Barb Installation Project involved the installation of rock barbs that would prevent the incision of the Yakima River westward. The project also included the installation of a spillway that would prevent the Satus Wildlife Area’s water supply from spilling into the Yakima River. No cultural properties were identified within the project area boundary however a prehistoric projectile point was uncovered as a result of construction activites. All ground disturbing activities should be monitored by a person trained in the field of cultural resources.

**Projectile Point**



**Satus Corridor**

The Satus Corridor Properties include an extensive stretch of

land parcels along Washington State Highway 97. Several archaeological investigations have taken place within the corridor as the result of highway and frequent fire suppression

activities. In response to a fellow YN Wildlife employee's verbal report, Jon Shellenberger and members of the YN Cultural Resource Program visited a prehistoric housepit feature within a recent burn area. Upon visiting the site a dense lithic scatter was also present. While many of the properties within the Satus Corridor have been recorded, these particular properties had not yet undergone investigation. A site form was filled out by staff, GPS points and photos taken. The site form is filed with YN Wildlife Archaeologist. It is recommended that all ground disturbing activities should be monitored by a cultural resource professional.



**Old Goldendale** Restoration work continued on the Old Goldendale property in the form of the Toppenish Creek Restoration project in which several grade control structures were installed in order to prevent erosion and reconnect several historic channels of Toppenish Creek. A cultural

resource survey was conducted in October 2008 of 100% of the project area. The project was heavily covered by vegetation and was in most places several feet high. No cultural properties were identified as a result of the survey, however after mowing of the vegetation to provide better access and staging areas, a prehistoric village was witnessed during monitoring activities in October 2008. A site form was filled out, GPS points and photos were taken of the village. A copy of the site form is filed with the YN Wildlife Archaeologist. It is recommended that all ground disturbing activities be monitored by a cultural resource professional.

**Tillman** The cultural resource inventory and survey of the Tillman Property was completed this year. We performed an extensive pedestrian survey of the property using a professional survey methodology that included transect intervals of three meters or ten feet between crew members over 100 percent of the property. All exposed ground was carefully examined for evidence of past human modification and included all areas of ground disturbance and wherever visibility afforded us an unobstructed view of

the ground. As a result of this cultural resource inventory and survey we found no evidence of prehistoric utilization of the property. We therefore recommend that wildlife restoration activities continue on the property with cultural resource monitoring as directed by the Yakama Nation's Natural Resource Management Plan.

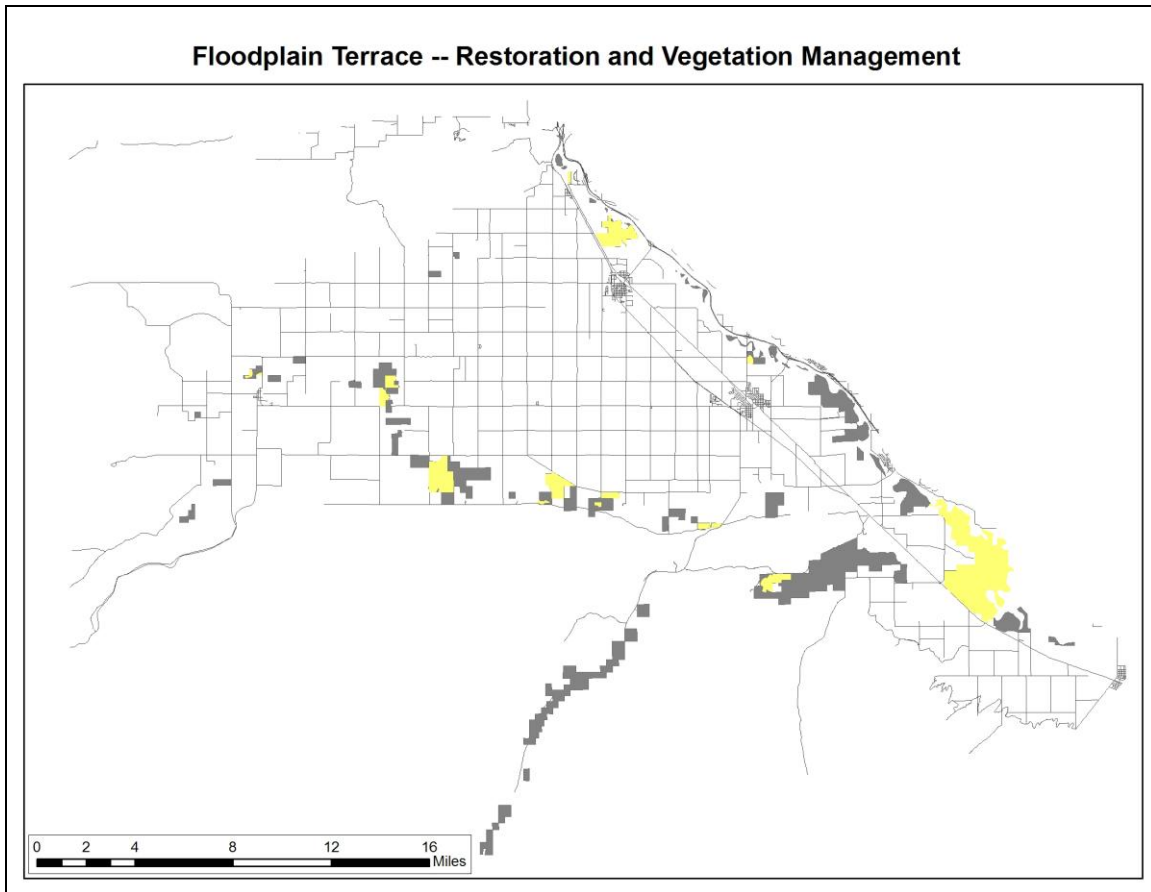


### **Parker**

The Parker property has undergone archaeological investigation by former YN Wildlife Archaeologist Gordon Lothson. The site mapped on this property has undergone significant looting and vandalism. The most common form of vandalism has been the use of subterranean housepit features as recreational vehicle ramps. This has left noticeable scars on the surface of the village. In spring 2009, the problem became way beyond acceptable to YN Cultural Resource Program staff and together with Jon Shellenberger notified Yakima County to take immediate action, as they are partial owners of the property. In retaliation, Yakima County reconnected the existing barbed wire fence and dug a three foot trench in front of the entry way utilized by the recreationists. This has since stopped all access by foot or any other means. Vegetation has slowly grown over the scars and is the least invasive method of restoration, given the already fragile condition of the site.

# Floodplain Terrace Restoration and Vegetation Management

Vegetation management in the project area includes (1) floodplain terrace restoration activities and (2) project-wide weed management activities. This portion of the report covers both types of vegetation management activities.



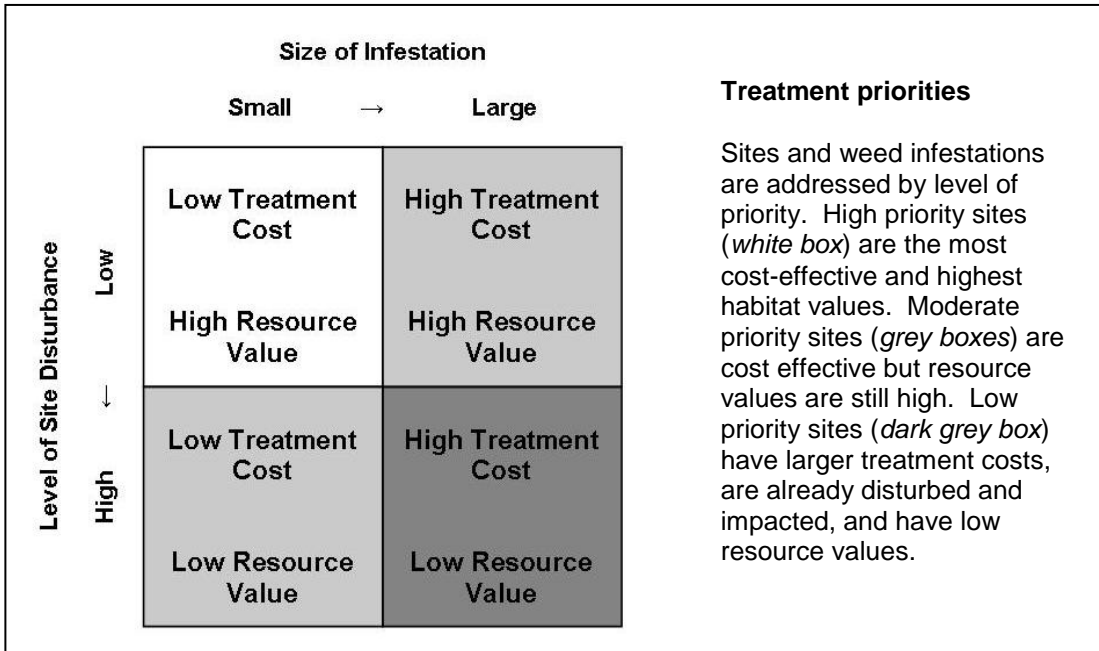
*Yellow areas on the map indicate sites where terrestrial vegetation management (project-wide weed control, site preparation or revegetation) activities occurred during the April 2008 - March 2009 project year. Grey areas indicate all properties currently managed under the project.*

## **Invasive Plant Control**

Noxious weeds are one of the primary threats to terrestrial habitats under this project, and thus weed management is a focal maintenance activity. General noxious weed control is one of the most cost-effective methods of protecting habitats from degradation. Weed management is a broad approach to protecting and restoring habitats for wildlife. In remote areas or relatively undisturbed areas, weed management includes treatment of noxious weed populations as they are located, or as they occur, and preventing weed

populations from expanding into uninfested areas. Where habitats have high resource values, such as riparian corridors and wildlife movement corridors, but where the habitats are moderately to severely degraded, weed management is achieved through habitat restoration to native species that assist with long-term suppression of noxious weeds.

Our approach to prioritizing weed management is summarized by the chart below.



Weed treatments are selected based on site conditions and weed species’ biology. Weed treatments include the following activities.

**Chemical treatment** – Herbicide treatments (used in accordance with BPA policies on herbicides and adjuvants) are generally highly effective and more cost-effective than mechanical or manual methods for many species. Weed suppression may require 1-5 years of treatment to eliminate weed infestations. Due to the location of floodplain and riparian habitats of the over 21,000 project acres within a larger agricultural setting, ongoing surveys and weed treatment of new infestations is required.

**Habitat restoration** – Restoration includes reintroduction of native species that assist with suppression of noxious weed species. Restoration requires a higher short-term cost input than chemical treatment, but results in lower long-term maintenance costs. Restoration typically requires a minimum five-year investment to reach weed suppression. Restoration is addressed in detail under the heading “Vegetation Restoration for Weed Suppression”.

**Grazing management** – Grazing includes weed suppression using domestic livestock in areas where habitat restoration in the short-term is not feasible. For example, a property infested with noxious weeds that requires hydrologic

restoration is a good candidate for grazing management. When hydrologic features are improved, resulting in higher water table, habitat restoration is feasible. In the interim, grazing management is a very cost-effective tool to prevent noxious weeds from expanding. Grazing management prescriptions are developed and local ranchers selected to implement prescriptions at no cost.

In 2007, project-wide invasive plant control took place across approximately 4,800 acres of managed properties. This included use of herbicide spray, mowing and use of domestic livestock to suppress invasive plants. All herbicide spraying was approved and reported through the BPA herbicide reporting process.

### **Habitat Restoration Approach**

The Yakama Nation Wildlife Program focuses on creating sustainable native habitat that provides a variety of wildlife, cultural and natural resource values. Terrestrial vegetation restoration occurs on an estimated 500-1,000 acres per year within the project area. Intensive restoration activities require approximately five years of higher labor and materials costs, followed by smaller maintenance costs needed to prevent reinfestation of noxious weeds.

Sites vary widely in their hydrology and vegetation. Properties also vary in their use history; some properties were homesteads, others were farmed and still others were grazed or used as stockyards. The broad steps involved are site preparation, weed control, revegetation with grasses, and reintroduction of forbs and shrubs. The methods used are selected to reduce initial construction costs as well as long-term maintenance costs.

Pre-planting weed control typically occurs for 1-3 years to control or suppress weed species required to allow native plant establishment. Native grasses adapted to particular site conditions are seeded using rangeland drills in the fall prior to rains. Genetically local seed sources of Basin wildrye (*Elymus cinereus*), bluebunch wheatgrass (*Pseudoregneria spicata*), and squirreltail (*Elymus elymoides*) are available; these species were collected from the Reservation and are propagated as a seed crop by a regional seed producer. Occasionally, funding is supplemented by NRCS grants such as the Wildlife Habitat Improvement Program or groups such as Pheasants Forever funding for purchase of native grass seed. Post-planting weed control generally is required for 1-2 years as slow-growing species native to the arid west become established. Upland native shrubs and forbs may be reintroduced after native grasses are established. Costs per acre are kept to a minimum by utilizing large-scale agricultural methods and rotating weed control techniques to reduce chemical herbicide use.

#### *Site preparation*

- removal of structures, debris and interior fences
- construction of interior or exterior fences to exclude trespass cattle
- removal of invasive trees that prevent restoration



*Weed control*

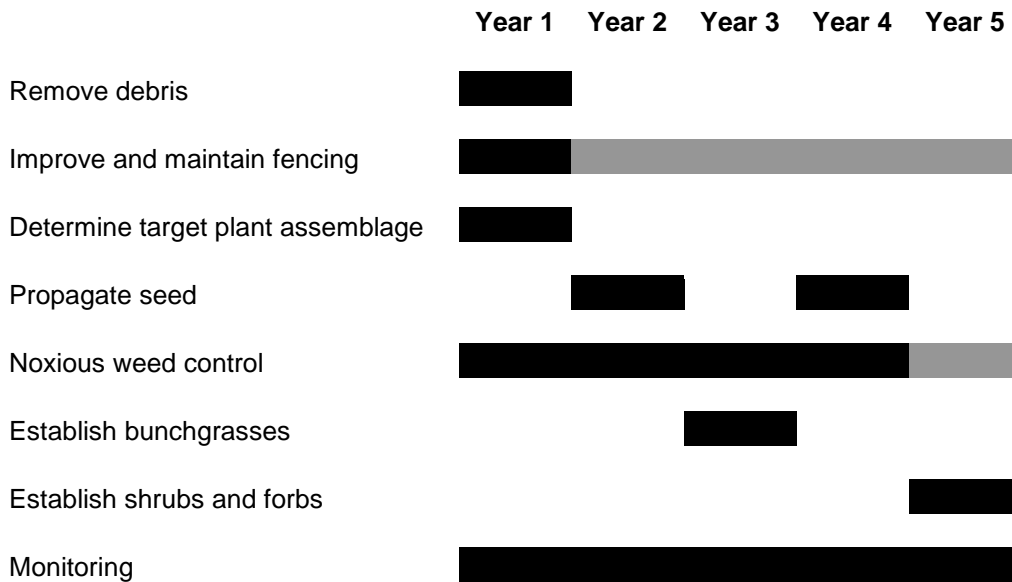
- weed control prior to revegetation
  - 1-3 years pre-treatment for perennial/difficult to control weeds
  - 1 year treatment for annual weeds
- weed control after revegetation
  - 1-3 years treatment during grass establishment to control broadleaf weeds.
- includes mowing, disking, broadcast spray of herbicides and hand spray of herbicides.

*Revegetation*

- native bunchgrasses are introduced after weeds are successfully suppressed
- native forbs and shrubs are introduced after grass establishment is successful
- grasses and shrubs grow very slowly in our region (6-9” average precipitation), especially with deeper water tables’

The table below illustrates the average timeline for floodplain terrace restoration projects:

**RESTORATION TIMELINE**



Terrestrial vegetation restoration activities occurred on approximately 920 acres in the project area, which included site preparation (removal of internal fences and debris, improvement of property boundary fences, and site-specific weed control) and native plant revegetation (seeding and planting native bunchgrasses and shrubs).

- Buena
- Campbell Road (South Buck Little)
- Carl
- Graves
- North White Swan
- Old Goldendale (Pumphouse Road)
- Satus Wildlife Area

South Lateral A  
Tule Road (2006 site)  
Tule Road (2007 site)

Debris removal occurred on approximately 40 acres of the project area, including removing an old homesites, structures and non-native trees. A contractor was employed to complete this site preparation work. Properties treated during the 2008-09 year are:  
Meninick

Site-specific weed treatments to prepare for restoration were conducted at least once on approximately 880 acres, which included mowing, disking and herbicide spray to kill invasive plant species that compete with reintroduced native species. Herbicide sprays and adjuvants used, as well as spray zones, follow the BPA-approved list of chemicals and treatment restrictions. Target weed species on acquired properties include: Russian olive (*Eleaegnus angustifolia*) knapweeds (*Acroptilon repens* and *Centaurea ssp.*), purple mustard (*Chorispora tenella*), Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), field bindweed (*Convolvulus arvensis*), kochia (*Kochia scoparia*), prickly lettuce (*Lactuca serriola*), and perennial pepperweed (*Lepidium latifolium*). Sites infested with perennial weed species typically require at least two years of weed control to kill underground root structures, prior to planting.

Figure 1. Photograph of Tule Road restoration before treatment in spring 2006.



Figure 2. Photograph of Tule Road restoration in spring 2008 following two years of invasive plant treatment and direct seeding of native bunchgrasses. Small plants are one-year old basin wildrye (*Leymus cinereus*), approximately 18 months after planting.



Native grasses adapted to particular site conditions are seeded using rangeland drills in the fall prior to rains. Basin wildrye (*Leymus cinereus*) and bluebunch wheatgrass (*Pseudoregneria spicata*) were collected locally from the Reservation in 2002 and 2005 and are grown for restoration projects at a regional seed producer. In 2007, squirreltail (*Elymus elymoides*) was collected in 2008 and 2009 and provided to a local grower for seed increase. Pheasants Forever provided funding for purchase of native grass seed and for broadcast herbicide treatments through fall 2008. Post-planting weed control occurs for 1-2 years following planting, as slow-growing species native to the arid west become established. Upland native shrubs and forbs are reintroduced after native grasses are established. Costs per acre are kept to a minimum by utilizing large-scale agricultural methods and rotating weed control techniques to reduce chemical herbicide use.

In September and October 2008, 149 acres were replanted with native grass seed. At the Buena property, approximately 46 acres were planted with a mix of basin wildrye, Sandberg's bluegrass (*Poa secunda*) and bluebunch wheatgrass using a no-till drill. At the Graves property, 83 acres were seeded with a mix of basin wildrye, bluebunch wheatgrass, squirreltail, and Sandberg's bluegrass. At the North White Swan property (east site), an area of approximately 10 acres was flooded following the previous planting and was reseeded with bluebunch wheatgrass, Sandberg's bluegrass and squirreltail. At the Tule Road property, approximately 110 acres was seeded with basin wildrye, saltgrass (*Distichlis spicata*) and Sandberg's bluegrass. The seeded areas were treated for weeds in late winter/early spring 2008 to suppress competition with germinating native grasses.

In April 2008, approximately 500 plants were planted on three units in the South Lateral A property, and on the South Buck Little portion of the Campbell Road property. Over two dozen volunteers from Pheasants Forever, Quail Forever and the local community joined

the effort. Sagebrush were grown in 10 cubic inch containers with soil; the soil was removed with water prior to planting to reduce water loss. All other species were grown as bare root plants. After planting, a wood chip mulch was placed around the base of each plant in a one to two feet around the plant to suppress weed growth and reduce water loss during plant establishment. Plants were irrigated from a water truck every two to three weeks during the summer drought.

*Figure 4. Seeding in October 2008 at the Buena property using a no-till drill seeder.*



*Figure 5. Approximately 500 shrubs were planted at the South Lateral A and Campbell Road properties in April 2008. Species included sagebrush (*Artemisia tridentata* ssp. *tridentata*), golden currant (*Ribes aureum*), chokecherry (*Prunus virginiana*), and mock-orange (*Philadelphus lewisii*). Survival estimates are presented in the “Monitoring Vegetation Restoration” section.*



*Figure 6. Transplants were planted as bare root seedlings. After transplanting, a wood chip mulch (oak and pine) was applied to a 2-foot radius around the plant. Plants were irrigated with 1-2 gallons of water every 2-3 weeks during the summer drought. Plants were tagged at the time of planting for survival monitoring the following spring. For estimates of survival, see the “Monitoring Vegetation Restoration” section.*



# Monitoring Vegetation Restoration Sites

## Photomonitoring

Photomonitoring was continued at vegetation restoration sites on several properties:

- Bailey
- Buena
- Campbell Road units
- North White Swan
- Old Goldendale (Pumphouse Road)
- South Lateral A
- West Plank/Tule Road

Permanent photomonitoring points were established in spring and summer 2005 and 2006. Photograph locations were marked with GPS and landmarks and the compass bearing of each photograph direction was recorded for relocation. Points were revisited to provide a qualitative evaluation of changes in habitat from protection, weed control and native plant revegetation efforts. Additional photomonitoring points will be established at new restoration sites as work continues. Following is an example of photomonitoring data that has been collected. Each site has photomonitoring sites set up in a similar fashion.

### **West Plank – Tule Road Restoration 2006 – PHOTOMONITORING POINTS**

All points are in magnetic north. Camera used is Fuji s5100, full wideangle lens.  
Projected Coordinate System:  
NAD\_1983\_StatePlane\_Washington\_South\_FIPS\_4602\_Feet  
Projection: Lambert\_Conformal\_Conic.  
Initial photos taken 4-7-2006.

Point 1 – Standing at the base of the power/phone pole to the south of the house at the end of Tule Road.

Y_PROJ	X_PROJ
343233.22281707	1692681.73554716

1A – 260 degrees. Looking West to the knob on the South side of Toppenish Ridge.



Following are examples of photomonitoring at selected sites:

Buena Property

**Figure 1.** Buena property, July 2005, prior to beginning restoration activities. Invasive plants including prickly lettuce (*Lactuca serriola*), poison hemlock (*Conium maculatum*) and tumble mustard (*Sisymbrium altissimum*) are visible in the frame.



**Figure 2.** Buena property, May 2008, following nearly three years of weed control. The site was planted in October 2008.





North White Swan Property

**Figure 3.** *North White Swan property during weed control activities, but prior to fencing and revegetation, in June 2006.*



**Figure 4.** *North White Swan property, September 2008, 10 months following planting of native grasses. Bunchgrasses are visible in the foreground and background.*



Old Goldendale Property

**Figure 5.** *Old Goldendale (Pumphouse Road) property in July 2005, prior to restoration activities. The site was dominated by Kochia scoparia, whitetop (Cardaria draba), and perennial pepperweed (Lepidium latifolium).*



**Figure 6.** *Old Goldendale (Pumphouse Road) property in August 2006 following 12 months of weed control. Practices included mechanical and chemical weed control.*



**Figure 7.** *Old Goldendale (Pumphouse Road) property in September 2008, nearly two years following revegetation with native bunchgrasses. Basin wildrye plants are visible in foreground and background.*



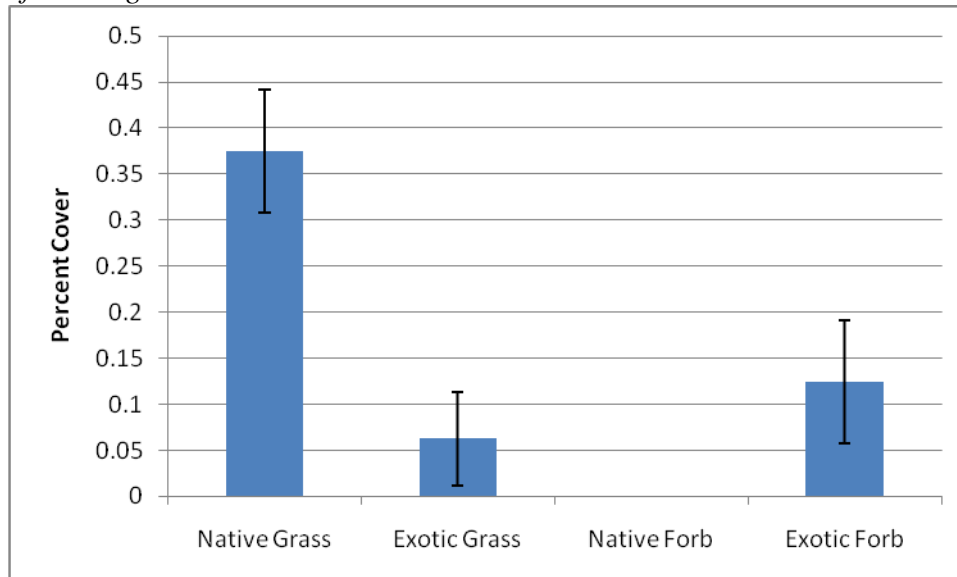
## Vegetation Monitoring

Vegetation monitoring was conducted for new hydrologic and vegetation restoration to evaluate vegetation response of projects in summer 2008. Monitoring focused on establishment of native bunchgrasses to suppress invasive plants and improve habitat. During the 2008 season, restoration sites in the South Lateral A, North White Swan, Pumphouse Road and Tule Road properties were monitored. A systematic survey method is used that employs temporary, random sampling locations for rapid surveys, easy repeatability, and good interpretation of results across an entire site. Below is summarized native bunchgrass establishment data.

### South Lateral A – Unit 8

	LECI (basin wildrye)	PSSP (bluebunch wheatgrass)	POSE (Sandberg's bluegrass)
Average seedlings/m <sup>2</sup>	4.25	1.50	0.00
Std error	1.49	1.01	0.00
Average seedlings/acre	17,199.14	6,070.28	0.00
Lbs/acre seeded	5.10	2.13	0.77
Approx seeds/lb	130,000.00	135,000.00	926,000.00
Seeds/acre	663,000.00	286,875.00	36,151.95
Establishment rate	2.59%	2.12%	0.00%

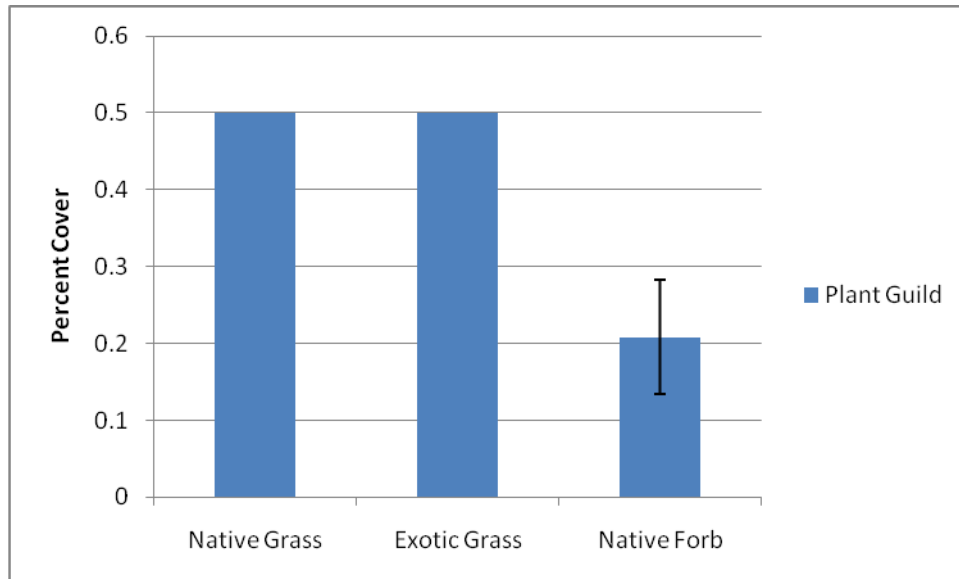
**Figure 8.** *Percent cover of vegetation of each of four primary plant guilds on the site. Data was collected in spring 2008, approximately 7 months following seeding of native grasses.*



North White Swan – West 30

	LECI (basin wildrye)	PSSP (bluebunch wheatgrass)	POSE (Sandberg's bluegrass)
Avg Seedlings/m2	21.83	0	0
Avg Seedlings/acre	88,356.37	0	0
Lbs/acre seeded	5.1	2.13	0.77
Approx seeds/lb	130,000	135,000	926000
Seeds/acre	663,000	286,875	36,151.95
Establishment rate	13.33	0	0

**Figure 9.** *Percent cover of vegetation of three primary plant guilds on the site. Data was collected in spring 2008, approximately 7 months following seeding of native grasses.*

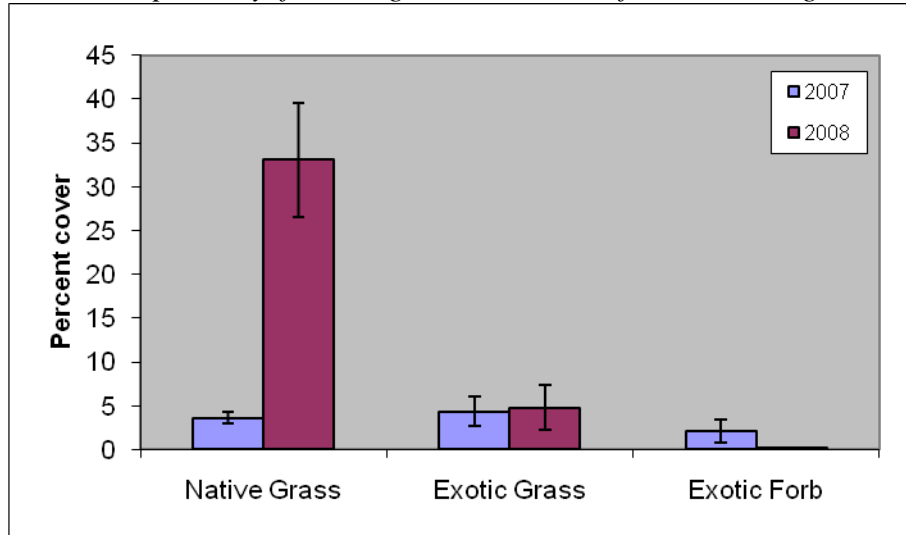


Old Goldendale (Pumphouse Road)

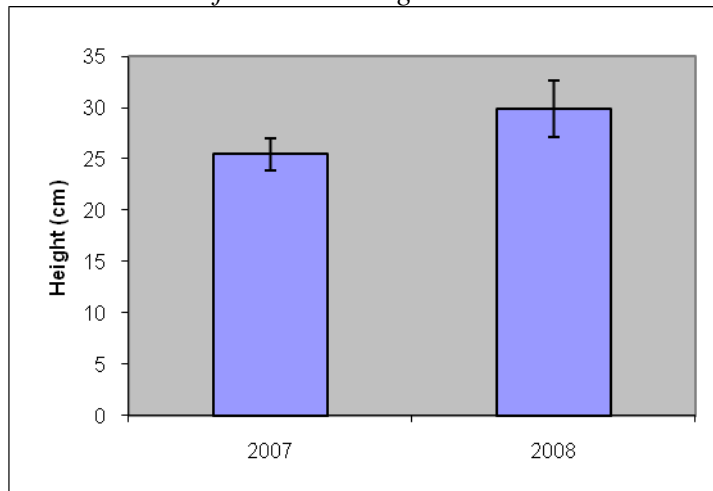
Germination rates for this site were reported in a previous annual report.

The graphs below show that while bunchgrasses had nearly reached mature height in the first season of growth, plant cover increased substantially during the second year.

**Figure 10.** *Percent cover of vegetation of each three primary plant guilds on the site. Data was collected in spring 2007 and spring 2008, approximately 7 and 20 months, respectively, following reintroduction of native bunchgrasses.*



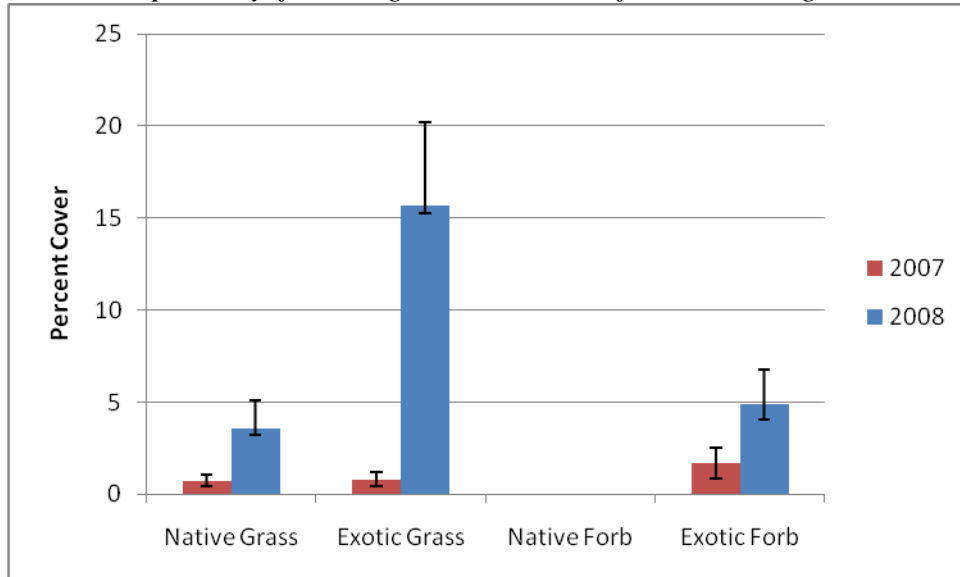
**Figure 11.** *Height of native bunchgrasses on the site. Data was collected in spring 2007 and spring 2008, approximately 7 and 20 months, respectively, following reintroduction of native bunchgrasses.*



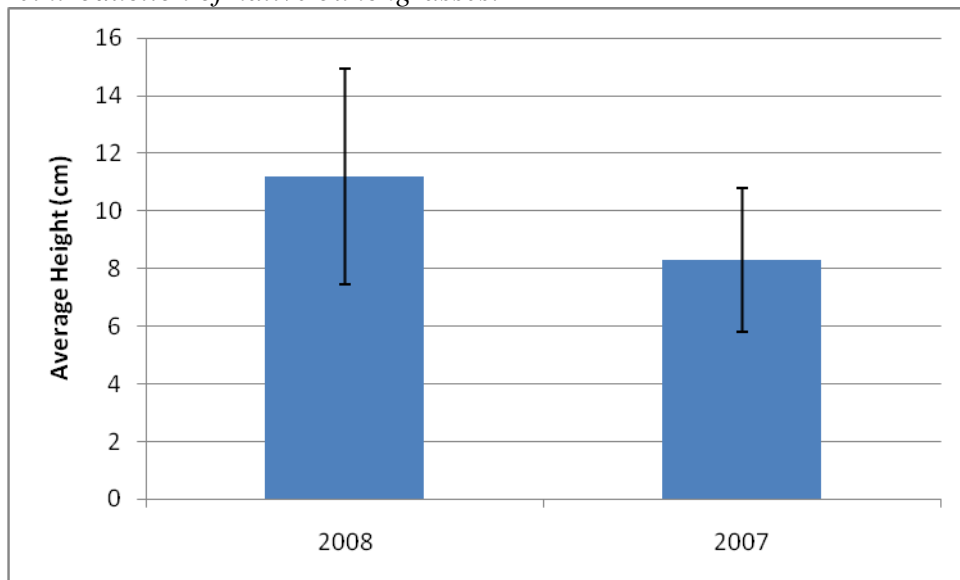
Tule Road

Germination rates for this site were reported in a previous annual report.

**Figure 12.** *Percent cover of vegetation of each four primary plant guilds on the site. Data was collected in spring 2007 and spring 2008, approximately 7 and 20 months, respectively, following reintroduction of native bunchgrasses.*



**Figure 13.** *Height of native bunchgrasses on the site. Data was collected in spring 2007 and spring 2008, approximately 7 and 20 months, respectively, following reintroduction of native bunchgrasses.*



In addition, pre-project monitoring of a hydrologic restoration site at Tule Road, funded partially through a North American Wetlands Conservation Act grant, was completed. Restoration activities will be completed in fall 2009, and post-project monitoring will occur in summer 2010. Monitoring included establishment of permanent photomonitoring points, line-point intercept transects to evaluate changes in shrub cover, and greenline monitoring following BLM and NRCS monitoring protocols.