State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Resource Management and Policy Division/Wildlife Branch/Waterfowl Program
1812 9th Street, Sacramento CA 95811

May 27, 2010

Attention: Government Documents Section

Enclosed is a copy of the following document prepared by the California Department of Fish and Game in compliance with the California Environmental Quality Act.

Draft Environmental Document Regarding Migratory Game Bird Hunting (Waterfowl, Coots, Moorhens)

To provide the public with an opportunity to review and comment on the proposals contained in this document, please make it available for public review until July 20, 2010.

If you have any questions regarding this request, please contact me at the letterhead address or by telephone at (916) 445-3555.

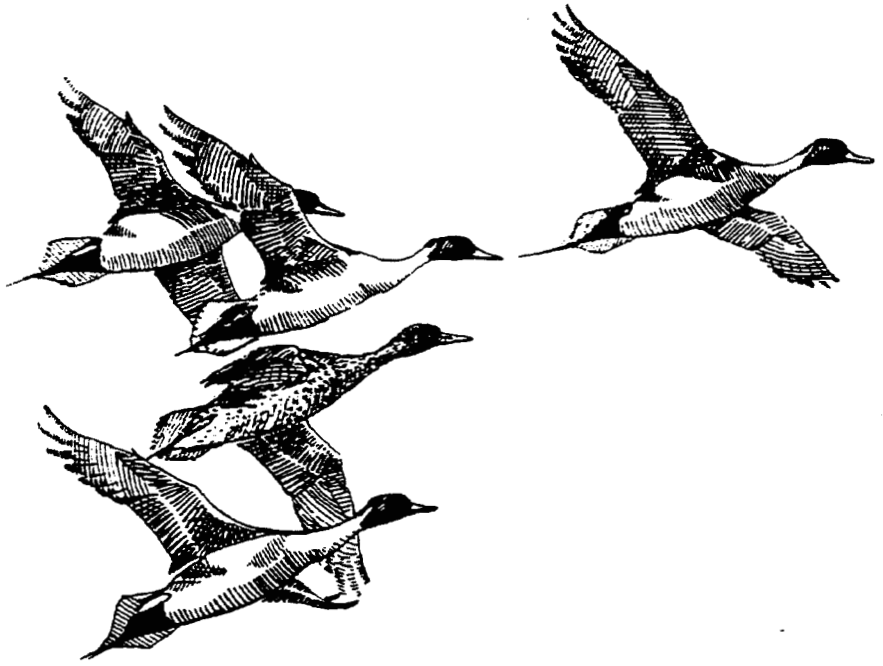
Sincerely,

Eric Loft, Chief
Wildlife Programs Branch

Enclosure

DRAFT
ENVIRONMENTAL DOCUMENT
Section 502, Title 14
California Code of Regulations

MIGRATORY GAME BIRD HUNTING
(WATERFOWL, COOTS, MOORHENS)



June 3, 2010

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

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CHAPTER 1 - SUMMARY

PROPOSED PROJECT AND ALTERNATIVES

The project discussed in this document (the proposed project) involves modifications to the current waterfowl hunting regulations for the 2010-2011 waterfowl hunting season. Specifically, the Department is proposing to:

- Increase the season length to 105 days for Large Canada geese in the Balance of State Zone, excluding the North Coast Special Management Area, and split the season into two segments.

- Increase the Small Canada goose daily bag limit from 1 per day to 2 – 6 per day in the Northeastern Zone. The increase is contingent upon the Small Canada goose bag limit in adjacent areas in Oregon. California limits should match the adjacent Oregon zone bag limit. The proposed range is necessary, as the status of Oregon's recommendation is uncertain at this time.

- Open the Northern Brant and Balance of State Brant Special Management Areas on November 7.

- Provide a range of waterfowl hunting season lengths (which may be split into two segments) between 38 and 107 days and beginning and ending dates for all hunting methods. A range of daily bag limits are also given for ducks in all zones. Federal regulations require that California's hunting regulations in the Colorado River Zone conform to those of Arizona.

The U.S. Fish and Wildlife Service (Service) will establish the frameworks in early August after it analyzes current waterfowl population data and considers input from the Flyway Councils and the public. The Federal frameworks specify the outside dates, total number of hunting days, bag limits, shooting hours, and methods of take authorized for migratory game birds. The Department will recommend specific season dates and bag limits to the Commission after those frameworks are established.

The Commission may not select more liberal season dates or bag limits than those set by the Federal frameworks. Therefore, the decisions of the Commission and the recommendations of the Department to the Commission center on the question of whether or not more restrictive or protective State regulations are necessary to keep migratory game bird populations in California in a healthy and productive condition.

The Department is also providing the Commission with a range of alternatives to the proposed project that could feasibly attain the basic objectives of the project. Table 1 summarizes the Department findings that there are no significant long-term adverse impacts associated with the proposed project or any of the project alternatives considered for the 2010-2011 waterfowl hunting regulations.

SUMMARY OF IMPACTS AND MITIGATION

Table 1. Summary of Alternatives and Their Impacts

Alternative	Description	Significant Impact	Mitigation
Proposed Project	Increase the season length to 105 days for Large Canada geese in the Balance of State Zone, excluding the North Coast Special Management Area, and split the season into two segments. Increase the Small Canada goose daily bag limit to 2 – 6 per day in the Northeastern Zone. The increase is contingent upon the Small Canada goose bag limit in Oregon. California limits should match the adjacent Oregon zone bag limit. The proposed range is necessary, as the status of Oregon's recommendation is uncertain at this time. Open the Northern Brant and Balance of State Brant Special Management Areas on November 7. Provide a range of waterfowl hunting season lengths (which may be split into two segments) between 38 and 107 days (including 2 youth waterfowl hunt days) and a range of beginning and ending dates for all hunting methods. A range of daily bag limits is also given for ducks in all zones. Federal regulations require that California's hunting regulations conform to those of Arizona in the Colorado River Zone.	No	N/A
Alternative 1. No Project	No change from the 2009-2010 hunting regulations.	No	N/A
Alternative 2. Reduced Season Lengths, Timing and Bag Limits	Reduce season lengths, timing, and/or bag limits by up to 50 percent.	No	N/A
Alternative 3. Elimination of All Mechanical Decoys.	Eliminate mechanical decoys as a method of take.	No	N/A

The Department concludes that the regulated harvest of migratory game birds within the Federal guidelines does not result in a significant adverse impact to their populations as analyzed in the 2006 Final Environmental Document for Migratory Game Bird Hunting of Waterfowl, Coots, and Moorhens. This is because the size of a wildlife population at any point in time is the result of the interaction between population (reproductive success and mortality rates) and its environment (habitat). Declines in habitat quality and quantity result in reduced carrying capacity, which results in corresponding declines in populations.

State and Federal roles in establishing waterfowl hunting regulations

Migratory birds are managed under the provisions of the Migratory Bird Treaty Act of July 3, 1918 (40. Stat. 755:16 U.S.C. 703 et seq.), Federal regulations [50 CFR 20 (K)(L)], as well as California statutes (Fish and Game Code sections 355 and 356) and regulations selected by the Commission.

The regulations governing the take of migratory game birds in California are selected by the Commission and forwarded to the Service each year. The regulations selected by the Commission must be from within frameworks established by the Service through the following generalized three-step process:

1. The Service, with assistance from the states, assesses the status of migratory game bird populations and establishes a set of regulation frameworks;

2. The Commission makes and forwards season selections to the Service regarding regulations for California; and

3. The Service and the State adopt the final regulations.

The Federal frameworks specify the outside dates, total number of hunting days, bag limits, shooting hours, and methods of take authorized for migratory game birds. Proposals selected by the Commission cannot be more liberal than the frameworks established by the Service (Fish and Game Code, Section 355).

In selecting hunting regulations, the Commission is governed by the State's Conservation of Wildlife Resources Policy (Fish and Game Code, Section 1801). This policy contains, among other things, objectives to maintain sufficient populations of wildlife resources in the State and to provide public hunting opportunities through regulated harvest where such harvest is consistent with maintaining healthy wildlife populations (Section 1801 California Fish and Game Code).

In May (75FR 27144 -27153), the Service indicated their intention to establish hunting regulations for the 2010-2011 hunting seasons, solicited public comments and established the annual schedule for meetings.

The Department is recommending 4 changes to the existing hunting regulations, two of which require a change in the existing frameworks. These two changes must be approved by both the Pacific Flyway Council at its meeting on July 23, 2010 and the Service at the July 29, 2010 Service Regulations Committee meeting. The Department's proposals for the 2010-2011 hunting season for waterfowl, coots, and moorhens are based on the most current Federal frameworks, which were established for 2009-2010.

The 2009-10 Federal Frameworks Pertaining to California (74 FR 48831-48832)

Ducks, Mergansers, Coots, Common Moorhens, and Purple Gallinules
Hunting Seasons and Duck Limits: Concurrent 107 days. The daily bag limit is 7 ducks and mergansers, including no more than 2 female mallards, 2 pintail, 3 scaup, 1 canvasback, and 2 redheads. For scaup, the season length would be 86 days, which could be split according to applicable zones/split duck hunting configurations approved for each State. The season on coots and common moorhens may be between the outside dates for the season on ducks, but not to exceed 107 days. Coot, Common Moorhen, and Purple Gallinule Limits: The daily bag and possession limits of coots, common moorhens, and purple gallinules are 25, singly or in the aggregate.

Outside Dates: Between the Saturday nearest September 24 (September 26) and the last Sunday in January (January 31).

Zoning and Split Seasons: Arizona, California, Idaho, Nevada, Oregon, Utah, Washington, and Wyoming may select hunting seasons by zones. Arizona, California, Idaho, Nevada, Oregon, Utah, Washington, and Wyoming may split their seasons into two segments. Colorado, Montana, and New Mexico may split their seasons into three segments.

Colorado River Zone, California: Seasons and limits shall be the same as seasons and limits selected in the adjacent portion of Arizona (South Zone).

Geese
Season Lengths, Outside Dates, and Limits

California, Oregon, and Washington:

Dark geese: Except as subsequently noted, 100-day seasons may be selected, with outside dates between the Saturday nearest October 1 (October 3), and the last Sunday in January (January 31). The basic daily bag limit is 4 dark geese, except the dark goose bag limit does not include brant.

Light geese: Except as subsequently noted, 107-day seasons may be selected, with outside dates between the Saturday nearest October 1 (October 3), and March 10. The daily bag limit is 6 light geese.

Split Seasons: Unless otherwise specified, seasons for geese may be split into up to 3 segments. Three-way split seasons for Canada geese and white-fronted geese require Pacific Flyway Council and U.S. Fish and Wildlife Service approval and a 3-year evaluation by each participating State.

California:

Northeastern Zone: The daily bag limit is 6 dark geese and may include no more than 1 cackling Canada goose or 1 Aleutian Canada goose.

Balance-of-the-State Zone (includes Southern San Joaquin Valley zone): Limits may not include more than 6 dark geese per day. In the Sacramento Valley Special Management Area, the season on white-fronted geese must end on or before December 14, and the daily bag limit shall contain no more than 2 white-fronted geese. In the North Coast Special Management Area, 107- day seasons may be selected, with outside dates between the Saturday nearest October 1 (October 3) and March 10. Hunting days that occur after the last Sunday in January shall be concurrent with Oregon's South Coast Zone.

Brant Season
California may select a 30-day season. Days must be consecutive. Washington and California may select hunting seasons by up to two zones. The daily bag limit is 2 brant and is in addition to dark goose limits. In Oregon and California, the brant season must end no later than December 15.

Shooting Hours – From One-half hour before sunrise to sunset.

AREAS OF CONTROVERSY

A public scoping session regarding the preparation of environmental documents for hunting waterfowl was held on February 11, 2010 at the Wildlife Branch office located at 1812 Ninth Street, Sacramento. No areas of controversy regarding migratory bird hunting were identified at that meeting but the 3 attendees recommended specific hunting regulation changes and those proposals are included in Table 2, Proposed Season Dates and Bag Limits for 2010-11. The proposals will also be addressed in the Administrative Procedures Act process. Some members of the public have expressed concern over the use of mechanical spinning wing decoys in the use of taking waterfowl during the past several hunting seasons. Specifically, since 2002 about 100 letters and or public testimony has been received by the Fish and Game Commission to ban mechanically spinning wing decoys while only about 12 letters of support or public testimony in favor of mechanically spinning wing decoys during the same time period (Department files). Similarly, the Commission has received numerous letters both supporting and opposing the continued hunting in Morro Bay. Concerns about the effect of climate change since the 2006 Final Environmental Document for Migratory Game Bird Hunting of Waterfowl, Coots, and Moorhens was published led to a discussion of this topic in Appendix F.

ISSUES TO BE RESOLVED

As provided by existing law, the Commission is the decision-making body (lead agency) considering the proposed project, while the Department has responsibility for conducting management activities such as resource assessments, preparing management plans, operating public hunting opportunities and enforcing laws and regulations. The primary issue for the Commission to resolve is whether to change waterfowl hunting regulations, within the federal framework, as an element of waterfowl management. If such changes are authorized, the Commission will specify the areas, season lengths, and bag and possession limits and other appropriate special conditions.

FUNCTIONAL EQUIVALANCY

The California Environmental Quality Act (CEQA) requires all public agencies in the State to evaluate the environmental impacts of projects they approve, including regulations, which may have a potential to significantly affect the environment. CEQA review of the proposed project will be conducted in accordance with the Commission's certified regulatory program (CRP) approved by the Secretary for the California Resources Agency pursuant to Public Resources Code section 21080.5 (See generally Cal. Code Regs., tit. 14, §§ 781.5, and 15251, subd. (b).). The Department has prepared this Environmental Document (ED) which is the functional equivalent of an Environmental Impact Report, on behalf of the Commission in compliance with this requirement. The ED provides the Commission, other agencies, and the general public with an objective assessment of the potential effects.

In addition, pursuant to Section 15087 of the CEQA Guidelines, this environmental document is available for public review for 45 days. During the review period, the public is encouraged to provide written comments regarding the environmental document to the Department of Fish and Game, Wildlife Branch, 1812 9th Street, Sacramento, California 95811. Comments must be received by the Department by 5:00 p.m. on July 20, 2010.

CHAPTER 2 - THE PROPOSED ACTION

The proposed project being considered consists of the following modifications to existing migratory game bird hunting regulations:

1. Increase the season length to 105 days for Large Canada geese in the Balance of State Zone and split the season into two segments.

2. Increase the Small Canada goose daily bag limit to 2-6 per day in the Northeastern Zone.

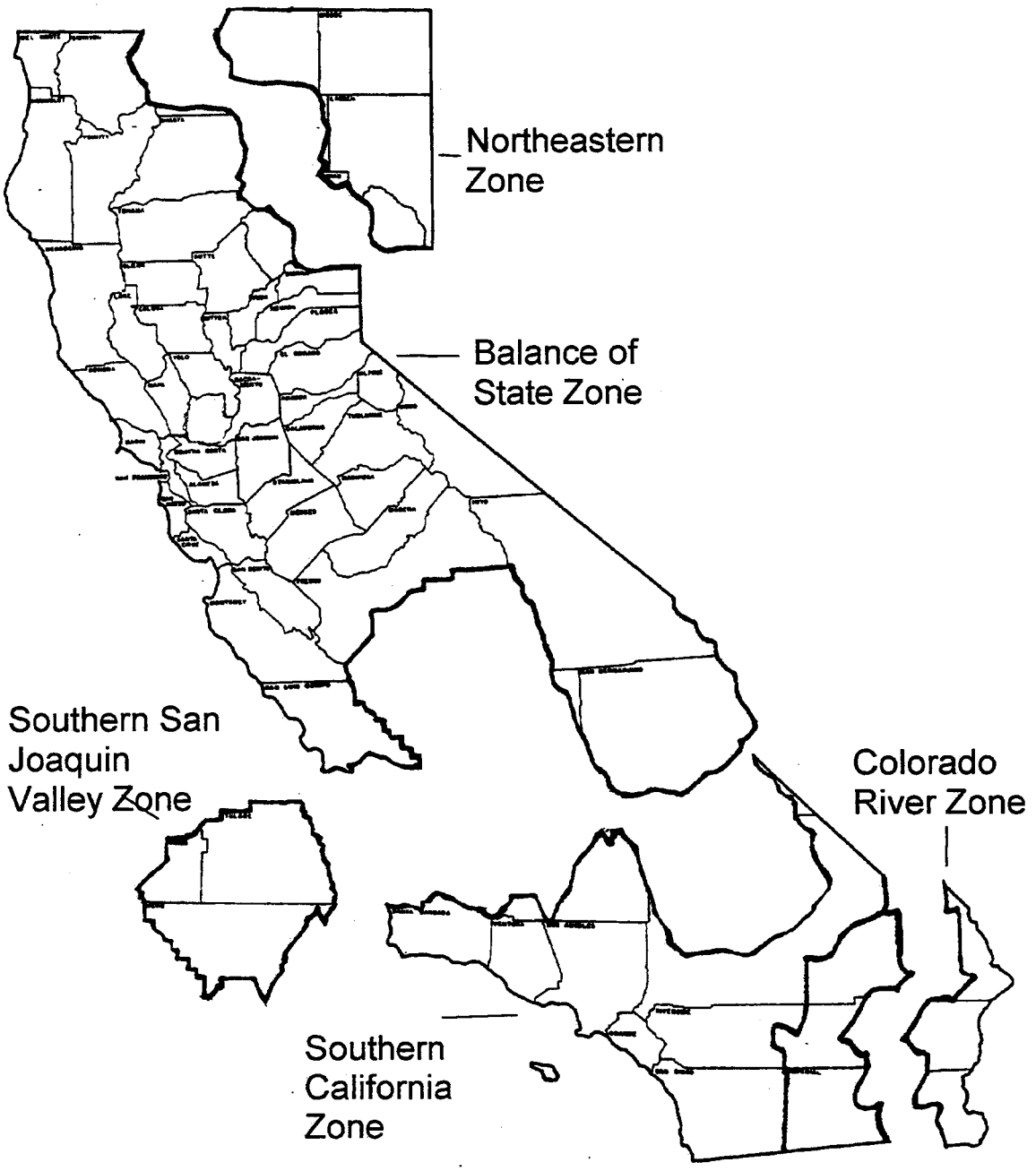
3. Open the Northern Brant and Balance of State Brant Special Management Areas on November 7.

4. Provide a range of waterfowl hunting season lengths (which may be split into two segments) between 38 and 107 days (including 2 youth waterfowl hunt days) and a range of beginning and ending dates for all hunting methods. A range of daily bag limits is also given for ducks in all zones. Federal regulations require that California's hunting regulations conform to those of Arizona in the Colorado River Zone.

Table 2. Proposed Season Dates and Bag Limits for 2010-2011

Species by Zone	Daily Bag Limit	Possession limit	Season Length
COOTS AND MOORHENS			
Northeastern CA	no change	no change	38-105 straight or split
So. San Joaquin Valley	no change	no change	38-105 straight or split
So. California	no change	no change	38-105 straight or split
Colorado River	no change	no change	no change
Balance of State	no change	no change	38-105 straight or split
DUCKS			
Statewide	4-7	no change	
EXCEPTIONS			
Mallard (max.)	3-7	no change	38-105 straight or split
Mallard Hen (max.)	1-2	no change	38-105 straight or split
Pintail (max.)	0-3	no change	0-105 straight or split
Redhead (max.)	no change	no change	38-105 straight or split
Scaup (max.)	0-7	no change	0-105 straight or split
Canvasbacks (max.)	0-3	no change	0-105 straight or split
Northeastern Calif.			38-105 straight or split
So. San Joaquin Valley			38-105 straight or split
Southern California			38-105 straight or split
Colorado River			no change
Balance of State			38-105 straight or split
GEESE			
Northeastern Calif.	no change	no change	no change
EXCEPTIONS			
Large Canada Geese (max.)	no change	no change	
White-Front (max.)	no change	no change	
Small Canada Geese (max.)	no change	no change	
White Geese (max.)	no change	no change	
So. San Joaquin Valley	no change	no change	no change
EXCEPTIONS			
Large Canada Geese (max.)	no change	no change	
White-Front (max.)	no change	no change	
Small Canada Geese (max)	no change	no change	
White Geese (max.)	no change	no change	
Southern Calif.	no change	no change	no change
EXCEPTIONS			
White Geese (max.)	no change	no change	
White-Front Geese (max.)	no change	no change	
Large Canada Geese (max.)	no change	no change	
Small Canada Geese (max)	no change	no change	
Colorado River	no change	no change	no change
EXCEPTIONS			
White Geese (max.)	no change	no change	
Dark Geese (max.)	no change	no change	
Balance of State	no change	no change	no change
EXCEPTIONS			
Large Canada Geese (max.)	no change	no change	100-105 straight or split
White-Front (max.)	no change	no change	
White Geese (max.)	no change	no change	
Small Canada Geese (max)	no change	no change	
Special Management Areas	**Species**		**Season**
North Coast	no change		no change
Humboldt Bay South Spit	no change		no change
Sacramento Valley (West)	no change		no change
Morro Bay	no change		no change
Martis Lake	no change		no change
North Coast Brant	no change		0-30
Balance of State Brant	no change		0-30
Imperial County	no change		no change

Figure 1. Waterfowl Zones in California



BACKGROUND AND EXISTING CONDITIONS

Background

Waterfowl, coots and moorhens are migratory game birds that use varied habitat types in different geographical areas of North America. Many individuals of these species reproduce in other states and countries and migrate in the fall and winter to California, although there are substantial resident populations of some species.

There are 36 species of migratory game birds (see the Final Environmental Document for Migratory Bird Hunting dated August 2006 for species accounts, and historical information on population trends and harvest) from two of the taxonomic families that occur in California, listed below. Migratory game birds are defined by convention and law as belonging to the following taxonomic families (USDI 1988a:1):

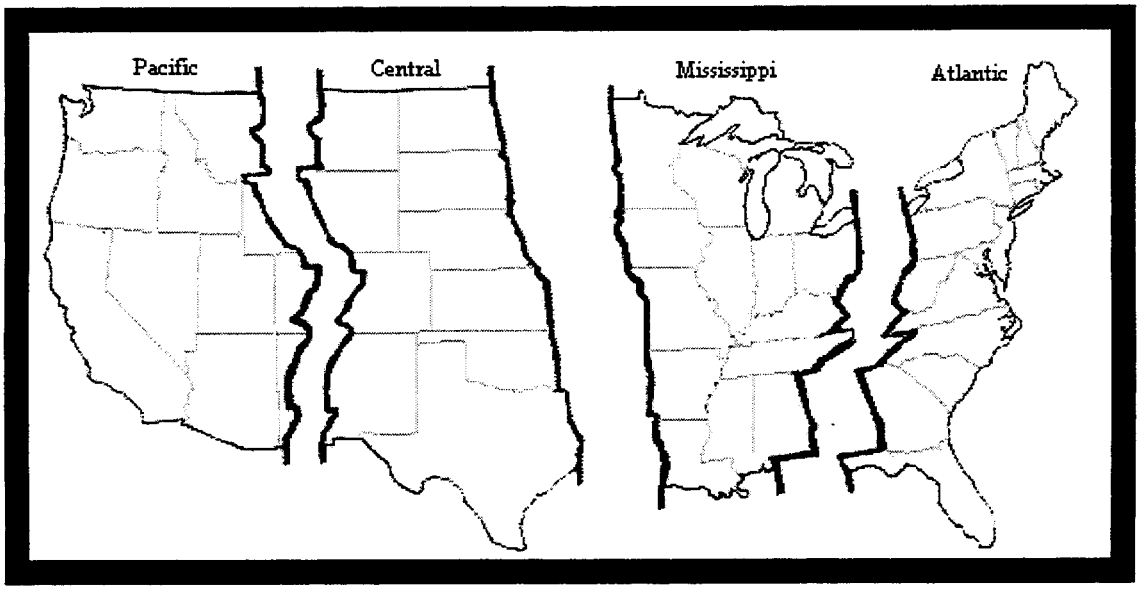
Anatidae (ducks, geese, brant, and swans);
Columbidae (doves and pigeons);
Gruidae (cranes);
Rallidae (rails, coots, and gallinules);
Scolopacidae (woodcock and snipe);
Corvidae (crows).

The two families discussed in this ED are *Anatidae* and *Rallidae*. These families are combined herein due to similarities in basic life history characteristics. These characteristics include: (1) the use of California as a migration and wintering area (Palmer 1976, Bellrose 1980, Zeiner *et al.* 1990); (2) the use of seasonal wetlands as roosting and foraging habitats (Bellrose 1980, Heitmeyer and Raveling 1988, USDI 1988a:31-56); and (3) for most duck species, similarities in nesting areas, habitat types, age at reproduction, and clutch sizes (Palmer 1976, Bellrose 1980, USDI 1988). Some differences among the species in these families exist. Geese and some duck species breed at an older age than do most ducks (Palmer 1976, Bellrose 1980). Deepwater and estuarine habitats are more important to some species (Palmer 1976, Bellrose 1980), and the use of dry and wet agricultural fields are more important to other species (Bellrose 1980, Zeiner *et al.* 1990).

Individuals and populations of migratory birds spend parts of the year in different geographical areas. Due to this geographic distribution and migratory nature, management for these species is based on geographic units, or flyways, (USDI 1975, USDI 1988a:63) comprised of several states (Figure 2).

These units, or flyways, incorporate populations that are generally discrete from populations in other units. Therefore, an analysis of the environmental effects of

Figure 2. Administrative Waterfowl Flyways



the proposed project in California must consider the status of the affected species at a flyway level.

Adaptive Harvest Management

In March 1995 (60FR 15642 -15648), the Service implemented a general harvest strategy for setting duck framework regulations and the process will be used again in 2010 (75FR 27144-27153). The regulatory process for migratory birds has evolved since the early 1900s from one that included little or no monitoring of populations and the establishment of regulations based on traditions, to today's more data-driven process (Johnson et al. 1993). The current process uses an "Adaptive Management Strategy" in which harvest objectives are clearly identified, and a single regulatory package is selected from a limited array of options. This single package is evaluated based on mathematical models, with the long-term goal of ensuring that duck populations are healthy and providing hunting opportunity while learning more about the effect of hunting mortality on population parameters (See Final Environmental Document for Migratory Game Bird Hunting August 2006).

The Service's duck harvest strategy balances hunting opportunities with the desire to achieve the duck population goals identified in the North American Waterfowl Management Plan (NAWMP). Currently, a set of four regulatory options, each containing flyway-specific season lengths, bag limits, and dates are being used. The selection of a specific option is recommended each year from a decision matrix based on mid-continent mallard breeding populations and habitat conditions in the current year, although the State continues to have the option to establish more restrictive regulations.

For the Pacific Flyway, the proposed regulatory packages vary primarily in season length (closed, 60, 86, or 107 days) and total duck bag limit (either four or seven ducks per day). Species- (mallards, pintail, scaup, redhead, and canvasback) and sex- (mallard) specific limits are contained within the AHM packages. Additionally, prescriptive regulation processes for pintail, canvasback and scaup have been adopted by the Service that determine daily bag limits depending on breeding population size, habitat conditions, and the season length established through the AHM process.

In March 2008, the Pacific Flyway Council recommended that the Service set duck season frameworks in the Pacific Flyway based on a separate modeling approach that uses data from western mallards rather than mallards from the mid-continent region. This is because most of the mallards harvested in the Pacific Flyway originate from within the Flyway. The Service adopted the separate mallard model in August 2008 and plans to continue the use of that approach in 2010 (75FR 27144-27153).

The western mallard approach uses the same regulatory packages as currently in use under continental AHM. Instead of a harvest objective constrained by the population goal in the NAWMP plan, the harvest objective for western mallards is based on a "shoulder approach", or a proportion of maximum sustained yield.

Current modeling suggests that western mallards have been harvested at about 80% of their maximum potential, compared to about 90% for mid-continent mallards under the continental AHM approach.

As in mid-continent AHM, daily bag limits and season length will be set based on the status of the mallard breeding population. Bag limits for other species, including those for which individual harvest strategies have been adopted (northern pintail, canvasbacks, scaup) based on mid-continent AHM will be used in the Pacific Flyway. The State continues to have the option to establish more restrictive regulations.

Existing Conditions

Northeastern Zone: In that portion of California lying east and north of a line beginning at the intersection of Interstate 5 with the California-Oregon line; south along Interstate 5 to its junction with Walters Lane south of the town of Yreka; west along Walters Lane to its junction with Easy Street; south along Easy Street to the junction with Old Highway 99; south along Old Highway 99 to the point of intersection with Interstate 5 north of the town of Weed; south along Interstate 5 to its junction with Highway 89; east and south along Highway 89 to Main Street in Greenville; north and east to its junction with North Valley Road; south to its junction of Diamond Mountain Road; north and east to its junction with North Arm Road; south and west to the junction of North Valley Road; south to the junction with Arlington Road (A22); west to the junction of Highway 89; south and west to the junction of Highway 70; east on Highway 70 to Highway 395; south and east on Highway 395 to the point of intersection with the California-Nevada state line; north along the California-Nevada state line to the junction of the California-Nevada-Oregon state lines west along the California-Oregon state line to the point of origin.

Ducks: From the second Saturday in October extending for 105 days, 7/day which may include 7 mallards, 2 hen mallard, 2 pintail, 1 canvasback, 2 redheads, 3 scaup (from the second Saturday in October extending for 86 days). Possession limit double the daily bag.

Geese: From the second Saturday in October extending for 100 days, 8/ day, up to 6 white geese, up to 4 white-fronts, up to 2 Large Canada geese, only 1 Small Canada goose. Possession limit double the daily bag.

Coots and Moorhens: Concurrent with Duck Season. 25/day. 25 in Possession.

Youth Hunting Days: The Saturday fourteen days before the opening of waterfowl season extending for 2 days.

Falconry Take of Ducks: Open concurrently with duck season extending for 105 days. 3/day. Possession limit double the daily bag.

Southern San Joaquin Valley Zone: All of Kings and Tulare counties and that portion of Kern County north of the Southern California Zone.

Ducks: A split season from the second Saturday in October extending for a period of 23 days and from the second Saturday in November extending for a period of 79 days, 7/day which may include, 7 mallards, 2 hen mallards, 2 pintail, 1 canvasback, 2 redheads, 3 scaup (from the second Saturday in November extending for 79 days). Possession limit double the daily bag.

Geese: From the fourth Saturday in October extending for 100 days, 8/ day, up to 6 white geese, up to 6 dark geese which may include 4 white-fronted geese. Possession limit double the daily bag.

Coots and Moorhens: Concurrent with Duck Season, 25/day. 25 in possession.

Youth Hunting Days: The Saturday following the closing of waterfowl season extending for 2 days.

Falconry Take of Ducks: Ducks only, concurrent with duck season and Jan 31-Feb 3. 3/day. Possession limit double the daily bag.

Southern California Zone: In that portion of southern California (but excluding the Colorado River zone) lying south and east of a line beginning at the mouth of the Santa Maria River at the Pacific Ocean; east along the Santa Maria River to where it crosses Highway 166 near the City of Santa Maria; east on Highway 166 to the junction with Highway 99; south on Highway 99 to the crest of the Tehachapi Mountains at Tejon Pass; east and north along the crest of the Tehachapi Mountains to where it intersects Highway 178 at Walker Pass; east on Highway 178 to the junction of Highway 395 at the town of Inyokern; south on Highway 395 to the junction of Highway 58; east on Highway 58 to the junction of Interstate 15; east on Interstate 15 to the junction with Highway 127; north on Highway 127 to the point of intersection with the California-Nevada state line.

Ducks: From the fourth Saturday in October extending for 100 days, 7/day which may include, 7 mallards, 2 hen mallards, 2 pintail, 1 canvasback, 2 redheads, 3 scaup (from the first Saturday in November extending for 86 days). Possession limit double the daily bag.

Geese: From the fourth Saturday in October extending for 100 days, 8/day, up to 6 white geese, up to 3 dark geese. Possession limit double the daily bag.

Coots and Moorhens: Concurrent with duck season, 25/day, 25 in possession.

Youth Hunting Days: The Saturday following the closing of waterfowl season extending for 2 days.

Falconry Take of Ducks: Concurrent with duck season extending for 107 days. 3/day. Possession limit double the daily bag.

Colorado River Zone: In those portions of San Bernardino, Riverside, and Imperial counties lying east of the following lines: Beginning at the intersection of Highway 95 with the California-Nevada state line; south along Highway 95 to Vidal Junction; south through the town of Rice to the San Bernardino-Riverside county line on a road known as "Aqueduct Road" in San Bernardino County; south from the San Bernardino-Riverside county line on road known in Riverside County as the "Desert Center to Rice Road" to the town of Desert Center; east 31 miles on Interstate 10 to its intersection with the Wiley Well Road; south on this road to Wiley Well; southeast along the Army-Milpitas Road to the Blythe, Brawley, Davis Lake intersections; south on the Blythe-Brawley paved road to its intersection with the Ogilby and Tumco Mine Road; south on this road to Highway 80; east seven miles on Highway 80 to its intersection with the Andrade-Algodones Road; south on this paved road to the intersection of the Mexican boundary line at Algodones, Mexico.

Ducks: From the Friday after the third Sunday in October extending for 101 days, 7/day which may include 7 mallards, 2 hen mallards or Mexican-like ducks, 2 pintail, 1 canvasback, 2 redheads, 3 scaup (from the first Saturday in November extending for 86 days). Possession limit double the daily bag.

Geese: From October 23 extending for 101 days, 6/ day, up to 6 white geese, up to 3 dark geese. Possession limit double the daily bag.

Coots and Moorhens: Concurrent with Duck Season, 25/day, 25 in possession.

Youth Hunting Days: The Saturday following the closing for waterfowl season.

Falconry Take of Ducks: Ducks only. Concurrent with duck season and from January 31 – Feb 4. 3/day. Possession limit double the daily bag.

Balance of State Zone: That portion of the state not included in Northeastern California, Southern California, Colorado River or the Southern San Joaquin Valley zones.

Ducks: From the fourth Saturday in October extending for 100 days, 7/day which may include 7 mallards, 2 hen mallards, 2 pintail, 1 canvasback, 2 redheads, 3 scaup (from the first Saturday in November extending for 86 days). Possession limit double the daily bag.

Geese: From the fourth Saturday in October extending for 100 days except in the Sacramento Valley (West) Special Management Area where the white-fronted goose season will close after December 14, 8/ day, up to 6 white geese, up to 6 dark geese which may include 4 white-fronted geese. Possession limit double the daily bag.

Coots and Moorhens: Concurrent with Duck Season, 25/day. 25 in possession

Youth Hunting Days: The Saturday following the closing of waterfowl season extending for 2 days.

Falconry Take of Ducks: Open concurrently with duck season and extending for 107 days, 3/day. Possession limit double the daily bag.

North Coast Special Management Area: All of Del Norte and Humboldt counties.

All Canada Geese: Nov 7 – Jan 31 and Feb 20 – Mar 10, except for Large Canada geese which are closed after the last Sunday in January. Only private lands are open to hunting during any season beyond the last Sunday in January. 6/day, only 1 may be a Large Canada goose. Possession limit double the daily bag.

Falconry Take of Ducks: Geese only. Concurrent with Small Canada goose season. 3/day. Possession limit double the daily bag.

Humboldt Bay South Spit Special Management Area: Beginning at the intersection of the north boundary of Table Bluff County Park and the South Jetty Road; north along the South Jetty Road to the South Jetty; west along the South Jetty to the mean low water line of the Pacific Ocean; south along the mean low water line to its intersection with the north boundary of the Table Bluff County Park; east along the north boundary of the Table Bluff County Park to the point of origin.

All species: Closed during brant season

Sacramento Valley (West) Special Management Area: Beginning at the town of Willows; south on Interstate 5 to the junction with Hahn Road; east on Hahn Road and the Grimes-Arbuckle Road to the town of Grimes; north on Highway 45 to its junction with Highway 162; north on Highway 45-162 to the town of Glenn; west on Highway 162 to the point of beginning.

White-fronted geese: Closed after Dec 14, 2/day. Possession limit double the daily bag.

Morro Bay Special Management Area: Beginning at a point where the high tide line intersects the State Park boundary west of Cuesta by the Sea; northeasterly to a point 200 yards offshore of the high tide line at the end of Mitchell Drive in Baywood Park; northeasterly to a point 200 yards offshore of the high tide line west of the Morro Bay State Park Boundary, adjacent to Baywood Park; north to a point 300 yards south of the high tide line at the end of White Point; north along a line 400 yards offshore of the south boundary of the Morro Bay City limit to a point adjacent to Fairbanks Point; northwesterly to the high tide line on the sand spit; southerly along the high tide line of the sand spit to the south end of Morro Bay; easterly along the Park boundary at the high tide line to the beginning point.

All species: Open in designated areas only

Martis Creek Lake Special Management Area: The waters and shoreline of Martis Creek Lake, Placer and Nevada counties.

All species: Closed until Nov 16

Northern Brant Special Management Area: Del Norte, Humboldt and Mendocino Counties.

Black Brant: From the first Saturday in November extending for 30 days. Possession limit double the daily bag.

Balance of State Brant Special Management Area: That portion of the state not included in the Northern Brant Special Management Area.

Black Brant: From the second Saturday in November extending for 30 days. Possession limit double the daily bag.

Proposed changes and analysis

1. Increase the season length to 105 days for Large Canada geese in the Balance of State Zone, excluding the North Coast Special Management Area, and split the season into two segments.

   The existing regulations allow the season length for dark geese to be 100 days. The proposed change would increase the season length to 105 days for Large Canada geese in the Balance of State Zone (excluding the

North Coast Special Management Area) and split the season into two parts. This is expected to increase the harvest of Large Canada geese. The nesting range of Large Canada geese has expanded to include urban and suburban areas in the Central Valley. Complaints from private property owners regarding the effects of resident Canada geese occur regularly. In 2008, the Fish and Game Commission adopted changes to Section 503 which allow the destruction of nests and eggs. The increase in the Large Canada goose season length is intended to increase harvest, allow additional hunting opportunity and potentially reduce nuisance Canada goose complaints.

2. Increase the Small Canada goose daily bag limit to 2-6 per day in the Northeastern Zone.

   The existing regulation allows a Small Canada goose daily bag limit of 1. The proposed change would increase the bag limit to 2-6 per day in the Northeastern Zone. An increase to 2-6 per day is contingent upon the Small Canada goose bag limit in Oregon. If Oregon moves forward with an increase in their Small Canada goose bag limit then the California limits should match the adjacent Oregon zone bag limit. This is expected to increase the harvest of Small Canada geese. The proposed range is necessary, as the status of Oregon's recommendation is uncertain at this time. Flyway Council and Service approval is needed for these proposed changes. The increase in bag limit will only move forward if the Flyway Council and Service agree on lowering the population objective for Cackling Canada geese. Cacklers largely winter in Oregon in the Willamette Valley and tend to feed on stubble fields and grass farms. Crop depredation has increased significantly over the years and there is insufficient goose habitat on public lands to support an increasing population.

3. Open the Northern Brant and Balance of State Brant Special Management Areas on November 7.

   The existing regulation opens the brant season in the above Special Management Areas the first and second Saturday in November, respectively. The proposal would create a fixed opening date for the brant season in both areas but keep the season length at 30 days. The fixed opening date of November 7 would simplify regulations and potentially allow more hunting opportunity.

4. Provide a range of waterfowl hunting season lengths (which may be split into two segments) between 38 and 107 days (including 2 youth waterfowl hunt days) for all hunting methods. A range of daily bag limits is also given for ducks in all zones. Federal regulations require that California's hunting regulations conform to those of Arizona in the Colorado River Zone.

   The existing waterfowl hunting regulations establish specific season dates

and daily bag limits for each zone. This proposal provides ranges for the season dates and daily bag limits. These ranges are necessary as the specific opening and closing dates and daily bag limits can not be proposed until the California Waterfowl Breeding Population Survey is completed in May and the Service has established federal regulation "frameworks" for the 2010/11 waterfowl hunting season. The Service will establish the frameworks in late July after the analysis of current waterfowl population survey, other data, and input from the Flyway Councils and the public.

POLICY CONSIDERATIONS

The legislature formulates laws and policies regulating the management of fish and wildlife in California. The general wildlife conservation policy of the State is to encourage the conservation and maintenance of wildlife resources under the jurisdiction and influence of the State (Section 1801, Fish and Game Code). The policy includes several objectives, as follows:

1. To provide for the beneficial use and enjoyment of wildlife by all citizens of the State;
2. To perpetuate all species of wildlife for their intrinsic and ecological values, as well as for their direct benefits to man;
3. To provide for aesthetic, educational, and non-appropriative uses of the various wildlife species;
4. To maintain diversified recreational uses of wildlife, including hunting, as proper uses of certain designated species of wildlife, subject to regulations consistent with public safety, and a quality outdoor experience;
5. To provide for economic contributions to the citizens of the State through the recognition that wildlife is a renewable resource of the land by which economic return can accrue to the citizens of the State, individually and collectively, through regulated management. Such management shall be consistent with the maintenance of healthy and thriving wildlife resources and the public ownership status of the wildlife resource;
6. To alleviate economic losses or public health and safety problems caused by wildlife; and
7. To maintain sufficient populations of all species of wildlife and the habitat necessary to achieve the above-state objectives.

With respect to migratory game birds, Sections 355 and 356 of the Fish and Game Code provides that the Commission may adopt migratory game bird hunting regulations as long as they are within the federal frameworks.

The Department has concluded that the proposed project will not have a significant adverse effect on the environment. No mitigation measures or alternatives to the proposed project are needed.

POTENTIAL FOR SIGNIFICANT EFFECTS

Previous reviews of other potential environmental effects were analyzed extensively in previous environmental documents. The analysis of these fifteen factors regarding migratory game bird hunting were examined in the prior year environmental document (August 2006) certified by the Fish and Game Commission. The modifications proposed are to increase hunter opportunity and reduce depredation of some goose populations that winter in California.

Table 3. Impacts of Proposed Regulation Modification

EFFECTS	FACTORS ANALYZED	Proposed Project
EFFECTS OF	Habitat Degradation	Not Significant
	Diseases, Pesticides, and other Contaminants	Not Significant
	Illegal Harvest	Not Significant
	Subsistence Harvest	Not Significant
	Harvest Outside United States	Not Significant
	Major Development Projects	Not Significant
EFFECTS ON	Listed Species	Not Significant
	Migratory Bird Habitats	Not Significant
	Recreational Opportunities	Not Significant
	Economics	Not Significant
	Impacts on Individual Animals	Not Significant
CUMMULATIVE IMPACTS	Short-term uses and Long-term Productivity	Not Significant
	Growth Inducing Impacts	Not Significant
	Significant Irreversible Environmental Changes	Not Significant

CHAPTER 3 – ALTERNATIVES

The three California project alternatives evaluated herein are: (1) no project – no change from the 2009-2010 hunting regulations; (2) reduced season lengths and bag limits; and (3) elimination of all mechanical decoys.

Alternative 1. No project – no change from the 2009-2010 hunting regulations

This alternative provides identical season and bag limit regulations as the 2009-2010 seasons. Under this alternative, the Large Canada goose season would not increase to 105 days (split) in the Balance of State Zone; the Small Canada goose daily bag limit would remain at 1 in the Northeastern Zone; the Northern and Balance of State Brant Special Management Areas would keep the existing opening dates; and a range of waterfowl hunting season lengths (which may be split into two segments) between 38 and 107 days (including 2 youth waterfowl hunt days) for all hunting methods as well as a range of daily bag limits for ducks in all zones would not be proposed by the Department.

Advantages of This Alternative

Waterfowl regulations are inherently complicated and any changes may result in confusion for some members of the public. Maintaining the 2009-2010 regulations for the 2010-11 season may result in less confusion to some members of the public.

Disadvantages of This Alternative

The no change alternative provides less hunting opportunity compared to the proposed project. Also, some populations affected by the proposed regulation changes may continue to grow in size and lead to increased depredation complaints on private lands.

Conclusion Regarding Alternative 1

It is unlikely that significant irreversible impacts would occur immediately or statewide as a result of selecting the no change alternative. However, the no change alternative is not recommended because it does not provide hunting opportunities that are based on current population goals and levels. Accordingly, this alternative was not recommended.

Alternative 2. Reduced Season Lengths, Season Timing and Bag Limits

This alternative provides a suite of restrictions that when taken alone or in combination are expected to reduce harvests. This alternative could be selected by the Commission based on changes in Federal frameworks or a conclusion by the Commission that reduced harvests are a better alternative than the project or existing regulations. Under this alterative, for a generalized analysis, the length of each migratory bird season could be reduced by about 50 percent. For ducks, more conservative Adaptive Harvest Management regulatory alternatives (86 or 60 days) could be used. For brant, the 30-day season would be reduced to 15 days and for most other geese the season would be reduced from either 107 or 100 days to 51 days.

The Adaptive Harvest Management alternatives for the Pacific Flyway include total duck bag limits that range from 4 to 7 with differing restrictions on mallards and hen mallards. Other bag limit reductions considered in this alternative include a reduction from as many as 6 to as few as three geese depending on zone; a reduction in brant from two to one; and a reduction in the coot limit from 25 to 12 birds per day. Additionally, species-specific regulations, for pintail, redheads, canvasback or scaup could be further reduced under this alternative.

Advantages of This Alternative

Selection of Alternative 2, reduced season lengths, timing and bag limits, would reduce total harvest, although the magnitude of this reduction is not precisely predictable. This alternative has advantages only if the levels of harvest are suppressing populations. In 2008-2009, the estimated retrieved harvest in California was 1,634,300 ducks, 245,500 geese and 18,700 coots. If harvest regulation restrictions cause a larger than expected decline in hunter participation, harvests might be reduced by more than 50 percent. If, as experienced in the 1989-90 season, there is a drop in hunter participation but fall flights are larger or contain higher percentages of juveniles than are expected, harvests would probably not decline by 50 percent. If harvests declined by exactly 50 percent; approximately 817,150 ducks; 122,750 geese; and 9,350 coots would not be harvested in California. If waterfowl, coots and moorhens have access to habitat of sufficient quality and quantity and these populations are being suppressed due to the levels of harvest previously experienced, populations might increase in following years as a result of the selection of this alternative. This alternative would provide recreational opportunity for hunters and meet one of the goals of the Conservation of Wildlife Resources Policy (Fish and Game Code, Section 1801), which is to include hunting as part of maintaining diversified recreational uses of wildlife.

Non-consumptive opportunities to view migratory birds would not differ substantially from the proposed project, because while this would increase non-conflicting viewing days on hunting areas, these areas are a small percent of

total waterfowl habitat. Reduction in possible conflicts between non-consumptive and consumptive users would be a likely result of this alternative.

Disadvantages of This Alternative

Harvest restrictions for waterfowl, coots and moorhens would probably be a disincentive for many of those private landowners who provide habitat through flooding of seasonal wetlands and agricultural lands during the fall and winter. These habitats form the majority of available wintering habitat for waterfowl and wetland dependent wildlife in California (Heitmeyer et al. 1989). Habitat provided only during the hunting season would be available for a shorter time. For many of these private landowners, the short period of time allowed for hunting may be judged to be not worth the high costs associated with providing water and managing this habitat. This would reduce the amount of habitat available for waterfowl and other wetland dependent wildlife. Overcrowding, and as a result, reduced food resources and increased losses to diseases, would be expected.

Conclusion Regarding Alternative 2

Selection of this alternative might lead to a greater decline in participation by hunters. The reductions in the number of days that waterfowl, coots and moorhens could be hunted might not be deemed to be worth the costs of licenses, stamps, travel, and entry fees. A change in season timing is not likely to significantly affect the number of active hunters. A reduction in hunter participation would result in reduced revenues to the Department and the Service which are used to acquire, manage, and maintain vital habitats. If the reduced season length resulted in a lower hunting harvest and hunting mortality was additive to natural mortality, an increase in some populations of waterfowl would be possible. However, the Department concludes that this alternative alone would not result in a significant increase in waterfowl numbers in future years.

Alternative 3. Elimination of all mechanically- and artificially-powered spinning wing decoys as a method of take.

The use of mechanical or electronic duck decoys (also known as spinning wing decoys (SWDs), "rotoducks", "motoducks", motion wing decoys, etc.) may lead to increases in harvest beyond those anticipated by existing bag limits and season length. Some hunters and other members of the public are opposed to the use of these devices because they believe that the devices exceed the bounds of "fair chase" and eliminate the emphasis on traditional hunting skills needed to successfully hunt ducks, and the advantages detract from the experience and dedication needed to sustain the hunting tradition.

This alternative would eliminate the use of all mechanical and artificially powered spinning wing decoys as a method of take. The Department analyzed several

sources of information relative to the possible effects of spinning wing decoys and these analyses are provided in Appendix D.

Advantages of This Alternative

The evidence seems clear that spinning blade and spinning wing decoys increase harvest at the individual hunt level, and level of observed increases in harvest at the individual hunt level are not reflected in overall estimates of harvest (Appendix E). However, the role of harvest in duck population dynamics is not clearly understood and the effect of reducing harvest success at the individual hunt level may or may not result in observable changes in population parameters. Some members of the hunting public have expressed concerns that continual advances in technology ultimately detract from the traditional hunting experience and potentially may lead to a reduction in the support for waterfowl hunting. This is thought to be due to hunters becoming less dedicated to developing skills and investing in the activity to a level that generates support for conservation and potentially increasing the negative view of hunting by those that are currently not opposed to hunting. As technology continues to improve, debates such as the one over spinning blade and spinning wing devices would continue. A new debate over each new technological advance would seem likely. Resources would continually be re-directed to assess each new technological advance.

Disadvantages of This Alternative

As detailed in Appendix D, existing analyses do not clearly establish an effect of harvest on duck population dynamics. To some unmeasured extent, the use of SWD may influence more hunters to join or remain in hunting, thereby providing support for wetland and waterfowl conservation. Commercial enterprises that develop and market these devices would likely be opposed to their regulation. There is no information regarding other duck attracting devices currently in use and there is no basis to conclude that these devices increase duck harvest. Commercial enterprises exist or may be developed to increase technological improvements for attracting ducks.

Conclusions Regarding Alternative 3

The selection of this alternative would not result in a significant adverse environmental impact. As reported in Appendix D, to date, the Department is unable to scientifically associate observed changes in duck population status, except perhaps for certain cohorts of local mallards, with the use of SWDs. The selection of this alternative would be viewed favorably by those hunters and other members of the public who are opposed to the use of non-traditional methods, but would be viewed unfavorably by those hunters who are not opposed to their use. Those commercial enterprises that develop and market these devices would likely be opposed to their regulation.

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Appendix A. 2009-2010 Regulations Related to Migratory Waterfowl, Coot, Moorhen, (Common Gallinule).

§502. Waterfowl, Migratory; American Coot and Common Moorhen (Common Gallinule).
(a) Definitions.
(1) Dark geese. Dark geese include Canada geese, cackling geese, Aleutian geese and white-fronted geese ("specklebelly").
(2) Large Canada geese. Large Canada geese include western Canada geese ("honker") and lesser Canada geese ("lessers").
(3) Small Canada geese. Small (about the size of a mallard) Canada geese include cackling geese and Aleutian geese. Both are white-cheeked geese nearly identical in appearance to Large Canada geese. Aleutian geese have a thin white neck ring and Cackling geese have dark breasts. Both species have a high-pitched cackle as opposed to the deeper "honking".
(4) White geese. White geese include Ross' geese and snow geese.
(b) Waterfowl Hunting Zones.
(1) Northeastern California Zone: In that portion of California lying east and north of a line beginning at the intersection of Interstate 5 with the California-Oregon state line; south along Interstate 5 to its junction with Walters Lane south of the town of Yreka; west along Walters Lane to its junction with Easy Street; south along Easy Street to the junction with Old Highway 99; south along Old Highway 99 to the point of intersection with Interstate 5 north of the town of Weed; south along Interstate 5 to its junction with Highway 89; east and south along Highway 89 to Main Street in Greenville; north and east to its junction with North Valley Road; south to its junction of Diamond Mountain Road; north and east to its junction with North Arm Road; south and west to the junction of North Valley Road; south to the junction with Arlington Road (A22); west to the junction of Highway 89; south and west to the junction of Highway 70; east on Highway 70 to Highway 395; south and east on Highway 395 to the point of intersection with the California-Nevada state line; north along the California-Nevada state line to the junction of the California-Nevada-Oregon state lines west along the California-Oregon state line to the point of origin.
(2) Southern San Joaquin Valley Zone: All of Kings and Tulare counties and that portion of Kern County north of the Southern California Zone.
(3) Southern California Zone: In that portion of southern California (but excluding the Colorado River zone) lying south and east of a line beginning at the mouth of the Santa Maria River at the Pacific Ocean; east along the Santa Maria River to where it crosses Highway 166 near the City of Santa Maria; east on Highway 166 to the junction with Highway 99; south on Highway 99 to the crest of the Tehachapi Mountains at Tejon Pass; east and north along the crest of the Tehachapi Mountains to where it intersects Highway 178 at Walker Pass; east on Highway 178 to the junction of Highway 395 at the town of Inyokern; south on Highway 395 to the junction of Highway 58; east on Highway 58 to the junction of Interstate 15; east on Interstate 15 to the junction with Highway 127; north on Highway 127 to the point of intersection with the California-Nevada state line.
(4) Colorado River Zone: In those portions of San Bernardino, Riverside, and Imperial counties lying east of the following lines: Beginning at the intersection of Highway 95 with the California-Nevada state line; south along Highway 95 to Vidal Junction; south through the town of Rice to the San Bernardino-Riverside county line on a road known as "Aqueduct Road" in San Bernardino County; south from the San Bernardino-Riverside county line on road known in Riverside County as the "Desert Center to Rice Road" to the town of Desert Center; east 31 miles on Interstate 10 to its intersection with the Wiley Well Road; south on this road to Wiley Well; southeast along the Army-Milpitas Road to the Blythe, Brawley, Davis Lake intersections; south on the Blythe-Brawley paved road to its intersection with the Ogilby and Tumco Mine Road; south on this road to Highway 80; east seven miles on Highway 80 to its intersection with the Andrade-Algodones Road; south on this paved road to the intersection of the Mexican boundary line at Algodones, Mexico.
(5) Balance of State Zone: That portion of the state not included in Northeastern California, Southern California, Colorado River or the Southern San Joaquin Valley zones.
(A) Special Management Areas
1. North Coast. All of Del Norte and Humboldt counties.

2. Humboldt Bay South Spit. Beginning at the intersection of the north boundary of Table Bluff County Park and the South Jetty Road; north along the South Jetty Road to the South Jetty; west along the South Jetty to the mean low water line of the Pacific Ocean; south along the mean low water line to its intersection with the north boundary of the Table Bluff County Park; east along the north boundary of the Table Bluff County Park to the point of origin.
3. Sacramento Valley. Beginning at the town of Willows; south on Interstate 5 to the junction with Hahn Road; east on Hahn Road and the Grimes-Arbuckle Road to the town of Grimes; north on Highway 45 to its junction with Highway 162; north on Highway 45-162 to the town of Glenn; west on Highway 162 to the point of beginning.
4. Morro Bay. Beginning at a point where the high tide line intersects the State Park boundary west of Cuesta by the Sea; northeasterly to a point 200 yards offshore of the high tide line at the end of Mitchell Drive in Baywood Park; northeasterly to a point 200 yards offshore of the high tide line west of the Morro Bay State Park Boundary, adjacent to Baywood Park; north to a point 300 yards south of the high tide line at the end of White Point; north along a line 400 yards offshore of the south boundary of the Morro Bay City limit to a point adjacent to Fairbanks Point; northwesterly to the high tide line on the sand spit; southerly along the high tide line of the sand spit to the south end of Morro Bay; easterly along the Park boundary at the high tide line to the beginning point.
5. Martis Creek Lake. The waters and shoreline of Martis Creek Lake, Placer and Nevada counties.
6. Northern Brant. Del Norte, Humboldt and Mendocino counties.
7. Balance of State Brant. That portion of the state not included in the Northern Brant Special Management Area.
8. Imperial County. Beginning at Highway 86 and the Navy Test Base Road; south on Highway 86 to the town of Westmoreland; continue through the town of Westmoreland to Route S26; east on Route S26 to Highway 115; north on Highway 115 to Weist Rd.; north on Weist Rd. to Flowing Wells Rd.; northeast on Flowing Wells Rd. to the Coachella Canal; northwest on the Coachella Canal to Drop 18; a straight line from Drop 18 to Frink Rd.; south on Frink Rd. to Highway 111; north on Highway 111 to Niland Marina Rd.; southwest on Niland Marina Rd. to the old Imperial County boat ramp and the water line of the Salton Sea; from the water line of the Salton Sea, a straight line across the Salton Sea to the Salinity Control Research Facility and the Navy Test Base Road; southwest on the Navy Test Base Road to the point of beginning.

(c) Statewide Seasons and Bag and Possession Limits for American Coots, and Common Moorhens.

(1) Species	*(2) Season*	*(3) Daily Bag and Possession Limits*
American Coot and Common Moorhen	Concurrent with duck season(s)	25 per day, 25 in possession, either all of one species or a mixture of these species.

(d) Seasons and Bag and Possession Limits for Ducks and Geese by Zone.

(1) Northeastern California Zone (NOTE: SEE SUBSECTION (5)(D) BELOW FOR SPECIAL SEASONS AND CLOSURES.)

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers)	From the second Saturday in October extending for 105 days. Scaup: From the second Saturday in October extending for 86 days.	Daily bag limit: 7 Daily bag limit may include: • 7 mallards, but not more than 2 females. • 2 pintail (either sex). • 1 canvasback (either sex). • 2 redheads (either sex). • 3 scaup (either sex). Possession limit: double the daily bag limit.

Geese	From the second Saturday in October extending for 100 days.	Daily bag limit: 8 Daily bag limit may include: • 6 white geese. • 6 dark geese which may include 4 white-fronted geese, 2 Large Canada geese, and 1 Small Canada goose (see definitions: 502(a)). Possession limit: double the daily bag limit.

(2) Southern San Joaquin Valley Zone (NOTE: SEE SUBSECTION (5)(D) BELOW FOR SPECIAL SEASONS AND CLOSURES.)

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers)	A split season from the second Saturday in October extending for a period of 23 days and from the second Saturday in November extending for a period of 79 days. Scaup: From the second Saturday in November extending for 79 days.	Daily bag limit: 7 Daily bag limit may include: • 7 mallards, but not more than 2 females. • 2 pintail (either sex). • 1 canvasback (either sex). • 2 redheads (either sex). • 3 scaup (either sex). Possession limit: double the daily bag limit.
Geese	From the fourth Saturday in October extending for 100 days.	Daily bag limit: 8 Daily bag limit may include: • 6 white geese. • 6 dark geese which may include 4 white-fronted geese (see definitions: 502(a)). Possession limit: double the daily bag limit.

(3) Southern California Zone (NOTE: SEE SUBSECTION (5)(D) BELOW FOR SPECIAL SEASONS AND CLOSURES.)

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers)	From the fourth Saturday in October extending for 100 days. Scaup: From the first Saturday in November extending for 86 days.	Daily bag limit: 7 Daily bag limit may include: • 7 mallards, but not more than 2 females. • 2 pintail (either sex). • 1 canvasback (either sex). • 2 redheads (either sex). • 3 scaup (either sex). Possession limit: double the daily bag limit.

Geese	From the fourth Saturday in October extending for 100 days.	Daily bag limit: 8 Daily bag limit may include: • 6 white geese. • 3 dark geese (see definitions: 502(a)). Possession limit: double the daily bag limit.

(4) Colorado River Zone (NOTE: SEE SUBSECTION (5)(D) BELOW FOR SPECIAL SEASONS AND CLOSURES.)

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers).	From the Friday after the third Sunday in October extending for 101 days. Scaup: From the first Saturday in November extending for 86 days.	Daily bag limit: 7 Daily bag limit may include: • 7 mallards, but not more than 2 females or Mexican-like ducks. • 2 pintail (either sex). • 1 canvasback (either sex). • 2 redheads (either sex). • 3 scaup (either sex). Possession limit: double the daily bag limit.
Geese	From October 23 extending for 101 days.	Daily bag limit: 6 Daily bag limit may include: • 6 white geese. • 3 dark geese (see definitions: 502(a)). Possession limit: double the daily bag limit.

(5) Balance of State Zone (NOTE: SEE SUBSECTION (D) BELOW FOR SPECIAL SEASONS AND CLOSURES.)

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers).	From the fourth Saturday in October extending for 100 days. Scaup: From the first Saturday in November extending for 86 days.	Daily bag limit: 7 Daily bag limit may include: • 7 mallards, but not more than 2 females. • 2 pintail (either sex). • 2 redheads (either sex). • 3 scaup (either sex). Possession limit: double the daily bag limit.
Geese	From the fourth Saturday in October extending for 100 days EXCEPT in the Sacramento Valley Special Management Area where the	Daily bag limit: 8 Daily bag limit may include: • 6 white geese. • 6 dark geese which may

	white-fronted goose season will close after December 14.	include 4 white-fronted geese EXCEPT in the Sacramento Valley Special Management Area where only 2 may be white-fronted geese (see definitions: 502(a)). Possession limit: double the daily bag limit.
(D) Special Management Areas		
Area	*Species*	*Season*
1. North Coast	All Canada Geese	From the first Saturday in November extending for a period of 86 days (Regular Season) and from the third Saturday in February extending for a period of 19 days (Late Season). During the Late Season, hunting is not permitted on public areas. Daily bag limit: 6 Canada Geese of which only 1 may be a Large Canada goose (see definitions: 502(a)), EXCEPT during the Late Season the bag limit on Large Canada geese is zero. Possession limit: double the daily bag limit.
2. Humboldt Bay South Spit	All species	Closed during brant season.
3. Sacramento Valley	White-Fronted Geese	Open concurrently with the goose season through December 14, and during Youth Waterfowl Hunting Days. Daily bag limit: 2 white-fronted geese. Possession limit: double the daily bag limit.
4. Morro Bay	All species	Open in designated area only from the opening day of brant season through the remainder of waterfowl season.
5. Martis Creek Lake	All species	Closed until November 16.
6. Northern Brant	Black Brant	From the first Saturday in November extending for 30 days. Daily bag limit: 2

		Possession limit: double the daily bag limit.
7. Balance of State Brant	Black Brant	From the second Saturday in November extending for 30 days. Daily bag limit: 2 Possession limit: double the daily bag limit.
8. Imperial County	White geese	From the first Saturday in November extending for a period of 86 days (Regular Season) and from the second Saturday in February extending for 16 days (Late Season). During the Late Season, hunting is not permitted on public areas. Daily bag limit: 6 Possession limit: double the daily bag limit.

(e) Youth Waterfowl Hunting Days Regulations (NOTE: Youth hunters must be 15 years of age or younger and must be accompanied by a non-hunting adult 18 years of age or older.)
(1) Statewide Provisions.

(A) Species	*(B) Season*	*(C) Daily Bag Limit*
Ducks (including Mergansers), American Coot, Common Moorhen, Black Brant, Geese	1. Northeastern California Zone: The Saturday fourteen days before the opening of waterfowl season extending for 2 days. 2. Southern San Joaquin Valley Zone: The Saturday following the closing of waterfowl season extending for 2 days. 3. Southern California Zone: The Saturday following the closing of waterfowl season extending for 2 days. 4. Colorado River Zone: The Saturday following the closing of waterfowl season extending for 2 days. 5. Balance of State Zone: The Saturday following the closing of waterfowl season extending for 2 days.	Same as regular season.

(f) Falconry Take of Ducks (including Mergansers), Geese, American Coots, and Common Moorhens.
(1) Statewide Provisions

(A) Species	*(B) Season*	*(C) Daily Bag and Possession Limits*
Ducks (including Mergansers), Geese, American Coot and Common Moorhen	1. Northeastern California Zone. Open concurrently with duck season extending for 105 days. 2. Balance of State Zone. Open concurrently with duck season extending for 107 days, except in the North Coast Special Management Area where the falconry season for geese runs concurrently with the season for Small Canada geese (see 502(d)(5)(D)1.) 3. Southern San Joaquin Valley Zone. Open concurrently with duck season and February 1-3, 2010. Goose hunting in this zone by means of falconry is not permitted. 4. Southern California Zone. Open concurrently with duck season extending for 107 days, except in the Imperial County Special Management Area where the falconry season for geese runs concurrently with the season for white geese. 5. Colorado River Zone. Concurrent with duck season and from February 1-4, 2010. Goose hunting in this zone by means of falconry is not permitted. Federal regulations require that California's hunting regulations conform to those of Arizona, where goose hunting by means of falconry is not permitted.	Daily bag limit: 3 Daily bag limit makeup: • Either all of 1 species or a mixture of species allowed for take. Possession limit: 6

NOTE: Authority cited: Sections 202 and 355, Fish and Game Code. Reference: Sections 202, 355 and 356, Fish and Game Code.

§507. Provisions Related to the Taking of Migratory Game Birds.(a) Authorized Methods. Only the following methods may be used to take migratory game birds:
(1) Falconry.
(2) Bow and Arrows or Crossbows. Only arrows or crossbows bolts with flu- flu fletching may be used except that conventionally fletched arrows may be used to take waterfowl sitting on the water from scullboats or similar watercraft. Archers hunting during any archery season may not possess a firearm while in the field engaged in archery hunting.
(3) Muzzle-loading Shotguns.
(4) Shotguns 10 Gauge or Smaller. Shotguns 10 gauge or smaller using shot shells only and incapable of holding more than three shells in the magazine and chamber combined may be used. except no shotgun larger than 12 gauge shall be used in areas open to hunting on, over or adjacent to the waters of Morro Bay, San Luis Obispo County. If a plug is used to reduce the capacity of a magazine to fulfill the requirements of this section, the plug must be of one piece construction incapable of removal without disassembling the gun. Shotgun shells may not be used or possessed that contain shot size larger than No. BB in lead or T shot in steel or other nontoxic shot approved by the U.S. Fish and Wildlife Service. All shot shall be loose in the shell.
(b) Use of Dogs. Dogs may be used to take and retrieve migratory game birds.
(c) Prohibition on Electronic or Mechanically operated Devices. Electronic or mechanically operated calling or sound reproducing devices are prohibited when attempting to take migratory game birds. It is unlawful to use electronic or mechanically-operated spinning blade devices or spinning wing decoys when attempting to take waterfowl between the start of waterfowl season and November 30. For the purposes of this regulation, wind-powered spinning blade devices and kites are not prohibited.
(d) Live Decoy Prohibition. The use of live decoys is prohibited when attempting to take migratory game birds.
NOTE
Authority cited: Section 355, Fish and Game Code. Reference: Sections 355, 356 and 3005, Fish and Game Code.

Appendix B. Estimated Retrieved Harvest of Geese in California

Year	Canada	White-Front	Snow	Ross'	Brant	TOTAL
1962	53,532	50,088	28,826	0	9,433	141,879
1963	99,888	56,694	66,810	0	8,008	231,400
1964	77,920	51,735	55,151	0	3,748	188,554
1965	49,685	42,211	33,771	0	10,735	136,402
1966	72,415	65,321	155,543	1,022	7,155	301,456
1967	8,756	62,819	72,413	533	6,929	151,450
1968	72,935	47,345	53,308	0	8,298	181,886
1969	72,613	68,443	72,545	2,514	10,056	226,171
1970	95,112	70,639	112,614	5,114	393	283,872
1971	74,008	34,216	94,123	3,646	2,524	208,517
1972	148,888	51,813	41,998	0	13,698	256,397
1973	69,701	44,615	106,721	4,398	2,161	227,596
1974	72,166	40,682	50,764	8,464	1,693	173,769
1975	62,002	30,193	81,993	6,968	0	181,156
1976	58,444	44,044	127,678	7,726	515	238,407
1977	42,610	33,572	77,771	3,395	9,700	167,048
1978	46,530	34,719	28,578	2,360	674	112,861
1979	31,373	21,399	26,179	4,419	0	83,370
1980	26,950	18,693	28,459	2,795	0	76,897
1981	52,089	21,781	28,591	6,316	0	108,777
1982	46,418	15,004	26,263	7,298	0	94,983
1983	56,384	16,157	43,223	6,789	3,573	126,126
1984	38,004	6,686	49,609	8,373	0	102,672
1985	40,313	15,157	65,085	8,913	0	129,468
1986	21,999	7,542	31,839	3,477	0	64,857
1987	1,348	9,634	28,601	2,375	0	41,958
1988	26,296	4,707	30,571	884	0	62,458
1989	24,486	9,519	30,263	5,106	566	69,940
1990	32,691	7,003	8,104	2,438	475	50,711
1991	9,474	9,828	25,839	3,253	211	48,605
1992	28,546	11,705	26,407	3,076	1,810	71,544
1993	21,066	12,311	46,461	7,430	2,368	89,636
1994	28,469	12,597	21,847	7,476	2,774	73,163
1995	21,119	11,476	30,679	4,833	328	68,435
1996	25,487	16,530	46,849	12,405	2,639	103,910
1997	23,659	22,448	27,628	8,058	4,029	85,822
1998	23,299	21,984	38,371	6,049	12,097	101,800
1999	14,017	23,925	35,563	23,545	2,639	99,689
2000	25,877	21,184	31,721	6,749	1,800	87,331
2001	30,228	27,080	33,167	13,015	4,100	107,590
2002	37,762	31,497	30,279	15,662	1,100	116,300
2003	41,946	24,685	32,851	16,333	2,300	118,115
2004	44,492	39,924	35,355	10,329	800	130,900
2005	49,182	42,156	46,653	7,729	900	146,620
2006	41,381	52,492	43,296	5,875	2,900	145,944
2007	50,484	59,416	52,038	7,961	1,800	171,699
2008*	49,252	110,523	70,946	13,779	1,000	245,500
Averages:						
1962-07	45,479	30,949	49,183	5,763	3,151	134,525
1962-65	70,256	50,182	46,140	0	7,981	174,559
1966-70	64,366	62,913	93,285	1,837	6,566	228,967
1971-75	85,353	40,304	75,120	4,695	4,015	209,487
1976-80	41,181	30,485	57,733	4,139	2,178	135,717
1981-85	46,642	14,957	42,554	7,538	715	112,405
1986-90	21,364	7,681	25,876	2,856	208	57,985
1991-95	21,735	11,583	30,247	5,214	1,498	70,277
1996-00	22,468	21,214	36,026	11,361	4,641	95,710
2001-06	40,832	36,306	36,934	11,491	2,017	127,578
% Change from:						
2007	-2.4%	86.0%	36.3%	73.1%	-44.4%	43.0%
1962-07	8.3%	257.1%	44.3%	139.1%	-68.3%	82.5%
% State's Total Goose Harvest:						
2008	20.1%	45.0%	28.9%	5.6%	0.4%	
1962-07	33.8%	23.0%	36.6%	4.3%	2.3%	

Appendix C. 2009 Pacific Flyway Fall and Winter Goose Surveys Survey

Fall	White-fronted Geese**	Cackling Canada Geese			Snow/Ross' Geese		
		Oregon-Wash.*	Calif. & Elsewhere	Total**	Skagit-Fraser	Calif. & Elsewhere	Total
1979	73,100	200	63,900	64,100	35,600	492,500	528,100
1980	93,500	200	127,200	127,400	22,400	181,800	204,200
1981	116,500	1,100	86,000	87,100	48,600	711,300	759,900
1982	91,700	0	54,100	54,100	26,100	328,000	354,100
1983	112,900	0	26,200	26,200	24,500	523,100	547,600
1984	100,200	4,000	21,800	25,800	26,600	439,700	466,300
1985	93,800	7,400	24,700	32,100	46,200	503,600	549,800
1986	107,100	12,000	39,400	51,400	39,900	481,800	521,700
1987	130,600	11,000	43,800	54,800	47,700	477,600	525,300
1988	161,500	19,100	50,800	69,900	43,800	397,200	441,000
1989	218,800	13,000	63,800	76,800	32,200	431,700	463,900
1990	240,800	34,700	75,500	110,200	31,700	676,800	708,500
1991	236,500	27,900	76,700	104,600	39,100	651,000	690,100
1992	230,900	60,700	88,600	149,300	34,300	605,000	639,300
1993	295,100	65,700	98,600	164,300	49,100	520,100	569,200
1994	324,800	75,900	76,600	152,500	42,600	435,600	478,200
1995	277,500	114,000	47,400	161,400	37,000	464,400	501,400
1996	344,100	123,600	11,000	134,600	45,800	320,500	366,300
1997	319,000	188,900	16,200	205,100	47,000	369,400	416,400
1998	413,100	139,000	9,600	148,600	47,100	307,200	354,300
1999	393,400	--	--	169,600	26,600	550,400	579,000
2000	352,700	--	--	175,000	56,300	600,500	656,800
2001	438,900	--	--	176,200	52,000	396,200	448,200
2002	359,700	--	--	127,900	73,100	523,700	596,800
2003	422,000	--	--	165,200	66,800	521,000	587,800
2004	374,900	--	--	130,200	68,141	682,128	750,269
2005	443,900	--	--	156,900	80,040	630,686	710,726
2006	509,262	--	--	169,266	79,891	719,810	799,701
2007	604,706	--	--	173,375	94,859	978,622	1,073,481
2008	627,035	--	--	193,321	57,000	900,403	957,403
2009	536,746	--	--	160,635	***		
Most recent 3-yr average:	589,496			175,777	77,250		943,528
Population objective:	300,000			250,000	>35,000		
Stop hunting if below 3-yr avg. threshold of:	95,000			80,000			
Resume hunting if above 3-yr avg. threshold of:	120,000			110,000			

Appendix D. Possible Effects of Spinning Wing Decoys in California

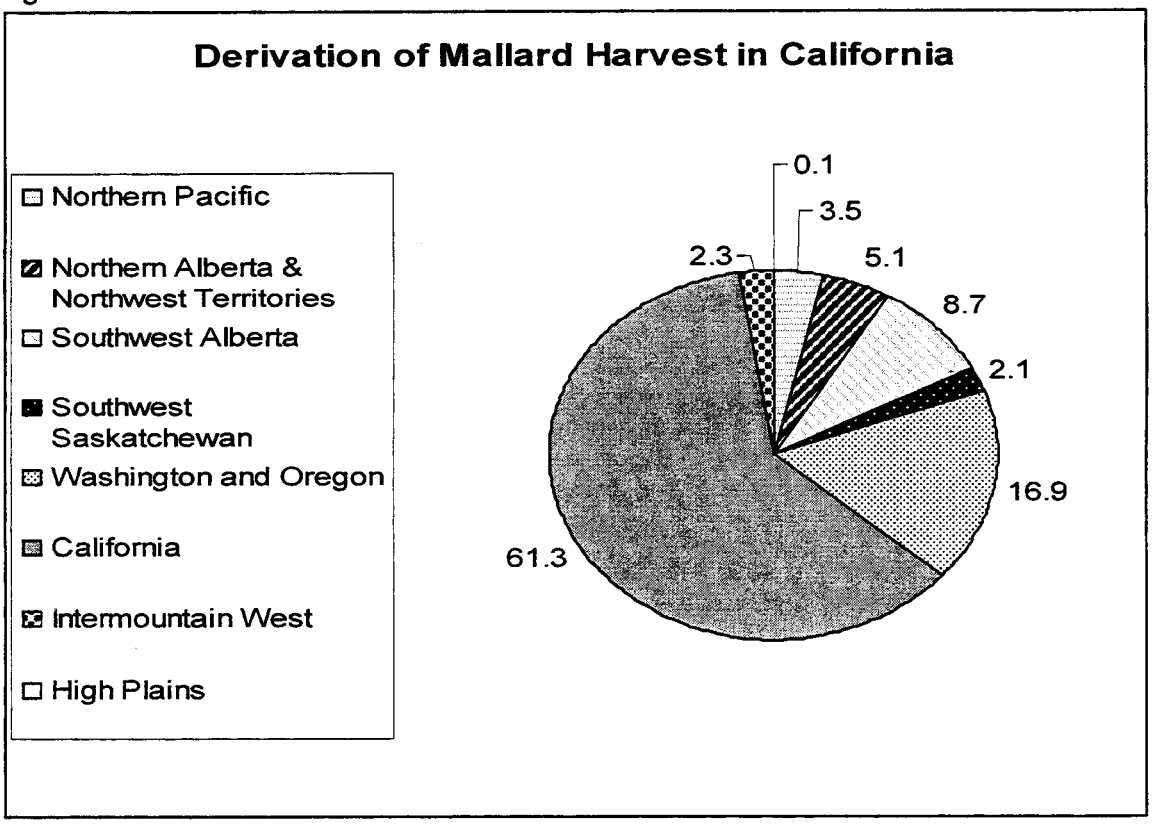
Introduction

The use of mechanical or electronic duck decoys (also known as spinning wing decoys (SWDs), "rotoducks", "motoducks", motion wing decoys, etc.) may lead to increases in harvest beyond those anticipated by existing bag limits and season length. Some hunters and other members of the public are opposed to the use of these devices because they believe that the devices may lead to excessive harvest or exceed the bounds of "fair chase" and eliminate the emphasis on traditional hunting methods.

The Department examined the results of studies, existing monitoring programs, and initiated additional analyses to assess the potential effects of SWDs on the harvest of ducks. Monitoring programs (i.e. estimates of breeding populations, total harvests) are not designed to measure the effectiveness of a single harvest method, such as a SWD.

These analyses mostly focus on mallards because mallards are the most abundant breeding duck in the State, are the most frequently occurring duck species in the harvest (Appendix E) and, unlike other species of ducks, are mostly derived from within California (62%; J. Dubovsky, USFWS, unpub data, Figure D-1).

Figure 2-1. Derivation of Mallard Harvest in California.



Department Surveys on the Use and Effectiveness of SWDs

The widespread use of SWDs in California began in 1998. The Department compared the daily harvest of hunters on public hunting areas who said they used SWDs to those that said they did not during the 1999-00 to 2001-02 seasons.

Hunters were sampled on five public hunting areas (Delevan National Wildlife Refuge, Upper Butte Basin Wildlife Area, Grizzly Island Wildlife Area, Los Banos Wildlife Area, and Mendota Wildlife Area) on 10 randomly-selected dates during the 1999-00 hunting season and again on five areas (Sacramento National Wildlife Refuge, Upper Butte Basin Wildlife Area, Grizzly Island Wildlife Area, Los Banos Wildlife Area, and Mendota Wildlife Area) on 14 random days during the 2000-01 hunting season. During the 2001-02 hunting season, sampling occurred on 10 days picked at random on the Delevan National Wildlife Refuge, Upper Butte Basin Wildlife Area, Grizzly Island Wildlife Area, Los Banos Wildlife Area, and Mendota Wildlife Area.

The results from nearly 23,000 hunter-days from the three year survey are summarized in Table D-1. Use of SWDs generally increased in the second year of study, especially in the Sacramento Valley, but use declined on some areas during the third year of study on some areas. SWD use varied from 16 to 59 percent of hunters. There were no other differences between years. Total ducks harvested was significantly greater for hunters using SWDs on all five areas, and the overall average increase was about 1 bird per hunter.

Although the average number of mallards taken by hunters using mechanical duck decoys trended higher, harvest on only one of the five areas was higher at a statistically significant level in one year. The overall average increase in mallards bagged for hunters using SWDs was about 0.5 mallards per hunter-day.

Although average numbers of ducks taken by hunters using SWDs were higher than the averages by hunters that did not use the devices, and use of the devices was common, overall duck harvest on the public hunting areas in 1999 (201,000); 2000 (165,000); and 2001 (157,000); was lower than in 1998 and the overall ducks per hunter per day was essentially unchanged.

Effectiveness of December 1st Regulation

Beginning in 2001, the Commission adopted a prohibition on the use of electronic or mechanically operated spinning-wing decoys from the beginning of the waterfowl season until November 30th. Before and after the regulation change, a variety of changes have occurred with mallard harvest regulations (i.e. opening days, bag limits, season length). The Department analyzed public hunt results to see if any changes have occurred with mallard harvest in relation to the regulation change. Mallards were chosen for this analysis, since the December 1st regulation was created when the

Table D-1. Use and success of hunters using SWD on selected public hunting areas.

Area	Year	% Who Used Decoy	Total Duck Harvest	Percent Mallard	Avg Mallards per Hunter	Avg Ducks per Hunter	Sample Size	Total Annual Hunter Visits
Little Dry Creek	1999-2000	52 - YES 48 - NO	2431 1610	36 34	1.4 1	3.9 2.8	1197	5030
	2000-2001	59 - YES 41 - NO	2707 1006	47 51	1.4 0.8	2.9 1.6	1550	4650
	2001-2002	52 - YES 47 - NO	2697 1553	42 47	1.86 1.32	4.42 2.79	1165	4188
Delevan	1999-2000	52 - YES 48 - NO	1643 1177	17 18	0.5 0.4	2.6 2	1210	7061
	2000-2001	not sampled						
	2001-2002	45 - YES 54 - NO	1831 1251	30 30	1.09 0.6	3.55 2.02	1132	5941
Sacramento	1999-2000	not sampled						
	2000-2001	57 - YES 43 - NO	1271 904	24 32	0.5 0.6	1.8 1.7	1212	8656
	2001-2002	not sampled						
Grizzly Island	1999-2000	29 - YES 71 - NO	1129 1998	14 18	0.3 0.3	2 1.4	1978	8658
	2000-2001	36 - YES 64 - NO	1508 1852	28 26	0.5 0.3	1.8 1.2	2305	7176
	2001-2002	39 - YES 60 - NO	699 652	17 17	0.24 0.14	1.42 0.85	1250	5880
Los Banos	1999-2000	24 - YES 76 - NO	416 786	31 28	0.6 0.3	1.8 1.1	981	4314
	2000-2001	41 - YES 59 - NO	802 448	31 35	0.7 0.3	2.1 0.9	914	4698
	2001-2002	34 - YES 65 - NO	454 502	16 23	0.32 0.26	2 1.17	654	4427
Mendota	1999-2000	16 - YES 84 - NO	790 3179	16 13	0.4 0.2	2.4 1.8	2133	9886
	2000-2001	24 - YES 76 - NO	1224 2716	29 20	0.6 0.3	2 1.3	2638	10196
	2001-2002	28 - YES 71 - NO	1842 3056	12 12	0.33 0.22	2.59 1.71	2497	11132

breeding population of mallards in California was declining. Beginning in December, a larger percentage of migrant mallards start appearing in the harvest.

A mallard per hunter visit was calculated for all public hunt areas. Although waterfowl zones and other issues exist (e.g. delay due to rice harvest), these were controlled for by computing an average mallard take per hunter day on all areas before and after December 1st (including this date). Additionally, for analysis, data from 1992 – 2006 was partitioned into three categories: 1992-1997, 1998-2000, and 2001-2006). Use of SWDs began during the 1998-1999 hunting season in California, and continued without restriction until the December 1st restriction starting with the 2001-2002 waterfowl hunting season, therefore we have a five year buffer (before and after restriction) on each side of their uncontrolled use on public hunting areas (Figure D-2). Also Included are past years (2007 – 2009) average mallard take per day on public areas.

Based on statistical tests (ANOVAs), there was no difference in mallard harvest per hunter day during the three time periods after December 1st (P = 0.617). However, there were significant differences in hunter harvest per day among the three time periods before December 1st (P = .005). On average, the mallard harvest per hunter-day was 33% larger from 1998-2000 than 1992-1997 before December 1st. The mallard harvest per hunter day was 26% larger for the same period when compared to 2001-2006 seasons. Based on public hunt results, it appears that the December 1st restriction has significantly decreased the before December 1st harvest on mallards on public hunt areas (on a hunter-day basis).

Studies and Scientific Literature on Spinning Wing Decoys (SWDs)

University of California Davis Study

A more rigorous study during the 1999-2000 hunting season by the University of California, Davis, also indicated an increase in harvest, particularly early in the season. In this study, hunters were observed during alternating 30 minute periods with SWDs in use and not in use. A total of 37 hunts were conducted. Overall, when hunters used a mechanical duck decoy, they shot about 2.5 times as many ducks as when they didn't use one. Early in the season, hunters using the device shot nearly 7 times more ducks than when the same hunters didn't use the device (Eadie et al 2001). Summary information from this study is provided in the Figure D-3.

Arkansas Study

In Arkansas, as study was conducted during 2 years (2001-02 and 2002-03) to evaluate their effectiveness. Overall, 272 hunters killed 537 ducks during 101 hunts. Mallards comprised 57% of the harvest. Of ducks taken, 64 percent were harvested during periods when decoys were on and only 36 percent when off. Results of paired observations indicate that kill per hunter was 1.8 times greater with decoys on versus off. Similarly, 1.3 times as many flocks were seen per hunt, 1.8 times as many shots were fired per hunter and 1.2 times as many cripples were lost during periods when SWDs were on versus off. Age ratios of harvested mallards were similar with decoy

use (Imm./Adult ratio = 0.26 when ON and Imm./Adult ratio = 0.23 when OFF), however, adult mallards were 2 times more likely to be shot during periods with a

Figure D-2. Mallard harvest on the public hunting areas relative to December 1.

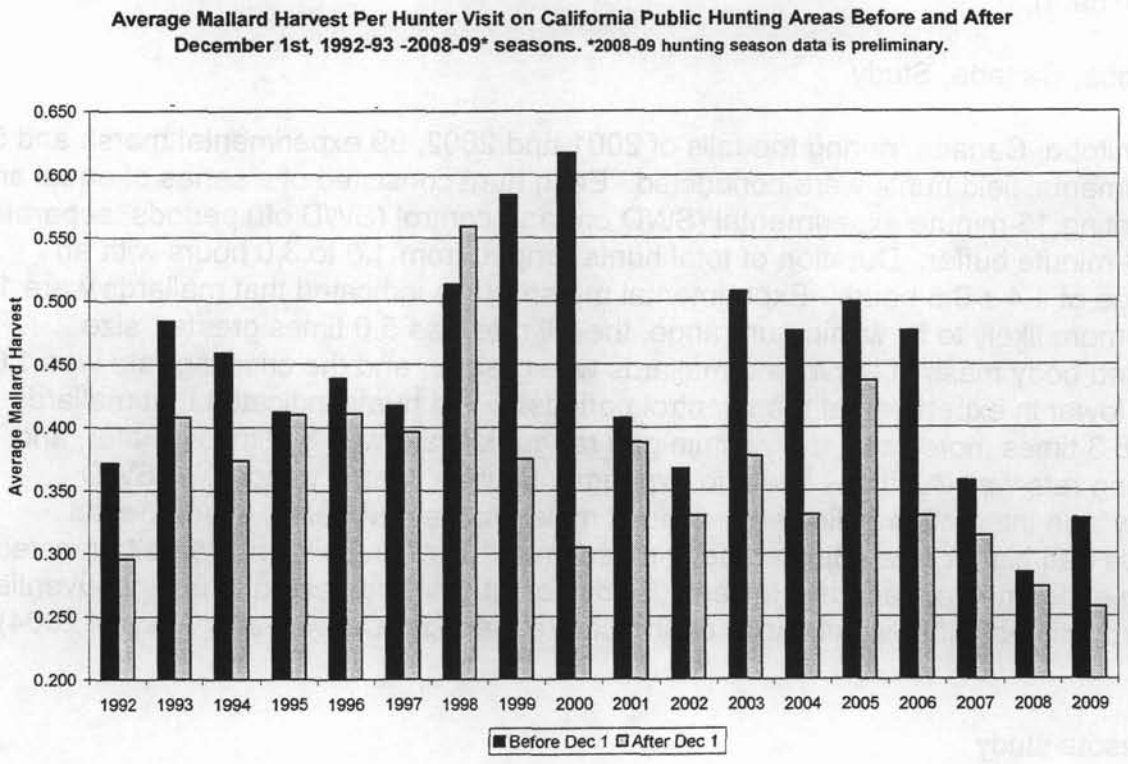
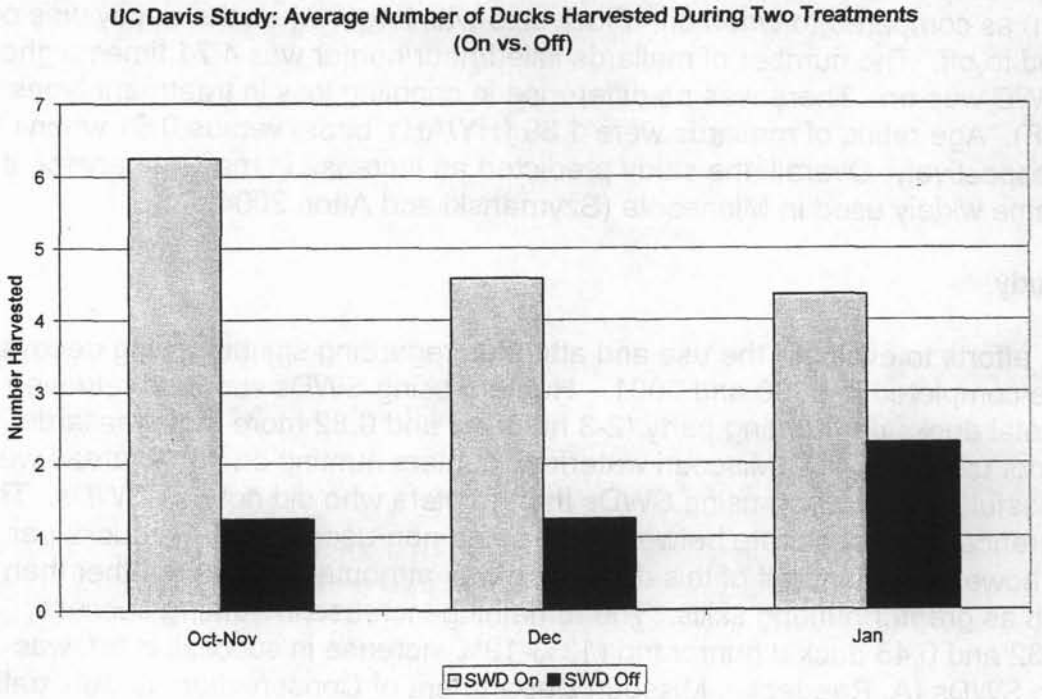


Figure D-3. Summary results from University of California, Davis Study



robo" decoy on than off. Body mass was similar for mallards shot and retrieved during both treatments (ON and OFF) (M. Checkett, Arkansas Game & Fish Commission, unpub. data).

Manitoba, Canada, Study

In Manitoba, Canada, during the falls of 2001 and 2002, 99 experimental marsh and 55 experimental field hunts were conducted. Each hunt consisted of a series of equal and alternating 15-minute experimental (SWD on) and control (SWD off) periods, separated by a 3-minute buffer. Duration of total hunts ranged from 1.0 to 3.0 hours with an average of 1.4 ± 0.5 hours. Experimental marsh hunts indicated that mallards were 1.9 times more likely to fly within gun range, the kill rate was 5.0 times greater, size adjusted body mass of harvested mallards was greater, and the crippling rate was 1.6 times lower in experimental than control periods. Field hunts indicated that mallards were 6.3 times more likely to fly within gun range, kill rate was 33 times greater, and crippling rate was 2.2 times lower in experimental than control periods. A SWD activity*age interaction indicated that adult males harvested during experimental periods had higher size adjusted body mass than that of juveniles mallards harvested during experimental periods. However, body condition of harvested adult and juvenile mallards did not differ significantly during control periods (Caswell and Caswell 2004).

Minnesota study

In Minnesota, due to concerns about the potential increased harvest of local mallards, 219 experimental hunts with 367 volunteer hunters were conducted during 1,556 sampling periods (both ON and OFF treatments) during the 2002 waterfowl season. When using a SWD, mallards were 2.91 times more likely to respond to the decoy (within 40 m) as compared to when off. Flock size was larger when the decoy was on, as compared to off. The number of mallards killed/hour/hunter was 4.71 times higher when the SWD was on. There was no difference in crippling loss in treatment types (ON vs. OFF). Age ratios of mallards were 1.89 (HY/AHY birds) versus 0.61 when ON and OFF, respectively. Overall, the study predicted an increase in mallard harvest, if SWDs became widely used in Minnesota (Szymanski and Afton 2004).

Missouri Study

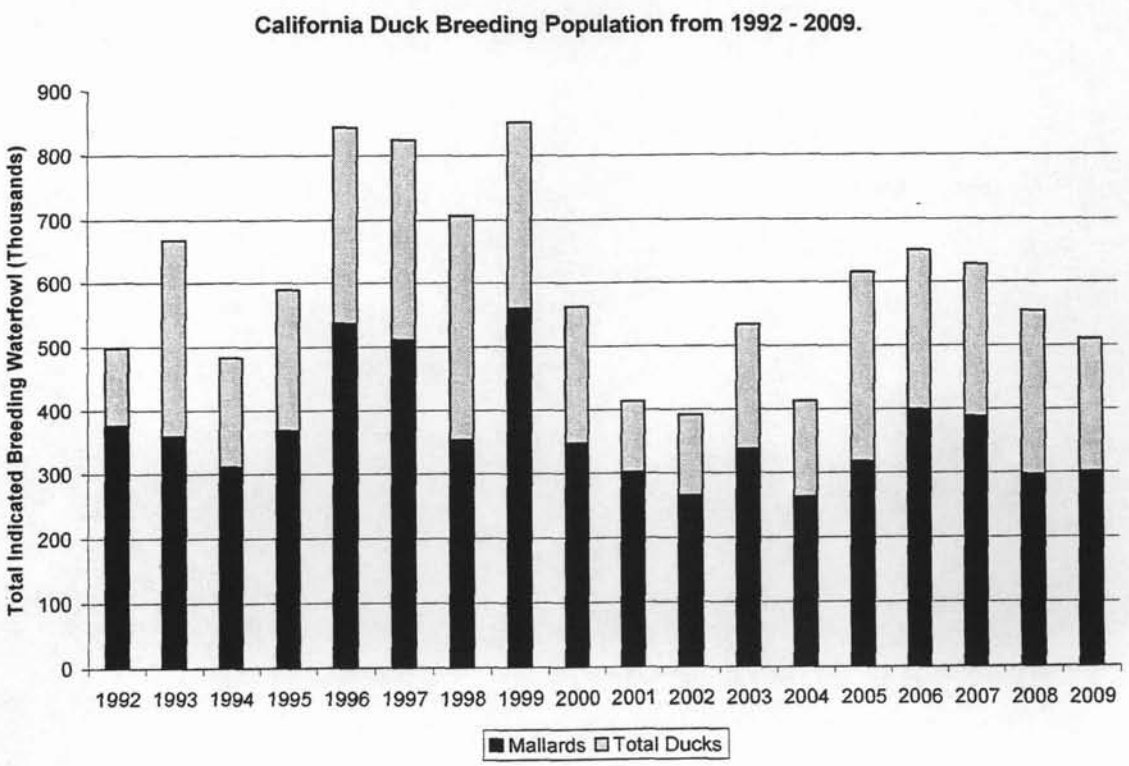
In Missouri, efforts to evaluate the use and attitudes regarding spinning-wing decoys (SWD) were completed in 2000 and 2001. Hunters using SWDs shot and retrieved 1.28 more total ducks per hunting party (2-3 hunters) and 0.82 more male mallards than when not using a SWD. Missouri waterfowl hunters hunting on public areas were more successful in 2000 when using SWDs than hunters who did not use SWDs. The overall difference in success rate between users and non-users was 0.78 ducks per hunter trip; however, about half of this difference was attributed to factors other than SWDs, such as greater hunting skills. The remaining increase in hunting success, between 0.32 and 0.45 ducks/ hunter trip (13%-19% increase in success rate), was attributed to SWDs (A. Raedecke, Missouri Department of Conservation, unpub. data).

These brief summaries of the additional results and other studies (Nebraska) were summarized in Ackerman et al (2006). Overall, 70.2% of all ducks were harvested when the SWDs were used, as compared to 29.8% when the decoy was not in use. Significant results indicated that the probability of being shot increased with latitude (study location) and annual survival rates of species. These results support that fact that ducks may be more naïve at the beginning of migration (i.e. Manitoba), as compared to late in migration (i.e. Arkansas). Ackerman et al (2006) suggested that these studies "only measured the effect of SWDs on kill rates of ducks and these rates will not necessarily translate into overall changes in population harvest rates."

California breeding populations

The Department annually estimates the breeding population of ducks in California. Results of the current year breeding population survey are not usually available until June of each year. Based on the mallard breeding population, a decline was observed following the 1999 waterfowl season, but this trend was not statistically significant because the annual estimates have large confidence intervals. More recent mallard breeding population levels are similar to the mid 1990s levels when SWDs were not being used for duck hunting. Furthermore, breeding populations of mallard and total ducks have increased in 2005 and 2006 but decreased in 2007 and 2008 in California (Figure D-4). Furthermore, breeding populations of mallard and total ducks have increased in 2005 and 2006 but decreased in 2007, 2008, 2009 in California (Figure D-4).

Figure D-4. California Duck Breeding Population Estimates.



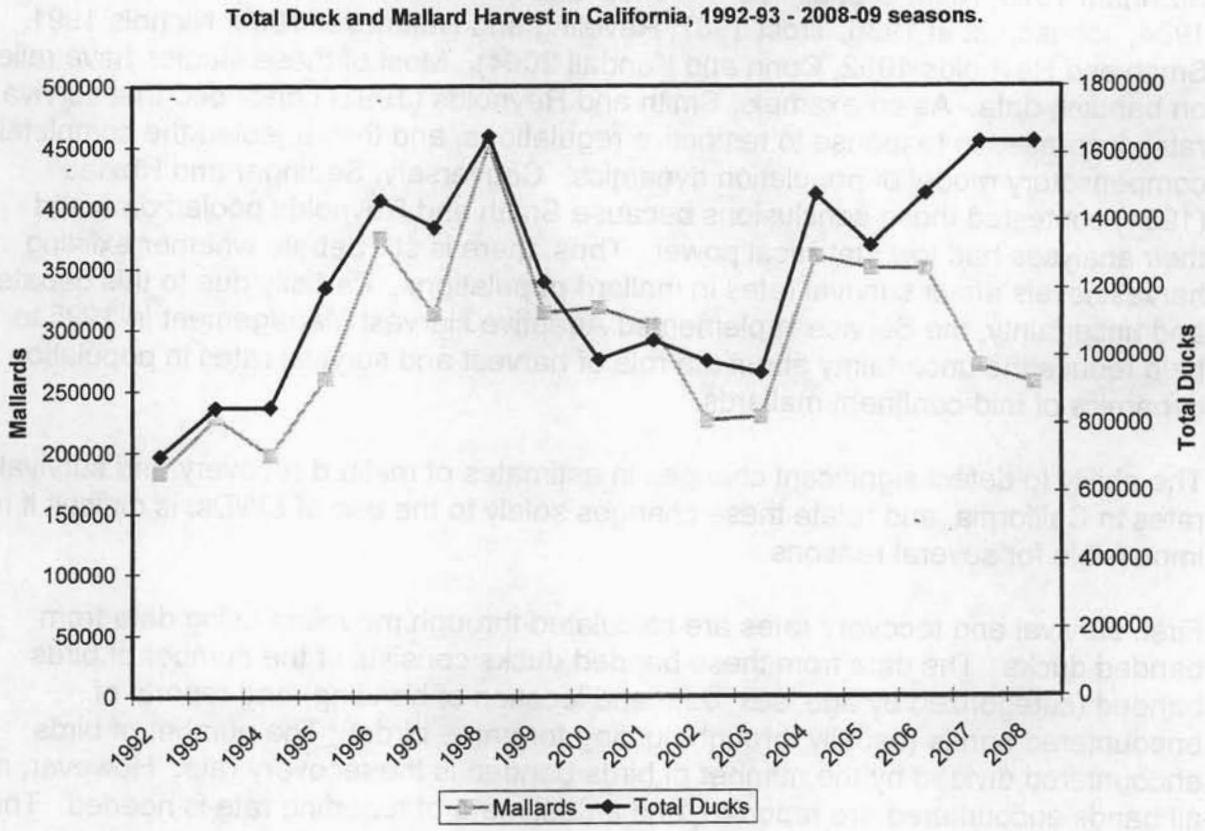
Total estimated duck harvest

The Service annually estimates the harvest of ducks in California and though out the United States. However, the most recent year of harvest is not available until July of the following year. For example, at this time, harvest information from the 2008-2009 season is available but harvest estimates from 2009-2010 will not be available until July, 2010. This information will be provided in an addendum to this DED. There remain many factors (e.g. regulations, weather, hunter participation, age ratios in duck populations, etc.) besides the use SWDs that may impact hunter success on an individual hunt, which may transfer to decreased or increased total statewide duck harvest.

Relationships Among Survival & Harvest in Mallards: Issues in Findings

The studies cited above indicate that the use of SWDs increases harvest at the individual hunt level, however, despite the widespread use of SWDs (at least when last measured) overall estimates of harvest have not changed at the same magnitude as indicated in the individual hunt studies (Appendix E, Figure D-5). To have a biological effect at the population level, SWDs would have to be shown to lead to increased harvests and those increased harvests would have to be shown to lead to decreased annual survival rates. Other unmeasured variables act on populations during and after hunting seasons and it is not possible to unequivocally attribute potential population level effects due to SWDs through existing monitoring programs. However, banding data are the most likely of these monitoring programs that provide any inference on the role of SWDs on population parameters of ducks.

Figure D-5. Mallard and Total Duck (all species combined) harvest in California.



Numerous scientific studies have attempted to improve the understanding of the relationship among harvest rates and annual survival rates of waterfowl (Anderson and Burnham 1976, Nichols et al. 1984, Nichols and Hines 1982, Burnham and Anderson 1984, Johnson et al 1986, Trost 1987, Raveling and Heitmeyer 1989, Nichols 1991, Smith and Reynolds 1992, Conn and Kendall 2004). Most of these studies have relied on banding data. As an example, Smith and Reynolds (1992) concluded that survival rates increased in response to restrictive regulations, and they rejected the completely compensatory model of population dynamics. Conversely, Sedinger and Rextad (1994) contested those conclusions because Smith and Reynolds pooled data and their analyses had low statistical power. Thus, there is still debate whether existing harvest levels affect survival rates in mallard populations. Partially due to this debate and uncertainty, the Service implemented Adaptive Harvest Management in 1995 to help reduce the uncertainty about the role of harvest and survival rates in population dynamics of mid-continent mallards.

The ability to detect significant changes in estimates of mallard recovery and survival rates in California, and relate these changes solely to the use of SWDs, is difficult if not impossible for several reasons.

First, survival and recovery rates are calculated through modeling using data from banded ducks. The data from these banded ducks consists of the number of birds banded (categorized by age, sex, date and location of banding) and reports of encountered bands (usually through hunting for game birds). The number of birds encountered divided by the number of birds banded is the recovery rate. However, not all bands encountered are reported, and an estimate of reporting rate is needed. The product of the recovery rate and the reporting rate is the harvest rate.

Reporting rates have been estimated because this rate is necessary to estimate the harvest rate and harvest rate is necessary to understand the relationship between harvest and population dynamics. Reporting rates vary widely due to band type and even geography (Nichols et al. 1991, 1995, Royle and Garretson 2004). Band types (i.e. their inscriptions) have changed over time. Before the 1990's, "avise" bands were used. These bands were inscribed with "AVISE BIRD BAND, WRITE WASHINGTON DC USA". Later, "address" bands were introduced with the inscription "WRITE BIRD BAND LAUREL MD 20708". These bands were replaced beginning in 1995, but not entirely until about 1999, with "toll-free" bands that were inscribed with "CALL 1 800 327 BAND and WRITE BIRD BAND LAUREL MD 20708 USA". The adoption and widespread advertising of this new reporting method greatly increased reporting rate and apparent recovery rates. Due to the overlap of band types and the timing and duration of research into reporting rates, harvest rates can not be calculated for all areas in all years.

Secondly, changes in basic hunting regulations (e.g. season length and bag limits) occurred before and after the use of SWDs began. For instance, in 2001 (the first year of the December 1 regulation), the season was 100 days long with a 7 mallard (2 hen) daily bag limit whereas in 2002, the season was 74 days long with a 5 mallard (1 hen) daily bag limit. Thus, changes in harvest and survival rates due to basic regulations could be confounded with any changes to these parameters due to the use of SWDs.

More inferences could be made from the standard monitoring programs with stabilized regulations over a period of time.

Third, duck (and presumably mallard) harvest varies annually due to non-regulatory effects (weather, hunter participation, etc.) and survival rates vary due to variation in natural mortality (disease, etc.) (Miller et al. 1988).

With these caveats in mind, the Department calculated recovery rates and survival rates for mallards banded in California between 1988 and 2005. These ducks were banded by the Department, the California Waterfowl Association, and the U.S. Fish and Wildlife Service. Only normal, wild mallards banded from June to September with standard USFWS bands were used in this analysis. The Department examined the data by age class (adult and hatch-year or immature) and sex. Survival and recovery rates were calculated using Brownie models (Brownie et al. 1985) in Program MARK (White and Burnham 1999). Harvest rates were calculated from recovery rates by incorporating reporting rates (Nichols et al 1995, Royle and Garretson 2004). For comparison purposes, the Department summarized harvest rates for mid-continent mallards during liberal seasons (1979-1984) (Smith and Reynolds 1992) and for mallards from eastern Washington (1981-198) (Giudice 2003).

For data from mallards banded in California, the data were portioned into 4 time periods (Table D-3): Period 1 (Restrictive season lengths and bag limits, no SWD); Period 2 (Liberal season lengths and bag limits, no SWD); Period 3 (Liberal regulations with SWD, but no December 1 regulation) and, Period 4 (Liberal regulations with December 1 regulation). If SWD affected harvest and survival rates, harvest rates should be highest and survival rates lowest during Period 3. If regulations by themselves change these parameters, harvest rates should be higher and survival rates lower in Period 2 compared to Period 1. If SWD had an effect, survival rates should be lower and harvest rates higher in Period 3 compared to Period 2. If the December 1 regulation had an effect, harvest rates should be lower and survival rates higher during Period 4 compared to Period 3.

Table D-3. Time periods used to summarize basic regulations, SWD use, and the December 1 regulation.

Time Period	Starting Season	Ending Season	Regulations	Pre or Post-SWD	Dec 1st Restrictions
1st	1988	1994	Conservative	Pre-SWD	No
2nd	1995	1997	Liberal	Pre-SWD	No
3rd	1998	2000	Liberal	Post-SWD	No
4th	2001	2004	Liberal	Post-SWD	Yes

Unfortunately, due to the introduction of "toll-free" bands and the increasing and changing reporting rates, harvest rate estimates are only available for Periods 1 and 4. Harvest rates for adults between Period 1 and Period 4 were unchanged and lower than those rates for eastern Washington and mallards from the mid-continent region (Table D-4). However, harvest rates of immature mallards banded in California have increased between periods 1 and 4 by 62 and 30 percent for males and females, respectively. Thus, the combination of regulation changes and use of SWD did not change harvest rates of adults, but the combination of more liberal regulations and the use of SWD did change harvest rates of immature mallards. The combination of liberalized regulations and SWD appears to have increased the harvest rate of mallards banded in California to higher levels than occurred in the mid-continent region or eastern Washington (Table D-4).

Table D-4. Harvest rates for mallards banded in California (restrictive and liberal periods), eastern Washington (liberal period) and the mid-continent region (liberal period).

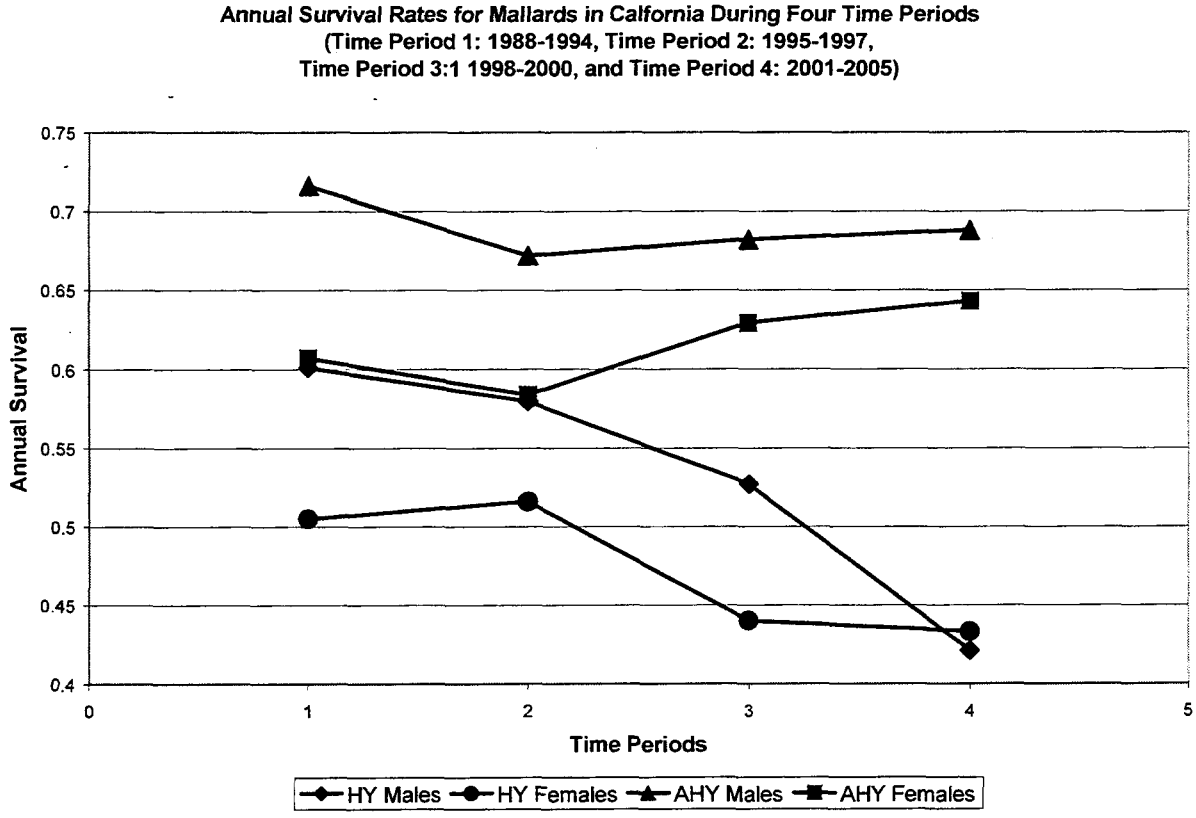
	California (restrictive)	California (liberal)	Eastern Washington	Mid-Continent (liberal)
Adult Males	0.138	0.138	0.172	0.150
Hatch-Year Males	0.202	0.327	0.286	0.228
Adult Females	0.058	0.058	0.100	0.097
Hatch-Year Females	0.143	0.186	0.172	0.157

Survival rates could be calculated for each cohort (age and sex) for each period (Figure D-6) since recovery and survival rate are not conditional on each other. Covariance among recovery and survival rates must be addressed to understand the impact of harvest on survival rates. Although recovery rates may have increased during these periods, it would not have as large an impact on survival rates, as compared to computed harvest rates. Furthermore, the grouping into time periods also correlates with the introduction of different band types.

Survival rates were constant for adult birds of sexes irrespective of harvest regulations, the use of SWD or the December 1 regulation (Figure D-6). However, survival rates for immature birds declined but only for males was the decline statistically significant ($P=0.048$).

From these analyses, it appears that adult mallard recovery, harvest and survival rates have not changed despite changes in regulations, the use of SWDs, or the imposition of the December 1 regulation. In contrast, immature mallard harvest rates have increased and survival rates have declined, but these changes may have been due to changing basic regulations, the use of SWDs, both, or other unmeasured variables.

Figure D-6. Annual survival rates of Mallards banded in California.



Public Perception of SWDs

The findings of this section have concentrated on biological information as related to the SWD in California. However, since past public views to the Commission has demonstrated different views on "fair chase", public opinion information has been added to this review of this topic. In 2005, D. J. Case & Associates, as commissioned by the Association of Fish and Wildlife Agencies, released the findings of the National Duck Hunter Survey. According to this study, 55% of California duck hunters stated that SWDs should be allowed, whereas 26% opposed their use and 19% had no opinion on the subject. Other surveys have shown a wide variety of responses to their opinions on SWDs. For instance, California Waterfowl Association's (CWA) 2006 survey indicated that a majority of hunters opposed electronic decoys, but accepted wind driven decoys (CWA, pers. comm.).

Summary of Findings

There is substantial evidence that SWDs can/have increased harvest and harvest potential on an individual hunt basis. Although SWDs have been shown to increase potential harvest, total harvest estimates have not increased at the same magnitude. Furthermore, SWDs have not increased harvest rates nor decreased survival rates on adult mallards. In hatch-year mallards, harvest rates have increased over 60 percent

on males, and survival rates have significantly declined. However, this is not a cause-and-effect relationship because other unmeasured variables were likely occurring simultaneously. The implementation of the December 1 regulation appears to have reduced daily harvest rates of mallards on public hunt areas when compared to unrestricted use of SWDs (1998-2000).

There is no clearly explicit link detectable through existing monitoring programs (or population level measures) between the introduction of SWDs and changes in measured population parameters. There remains no substantial evidence either for or against their large-scale effect on waterfowl populations. There are strongly held opposing positions on the "fair-chase" and other aspects of SWDs. For this reason, the Department has provided an alternative in Chapter 3.

Appendix E. Estimated Retrieved Harvest of Certain Ducks in California, 1962-2008

Year	Mallard	Gadwall	American Wigeon	G-w Teal	B-w/Cin. Teal	Northern Shoveler	Pintail	Wood Duck	Red-head	Canvas-back	All Other Species	TOTAL
1961	197.0	19.2	183.9	153.3	28.9	108.4	299.3	7.3	0.8	0.4	49.3	1,047.8
1962	167.0	17.5	128.5	145.1	48.8	86.8	285.3	12.1	1.0	0.0	70.1	962.2
1963	267.5	42.3	159.2	242.5	59.5	182.3	415.7	14.7	4.3	0.0	72.0	1,460.0
1964	249.0	40.5	166.3	214.6	49.4	77.2	342.0	17.0	7.8	9.2	74.2	1,247.3
1965	295.0	41.7	202.2	216.2	59.1	139.6	373.0	34.7	10.6	8.3	79.9	1,460.3
1966	288.4	51.5	215.2	267.1	36.6	162.3	563.0	13.1	8.6	39.9	97.5	1,743.2
1967	446.0	85.3	311.8	363.1	73.1	194.2	798.5	24.3	9.8	15.5	133.6	2,455.2
1968	236.2	34.2	169.6	262.5	42.6	111.5	381.1	11.3	5.5	10.5	68.3	1,333.4
1969	331.7	43.3	229.9	332.2	49.2	197.4	900.5	18.8	6.0	12.3	94.4	2,215.8
1970	371.0	43.5	264.0	361.3	38.2	201.8	1,032.9	21.4	12.9	26.9	77.7	2,451.5
1971	313.4	66.0	255.3	295.9	44.6	189.3	752.1	14.2	13.2	34.4	96.6	2,075.0
1972	321.8	49.3	231.5	332.6	64.9	157.4	715.3	21.2	5.8	0.9	90.2	1,991.0
1973	219.4	32.4	145.6	245.2	94.8	101.1	477.0	32.7	9.5	13.8	79.5	1,451.0
1974	292.3	60.2	194.3	319.6	59.8	167.4	712.4	21.7	8.9	27.1	59.4	1,923.0
1975	293.1	46.5	193.9	344.7	47.7	184.5	746.9	19.3	5.4	28.1	49.5	1,959.6
1976	305.6	37.6	278.7	403.0	42.5	185.6	680.6	23.4	6.6	34.2	82.9	2,080.6
1977	229.7	27.4	162.4	306.4	44.8	115.3	350.8	24.3	7.1	22.4	82.9	1,373.5
1978	294.3	39.2	179.4	405.1	64.9	161.0	596.0	29.0	8.2	14.1	66.0	1,857.2
1979	260.7	47.9	168.3	292.0	42.4	112.6	641.5	12.4	6.6	14.8	63.1	1,662.3
1980	238.6	64.2	165.6	259.1	27.1	108.4	410.0	40.2	10.8	10.3	67.6	1,401.8
1981	239.0	33.6	125.8	211.8	28.9	120.4	261.0	23.8	7.9	14.3	73.8	1,140.3
1982	284.2	53.8	122.8	266.5	50.3	140.2	327.9	26.2	10.9	10.6	59.6	1,353.1
1983	298.6	59.2	103.7	203.7	58.9	112.4	334.3	23.1	14.8	6.9	71.4	1,287.0
1984	265.1	43.3	94.6	178.2	52.6	91.9	194.9	15.7	6.6	12.2	50.8	1,005.9
1985	261.8	53.6	106.0	180.7	28.6	99.6	200.3	9.5	6.7	27.5	52.7	1,027.0
1986	257.6	57.7	113.9	176.8	19.0	86.6	194.5	20.2	4.4	16.3	43.2	990.2
1987	228.4	50.4	124.3	214.1	29.4	113.1	243.8	11.8	5.3	12.6	49.8	1,083.0
1988	139.7	23.2	62.7	122.1	16.0	44.1	70.3	9.6	2.3	0.1	23.7	513.8
1989	175.8	42.1	71.8	185.0	31.9	64.2	91.6	15.9	4.6	7.2	33.3	723.3
1990	179.7	45.2	80.1	149.9	19.4	69.5	80.3	11.4	2.5	4.2	28.7	671.0
1991	161.2	40.4	94.3	169.7	13.7	49.4	81.3	14.3	1.8	4.7	23.0	653.9
1992	182.7	33.3	72.9	183.9	18.4	74.1	75.0	16.4	3.5	8.8	39.2	708.1
1993	228.4	63.1	77.3	219.2	25.7	60.2	90.5	31.9	5.6	10.2	37.1	849.2
1994	197.4	68.7	97.6	183.0	14.7	106.0	92.0	20.8	5.8	14.4	51.0	851.3
1995	259.8	85.4	159.2	291.2	35.4	101.5	162.7	28.8	9.0	10.2	59.6	1,202.8
1996	374.4	104.1	175.6	306.5	39.4	164.1	182.0	26.4	10.8	12.7	66.4	1,462.4
1997	312.2	79.4	162.0	311.6	36.9	172.6	188.2	22.5	11.7	17.1	67.3	1,381.5
1998	452.6	129.6	166.5	352.4	62.0	217.1	146.3	33.4	15.9	21.4	55.2	1,652.4
1999	313.5	69.4	153.9	285.5	66.8	116.1	123.3	25.6	5.0	13.8	47.9	1,220.8
2000	317.7	62.4	113.1	207.2	31.3	87.5	85.4	32.0	4.7	10.6	39.6	991.5
2001	302.8	65.4	146.9	200.5	36.1	111.6	89.7	32.5	4.3	6.6	51.5	1,047.9
2002	225.4	83.7	134.4	239.7	35.6	103.9	79.9	24.7	4.9	0.7	52.4	985.3
2003	228.1	79.7	112.8	218.0	46.2	96.2	79.2	25.2	8.2	7.0	51.5	952.1
2004	359.7	132.6	196.8	348.7	57.3	147.7	98.8	22.5	9.6	11.5	94.1	1,479.3
2005	349.8	105.0	176.8	297.6	58.2	128.8	115.7	39.4	7.8	4.8	43.3	1,327.2
2006	349.1	124.2	165.7	331.3	56.9	224.6	123.2	31.3	9.1	17.5	47.9	1,480.8
2007	270.3	122.2	218.8	402.9	43.4	275.3	137.9	33.7	9.5	32.6	86.4	1,632.9
2008*	255.9	110.2	271.8	468.5	39.9	209.5	169.4	36.3	7.0	0.6	64.2	1,633.7
Averages:												
1961-07	273.0	59.6	158.2	259.6	43.2	130.3	328.2	22.2	7.3	13.6	62.9	1,358.0
1961-65	235.1	32.3	168.0	194.3	49.2	118.9	343.1	17.2	4.9	3.6	69.1	1,235.5
1966-70	334.7	51.6	238.1	317.2	47.9	173.4	735.2	17.8	8.6	21.0	94.3	2,039.8
1971-75	288.0	50.9	204.1	307.6	62.4	159.9	680.7	21.8	8.6	20.9	75.0	1,879.9
1976-80	265.8	43.2	190.9	333.1	44.3	136.6	535.8	25.8	7.9	19.2	72.5	1,675.1
1981-85	269.7	48.7	110.6	208.2	43.9	112.9	263.7	19.7	9.4	14.3	61.7	1,162.7
1986-90	196.2	43.7	90.6	169.6	23.1	75.5	136.1	13.8	3.8	8.1	35.8	796.3
1991-95	205.9	58.2	100.3	209.4	21.6	78.3	100.3	22.4	5.1	9.7	42.0	853.1
1996-00	354.1	89.0	154.2	292.6	47.3	151.5	145.0	28.0	9.6	15.1	55.3	1,341.7
2001-06	302.5	98.4	155.6	272.6	48.4	135.5	97.8	29.3	7.3	8.0	56.8	1,212.1
% Change from:												
2007	-5.3%	-9.8%	24.2%	16.3%	-8.1%	-23.9%	22.8%	7.7%	-26.3%	-98.2%	-25.7%	0.0%
1961-07	-6.3%	85.0%	71.8%	80.5%	-7.7%	60.8%	-48.4%	63.8%	-4.0%	-95.6%	2.1%	20.3%
% State's Total Duck Harvest:												
2008	15.7%	6.7%	16.6%	28.7%	2.4%	12.8%	10.4%	2.2%	0.4%	0.0%	3.9%	
1961-07	20.1%	4.4%	11.7%	19.1%	3.2%	9.6%	24.2%	1.6%	0.5%	1.0%	4.6%	

* Preliminary Data

Appendix F. Possible Effects of Climate Change Impacts on Waterfowl

Over the long term climate change models suggest temperature increases in many areas, both increases and decreases in precipitation, its timing, sea level rise, changes in the timing and length of the four seasons, declining snow packs and increasing frequency and intensity of severe weather events. Many uncertainties make it difficult to predict the precise impacts that climate change will have on wetlands and waterfowl. The effects of climate change on waterfowl populations, including their size and distribution, will probably be species specific and variable, with some effects considered negative and others considered positive (Anderson and Sorenson 2001). For example, a longer and warmer ice-free season in the Arctic would be expected to result in higher overall reproductive success for Arctic nesting geese (Batt 1998).

Breeding Season

Increasing spring temperatures have led to earlier arrival of waterfowl on northern breeding areas (Murphy-Klassen et al 2005), yet nest survival has not decreased at this point of time (Drever and Clark 2007). In fact, earlier nest initiations are often more successful (Emery et al 2005, Sedinger et al 2008). However, future changes in wetland distribution and type (Johnson et al 2005) on northern breeding grounds may impact settling patterns (Johnson and Grier 1988), and potentially recruitment for certain species through differences in breeding probability (Krapu et al 1983), nest survival, and duckling survival. In California, areas with wetland brood habitat may become more limited if precipitation decreases with increasing temperatures, as predicted for the prairie pothole region of the United States and Canada (Sorenson et al 1998). Production of waterfowl that rely on agricultural habitats may be similarly affected if water availability (amounts and or timing) change.

Non-breeding Season

The Central Valley of California has one of the world's largest concentrations of over-wintering waterfowl (Heitmeyer et al 1989). The primary expected response of waterfowl to climate change is redistribution as birds seek to maintain energy balance. Increased fall and winter temperatures in northern regions would make it unnecessary for waterfowl to migrate as far south and the wintering populations of waterfowl in California may be reduced. Shifting patterns of precipitation and temperatures may cause decreased availability of water for managed wetlands and agricultural production in the Central Valley. Changes in water availability and timing (Miller et al 2003) would likely have the greatest impact on rice agriculture, an important component of wintering waterfowl habitat in California. Decreasing habitats may cause a decline in body condition which may impact recruitment and survival in waterfowl populations. Ultimately, this will cause decreased recruitment as birds shift out of optimal nesting habitats (e. g. Ward et al 2005), and a decrease in over-wintering populations.

Summary of Findings

There is substantial evidence that climate change will cause changes in habitats and other factors that affect waterfowl populations over the long term. Waterfowl populations are assessed in many ways on an annual basis (See Final Environmental Document for Migratory Game Bird Hunting August 2006) and specific hunting regulation recommendations are made on an annual basis based on these annual assessments. Because the effect of regulated harvest is minimal (See Final Environmental Document for Migratory Game Bird Hunting August 2006), implementation of the proposed project in the current year is not expected to result in significant negative effects to waterfowl populations.