Environmental Assessment for Wild Turkey Hunting Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges

August 2019

This Environmental Assessment (EA) is being prepared to evaluate the effects associated with this proposed action and complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (43 CFR 46; 516 DM 8) and U.S. Fish and Wildlife Service (550 FW 3) regulations and policies. NEPA requires examination of the effects of proposed actions on the natural and human environment.

Proposed Action:

The U.S. Fish and Wildlife Service (Service) is proposing to open hunting opportunities for wild turkeys (*Meleagris gallopavo*) on **Sacramento**, **Delevan**, **Colusa**, and **Sutter** National Wildlife Refuges (NWR or Refuges) in accordance with the Wild Turkey Hunt Plan (Appendix I). The Sacramento, Delevan, Colusa, and Sutter Refuges are part of the Sacramento National Wildlife Refuge Complex (Complex) and are located in the Sacramento Valley of north-central California. The Valley is bordered on the east by the Sierra Nevada Range and on the west by the Coast Range.

This proposed action is often iterative and evolves over time during the process as the agency refines its proposal and learns more from the public, tribes, and other agencies. Therefore, the final proposed action may be different from the original. The final decision on the proposed action will be made at the conclusion of the public comment period for the EA and the Draft 2019-2020 Refuge-Specific Hunting and Sport Fishing Regulations. The Service cannot open a refuge to hunting and/or fishing until a final rule has been published in the Federal Register formally opening the refuge to hunting and/or fishing.

Background:

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purpose(s) of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

The Sacramento National Wildlife Refuge was established in 1937 to provide refuge and breeding habitat for migratory birds and other wildlife. Legal authorities include: Executive Order 7562, February 27, 1937, Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended, the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742). The Refuge is currently 10,819 acres and is comprised of approximately 7,086 acres of managed wetlands and 3,360 acres of unmanaged wetlands, grasslands, alkali meadows, vernal pools, and riparian habitat.

Delevan National Wildlife Refuge was established in 1962 to provide sanctuary for migratory birds. Legal authority includes: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d). The Refuge consists of 5,877 acres and is comprised of approximately 4,600 acres of managed wetlands and approximately 984 acres of unmanaged wetlands, grasslands, alkali meadows, vernal pools, and riparian habitat.

Colusa National Wildlife Refuge was established in 1945 to provide sanctuary for migratory birds and alleviate crop depredation. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Lea Act of 1948 (16 U.S.C. 695), the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742). It is 5,077 acres in size and is comprised of approximately 3,347 acres of managed wetlands and approximately 1,191 acres of unmanaged wetlands, grasslands, alkali meadows, vernal pools, and riparian habitats. Also included in this acreage number are portions of the North Central Valley Wildlife Management Area that are managed as part of the Colusa Refuge.

Sutter National Wildlife Refuge was established in 1945 to provide sanctuary for migratory birds and to alleviate crop depredation. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Lea Act of 1948 (16 U.S.C. 695), and the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884). It is 2,591 acres in size and is comprised of 1,881 acres of managed wetlands and 647 acres of unmanaged wetlands, grasslands, and riparian habitats.

The mission of the NWRS, as outlined by the National Wildlife Refuge System Administration Act (NWRSAA), as amended by the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd et seq.), is to:

"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans"

The NWRSAA mandates the Secretary of the Interior in administering the System to (16 U.S.C. 668dd(a)(4):

- Provide for the conservation of fish, wildlife, and plants, and their habitats within the NWRS;
- Ensure that the biological integrity, diversity, and environmental health of the NWRS are maintained for the benefit of present and future generations of Americans;

- Ensure that the mission of the NWRS described at 16 U.S.C. 668dd(a)(2) and the purpose(s) of each refuge are carried out;
- Ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the States in which the units of the NWRS are located;
- Assist in the maintenance of adequate water quantity and water quality to fulfill the mission of the NWRS and the purposes of each refuge;
- Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the NWRS through which the American public can develop an appreciation for fish and wildlife;
- Ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; and
- Monitor the status and trends of fish, wildlife, and plants in each refuge.

Therefore, it is a priority of the Service to provide for wildlife-dependent recreation opportunities, including hunting and fishing, when those opportunities are compatible with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System.

All four of the Refuges are heavily used during the waterfowl and pheasant hunting seasons, while Sacramento and Colusa National Wildlife Refuges also support a large number of visitors who participate in wildlife observation, photography, environmental education and interpretation.

Purpose and Need for the Proposed Action:

The purpose of this proposed action is to provide additional compatible wildlife-dependent recreational hunting opportunities in areas that have existing waterfowl and ring-necked pheasant (*Phasianus colchicus*) hunting opportunities and for which substantial demand for additional opportunities exists. Additional hunting opportunities are proposed on Sacramento, Delevan, Colusa, and Sutter Refuges. The need of the proposed action is to meet the Service's priorities and mandates as outlined by the NWRSAA to "recognize compatible wildlife-dependent recreational uses as the priority general uses of the NWRS" and "ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses." 16 U.S.C. 668dd(a)(4))

In Recommendation 17 of Conserving the Future: Wildlife Refuges and the Next Generation (USFWS 2014a), we stated we will work closely with state fish and wildlife agencies to conduct a review of its current hunting and fishing opportunities, especially opportunities currently offered for youth and people with disabilities. Based on this review, we are working cooperatively with the states to increase quality hunting and fishing opportunities on national wildlife refuges.

In addition, Secretarial Order 3356 directs Departmental agencies to support and expand hunting and fishing, enhance conservation stewardship, improve wildlife management, and increase outdoor recreation opportunities for all Americans.

The purpose and need for the action is tied to the management direction adopted in the 2009 CCP/EA. Goal 3 of the CCP/EA is to provide visitors with compatible wildlife-dependent recreation to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources (CCP 2009, Chapter 4).

Alternatives Considered

Alternative A –Proposed Action:

The refuge has prepared a hunt plan for wild turkeys (Appendix I), which is presented in this document as the Proposed Action Alternative.

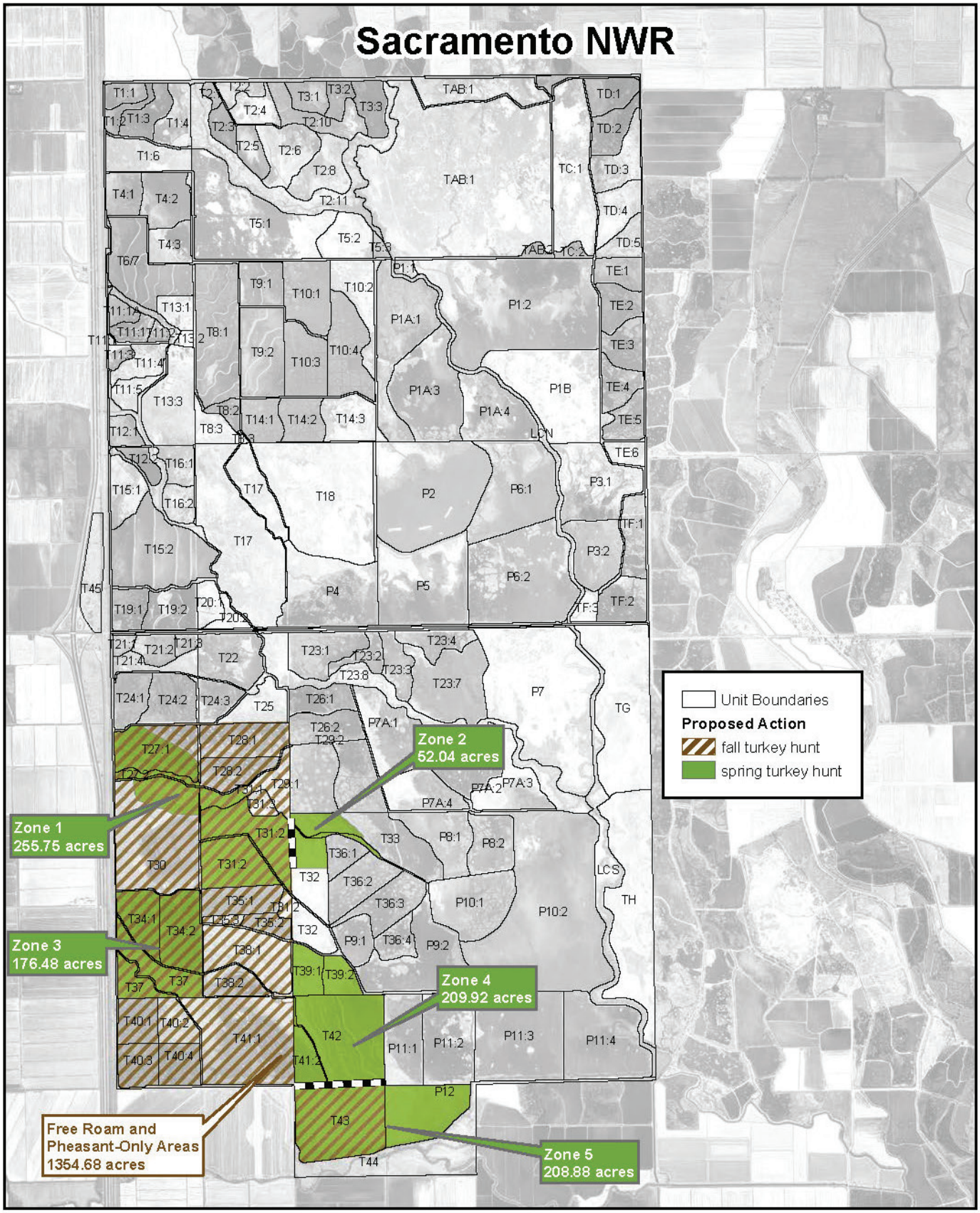
Under the Proposed Action Alternative, the Service would open the Free Roam and Pheasant Only units at Sacramento, Delevan, Colusa, and Sutter Refuges to hunting of wild turkeys during the fall turkey season on each Wednesday, Saturday, and Sunday. In addition, the Service would open the Sacramento and Delevan Refuges to spring turkey hunting. On Sacramento Refuge, spring turkey hunting would take place on 903 acres within the existing hunt area. On Delevan Refuge, spring turkey hunting would take place on 652 acres within the northern sanctuary units as well as on 151 acres within the existing hunt area. The spring turkey season would be limited to Saturdays and Sundays and would only occur on alternate weekends at Sacramento and Delevan Refuges. The spring turkey hunt would be limited to 4-5 mentored hunters on the Sacramento Refuge and 2-3 mentored hunters on the Delevan Refuge. The spring turkey hunt season extends from the last Saturday in March to the first Sunday in May (6 weeks). A total of 5,815 acres on the four refuges would be open to turkey hunting, including 1,699 acres on Sacramento Refuge, 1,678 acres on Delevan Refuge, 1613 acres on Colusa Refuge, and 825 acres on Sutter Refuge. Figures 1 through 4 show the areas on each of the four Refuges that would be opened to wild turkey hunting under the Proposed Action.

Refuge-specific regulations applicable to these areas will be published in the Federal Register as part of the 2019-2020 Refuge-Specific Hunting and Sport Fishing Regulations.

Mitigation Measures to Avoid Conflicts:

- Population monitoring will be reviewed annually with the CDFW to ensure that harvest from hunting is not unacceptably impacting the targeted populations. The program will be modified accordingly.
- To minimize impacts to colonial waterbird rookeries or bald eagle nests, a half-mile radius around rookery sites and bald eagle nests would be closed to hunting and access. Refuge staff will monitor rookeries and bald eagle nests and, if necessary, refuge staff will adjust hunting to minimize disturbance.

Figure 1. Proposed Action - Sacramento National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

0 0.25 0.5 1 Miles

0 0.25 0.5 1 Kilometers

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Figure 2. Proposed Action - Delevan National Wildlife Refuge

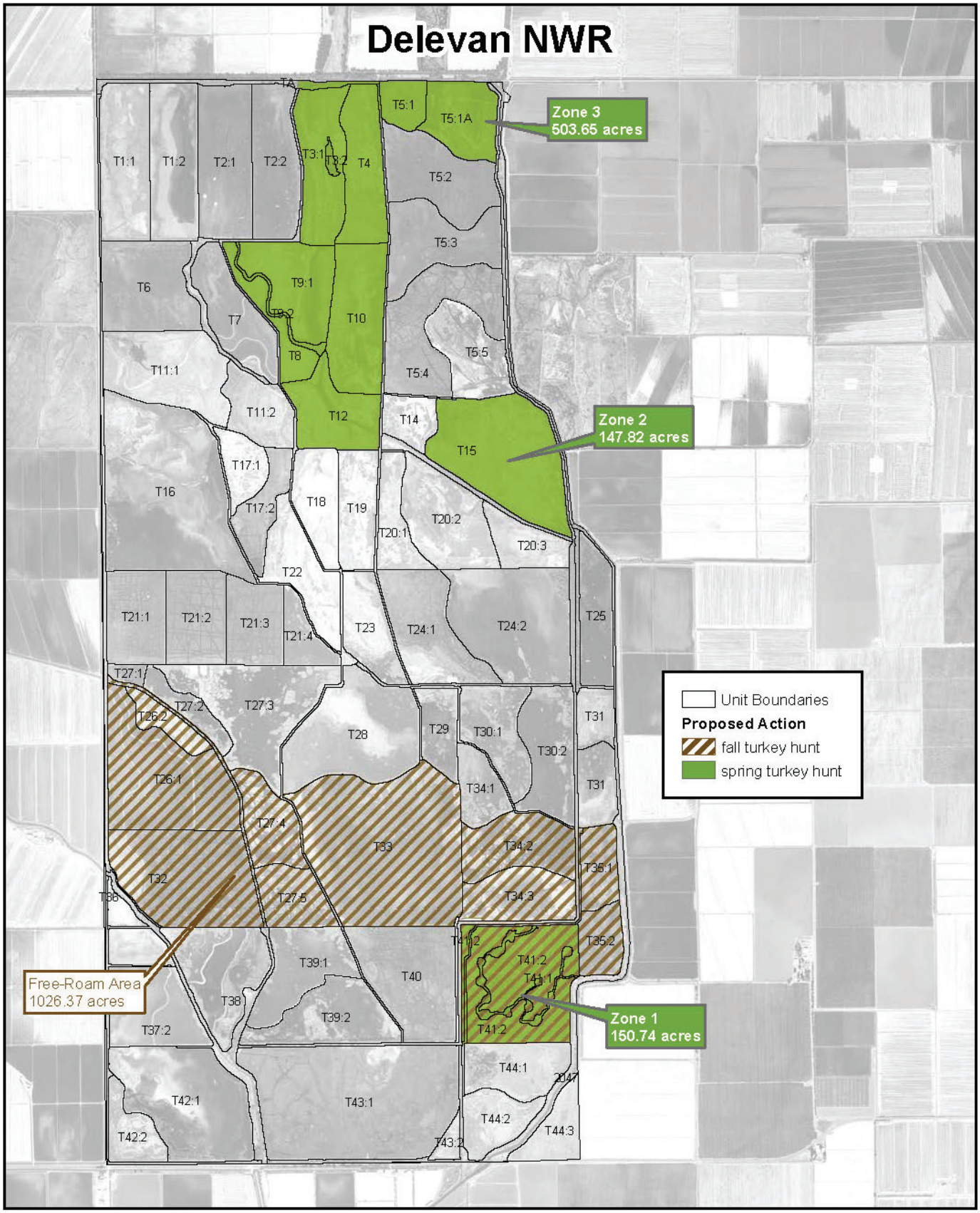

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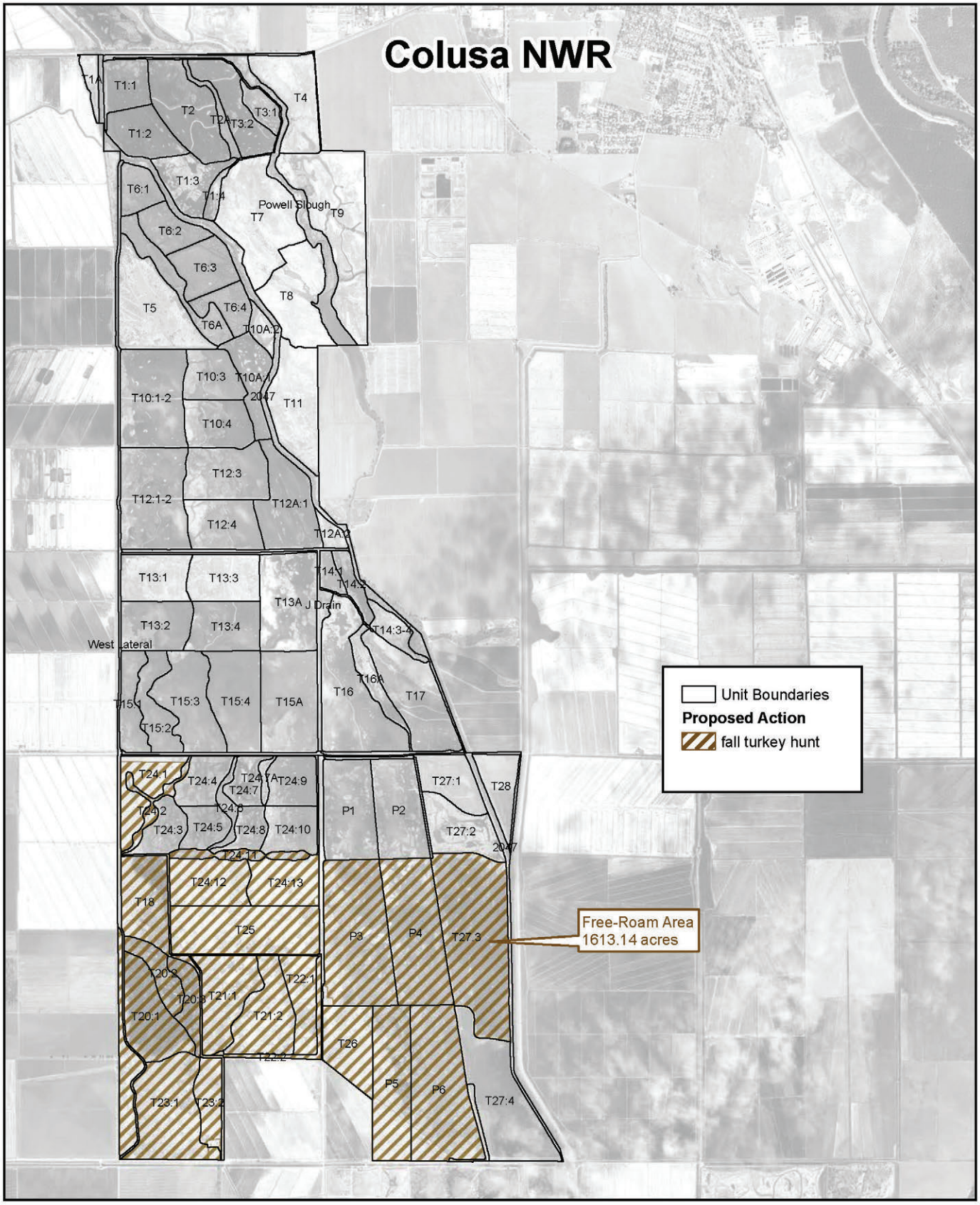
Figure 3. Proposed Action - Colusa National Wildlife Refuge



Produced by Sacramento NWRC
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0 0.225 0.45 0.9 Kilometers

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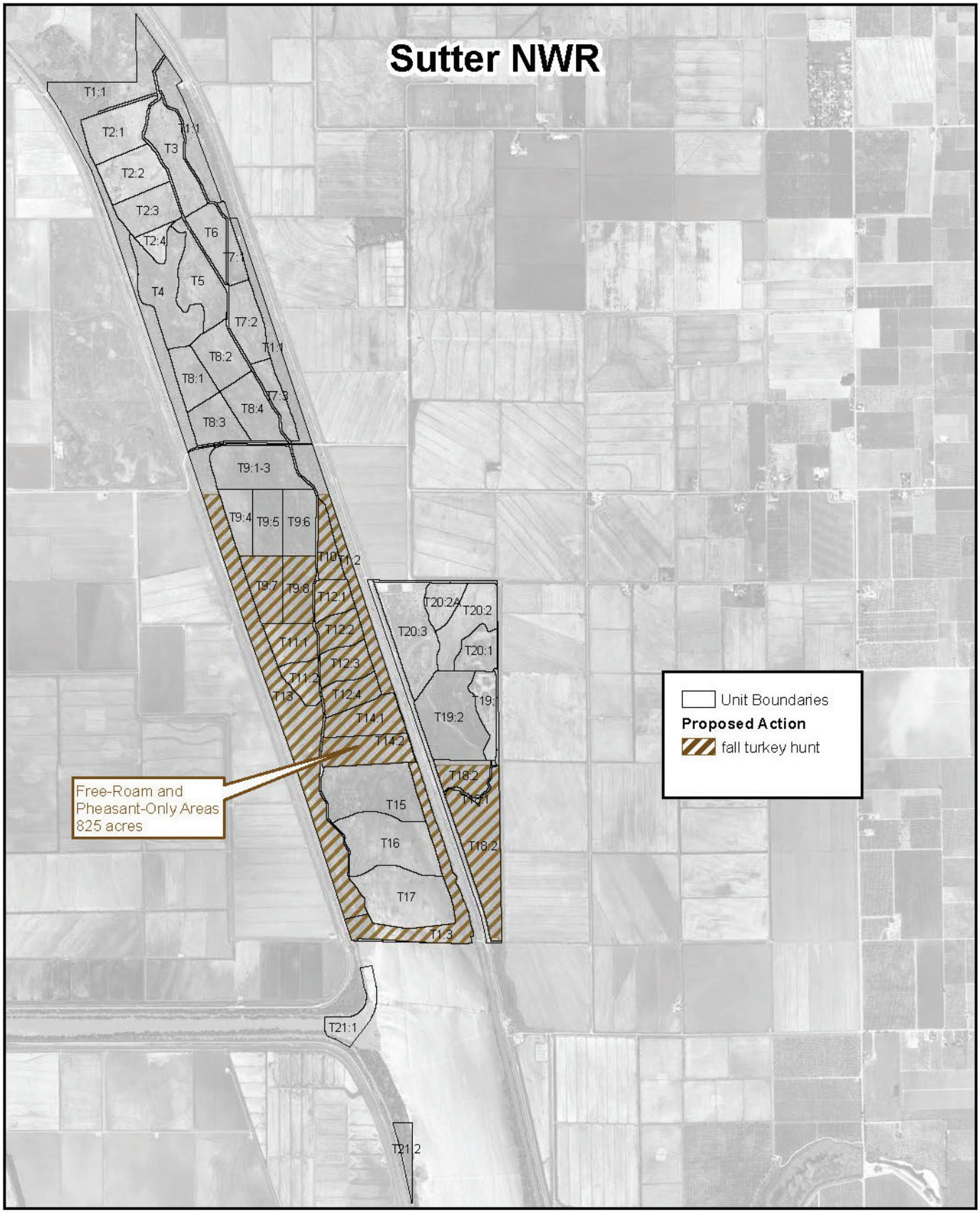
Figure 4. Proposed Action -Sutter National Wildlife Refuge



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0 0.25 0.5 1 Kilometers

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- Maintain sanctuary habitat on each Refuge. The Service manages a portion of wetland, vernal pool/alkali meadow, grassland, and riparian habitats as sanctuary (i.e. no hunting or other public access) on each Refuge to reduce human disturbance at sensitive fish, wildlife, and plant sites during the rearing, breeding, and growing seasons.

This alternative offers increased opportunities for public hunting/fishing and fulfills the Service's mandate under the National Wildlife Refuge System Improvement Act of 1997. The Service has determined that the hunt plan is compatible with the purposes of the Sacramento, Delevan, Colusa, and Sutter Refuges and the mission of the NWRS.

Alternative B –Expanded Spring Wild Turkey Hunt:

In addition to the hunt openings described under Alternative A, under the Expanded Spring Turkey Hunt Alternative, the Service would open 303 acres of Colusa Refuge, and 78 acres of Sutter Refuge to the spring wild turkey season on Saturdays and Sundays. The spring turkey hunt on Colusa and Sutter Refuges would occur on alternate weekends from those at Sacramento and Delevan Refuges. The spring turkey hunt on Colusa and Sutter Refuges would take place in the northern portions of each refuge (see Figures 5 and 6) within the current Sanctuary Zone. We would allow 2-4 hunters on Colusa Refuge and 1-2 hunters on Sutter Refuge for the spring turkey hunt. Under Alternative B we would implement the same mitigation measures described for the Proposed Action, although the area of sanctuary on the refuges would be slightly reduced by opening an additional 381 acres of sanctuary to a spring turkey hunt.

In summary, under Alternative B, the Sacramento, Delevan, Colusa, and Sutter Refuges would be open to both fall and spring turkey hunting. Fall turkey hunts would take place in Free Roam and Pheasant Only units on each of these refuges. Spring turkey hunts would also occur on each of these Refuges with the Colusa/Sutter spring hunts occurring on alternate weekends from the Sacramento/Delevan spring hunt. The timing of the spring turkey hunt would be the same as under the Proposed Action.

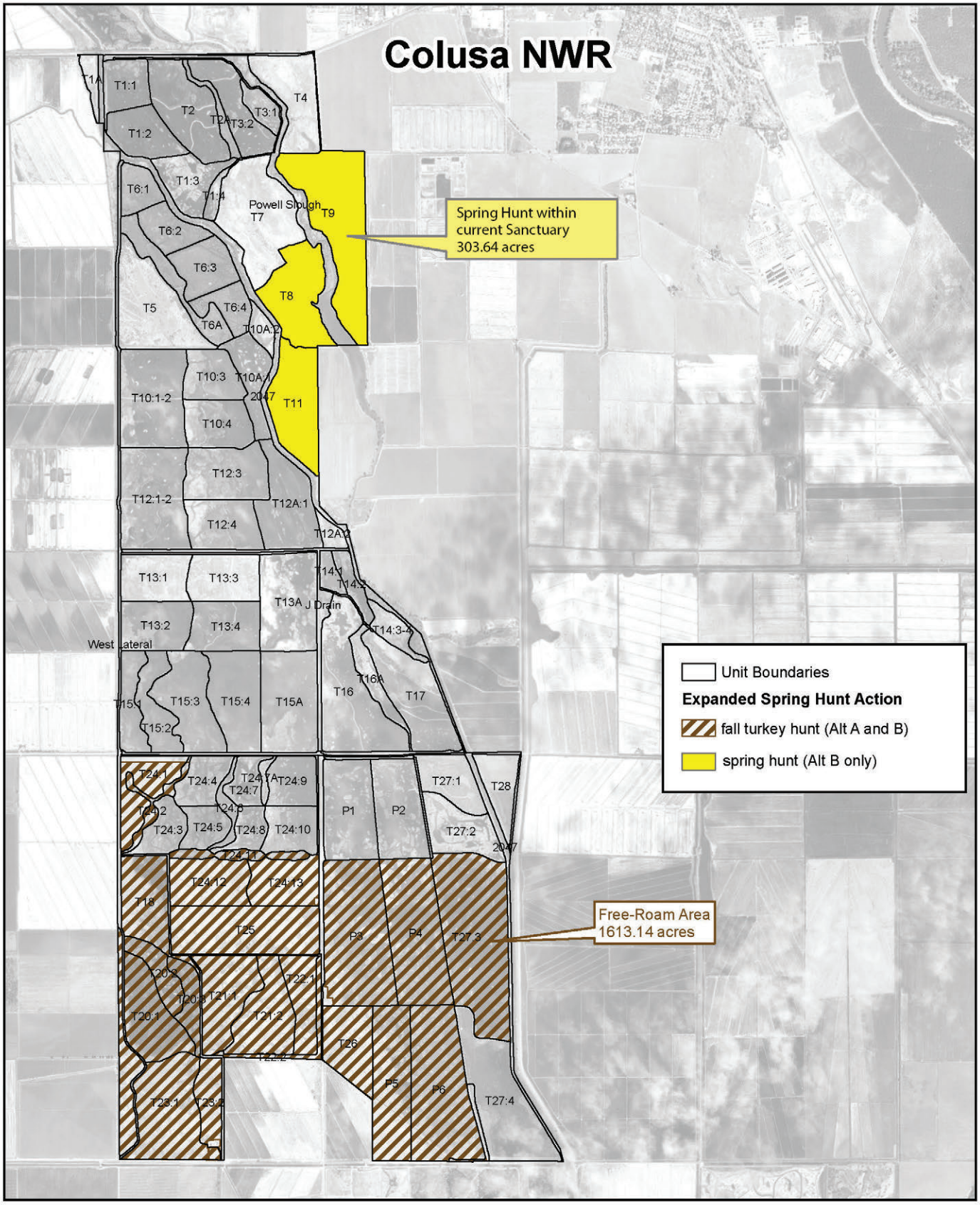
Alternative C – No Action

Under the No Action alternative the Service would not open Sacramento, Delevan, Colusa or Sutter Refuges to hunting of wild turkeys.

Affected Environment

The discussion of the affected environment and the impact analysis that follows, focuses specifically on opening the Refuges to the hunting of wild turkeys. Because none of the alternatives would physically alter the landscape of the Refuges and because hunting is an activity that currently occurs on the Refuges, the following resources were not evaluated in this

Figure 5. Alternative B, Expanded Spring Hunt - Colusa National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

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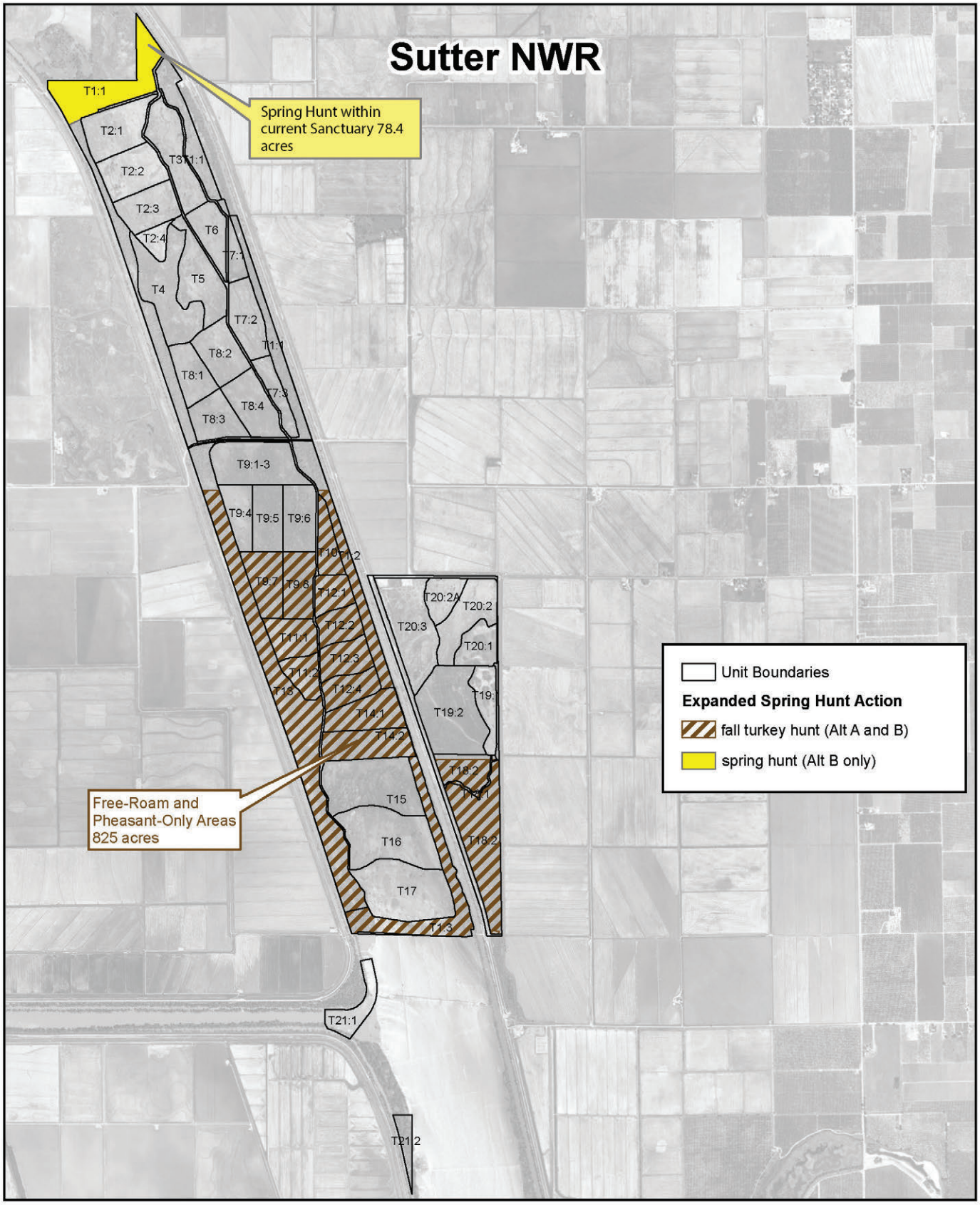
Figure 6. Alternative B, Expanded Spring Hunt - Sutter National Wildlife Refuge



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Projection: UTM Zone 10N
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EA: Hydrology; Water Quality and Contaminants; Geology and Soils; Air Quality; Hazardous Materials; Cultural Resources; Social and Economic Environment.

Vegetation and Habitats:
The Sacramento Refuge consists of 10,819 acres in Glenn and Colusa counties. Delevan Refuge consists of 5,877 acres in Colusa County. Colusa Refuge consists of 5,077 acres in Colusa County. Sutter Refuge consists of 2,591 acres in Sutter County.

Habitats on these refuges consist mostly of managed wetlands with lesser amounts of unmanaged wetlands, vernal pools, alkali meadows, grasslands, riparian forest, and other habitats. For more information regarding the affected environment, please see Chapter 3, specifically Table 4 and Figures 6 through 9, in the Final CCP/EA. The Final CCP/EA can be found here: https://www.fws.gov/refuge/Sacramento/CCP.html.

Fish and Wildlife:
Given the variety of habitats on the Complex, a diversity of wildlife species occur here. While many species are common year-round, others are here only during migration, for the winter, or during the spring and summer months to breed. A description of fish, wildlife, and plants occurring on the Refuges can be found in Chapter 3 of the Final CCP/EA, and a complete list of fish and wildlife species that occur or potentially could occur on the Sacramento, Delevan, Colusa, and Sutter Refuges can be found in Appendix K of the Final CCP/EA (USFWS 2009).

Wild turkeys are non-native residents of the Refuges and use a variety of grassland, riparian, and wetland habitats throughout the year. Grasslands are used for foraging, and riparian forest and wetlands provide roosting sites and escape cover for wild turkeys. As shown in Table 1, observations of wild turkeys during regular monthly wildlife surveys have increased substantially on Sacramento, Delevan, Colusa, and Sutter Refuges since the publication of the CCP in 2009.

Table 1. Annual Average Number of Wild Turkey Observations per Regular Wildlife Survey at Sacramento NWR Complex, 2007-2018.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sacramento NWR	3.3	0.8	3.9	6.7	5.9	11.8	17.2	24.9	22.1	40	55.5	73.9
Delevan NWR	1.9	3.3	3.9	4.6	9.7	10	15.1	7.6	17.8	9.9	12.9	53.5
Colusa NWR	0.1	0	0	0.2	0.2	3.2	2.8	4.8	11.5	9	13.8	22.7
Sutter NWR	0	0	0	0.1	1.1	4.1	0.3	4.3	3.3	1.3	4	3.3

Threatened and Endangered Species:
The Refuges provide breeding, rearing, migratory and/or wintering habitat for a number of Federal and State threatened and endangered species and special status species. Federal and State listed species associated with vernal pools and alkali meadow include: palmate-bracted bird's beak, Hairy Orcutt grass, Greene's tuctoria, Hoover's spurge, Colusa grass, Conservancy fairy

shrimp, and vernal pool tadpole shrimp. Special status fish species found in riverine floodplains include Central Valley spring-run chinook salmon, Sacramento River winter-run chinook salmon, Central Valley fall/late fall-run chinook salmon and the Central Valley steelhead ESU. The giant garter snake may be found in wetlands and uplands on the Refuges and the bald eagle in wetlands and riparian forests. Chapter 3, section 6.13, in the Final CCP/EA includes a description of Federal and State threatened or endangered fish, wildlife, and plants occurring on the Refuges or potentially occurring on the Sacramento, Delevan, Colusa, and Sutter Refuges (USFWS 2009). Since publication of the Final CCP in 2009, the status of two species changed. In 2014, the Service listed the western yellow-billed cuckoo as a threatened species under the Federal Endangered Species Act (USFWS 2014b). In 2018, the tricolored blackbird was listed as a threatened species under the California Endangered Species Act (CFGC 2018). Each of these species is discussed in Chapter 3 of the CCP. The western yellow-billed cuckoo is discussed in section 6.13.17, and the tricolored blackbird in section 6.8. A statewide survey conducted during 1986 and 1987 found that the majority of yellow-billed cuckoos were concentrated along the upper Sacramento River from Red Bluff to Colusa and at the South Fork Kern River. Cuckoos were located at Sutter Refuge during a comprehensive survey for this species on the Sacramento National Wildlife Refuge Complex between 1999 and 2000 (Isola 2000). The tricolored blackbird nest in wetlands on the Refuges and feed in grasslands and seasonal wetlands. While tricolored blackbird colonies occur periodically on all the Refuges, they are not generally found in upland habitats where wild turkey hunting would take place.

Recreational Uses:
Several wildlife dependent recreation activities are allowed on the Refuges, including: hunting, wildlife observation, wildlife photography, environmental education, and interpretation. Sacramento and Colusa Refuges provide opportunities for wildlife observation and photography on auto tour routes and walking trails; there is also a seasonal walking trail on Sutter Refuge. In addition, Sacramento, Colusa, and Delevan Refuges provide access to photography blinds. All four of the refuges provide hunting for waterfowl and pheasants on Wednesdays, Saturdays, and Sundays throughout the state hunting season.

Environmental Consequences of the Action

This section analyzes the environmental consequences of the action on each affected resource, including direct and indirect effects.

Impact Types:

- *Direct effects* are those which are caused by the action and occur at the same time and place.
- *Indirect effects* are those which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.
- *Cumulative impacts* result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.

In 2009, the Service completed a final CCP/EA which is incorporated by reference. As part of the CCP/EA, the Service considered the opportunity for a limited spring Turkey Hunt Program on Sacramento, Delevan, and Colusa Refuges. We stated that we would assess a limited spring Wild Turkey Hunt when Wild Turkey populations within the Refuges were sufficient to support a hunting program. We drafted a hunting plan and prepared a compatibility determination for hunting on the four Refuges. We found waterfowl and pheasant hunting compatible; however, we did not open the refuge to hunting of wild turkeys. We are now reviewing and updating previous compliance work and now propose to open the Sacramento, Delevan, Colusa, and Sutter Refuges to hunting of wild turkeys.

Vegetation and Habitats:

Alternative A - Proposed Action

Impacts to vegetation and habitats from wild turkey hunts during the fall would be minimal. Hunting for wild turkeys during the fall would occur within existing Free Roam and Pheasant Only hunt units, resulting in no additional impacts to vegetation and habitats on Sacramento, Delevan, Colusa, and Sutter Refuges. Hunting is conducted on foot by individuals or small groups. This direct impact of foot travel by hunters on the habitat is often different from that of other wildlife-dependent recreation users because hunters tend to travel in dispersed patterns over wide areas, minimizing the chances of negatively impacting sites.

Under this Alternative we would open a very limited wild turkey hunt on Sacramento and Delevan Refuges during the spring. Impacts to vegetation and habitat from a spring turkey hunt would also be minimal because we would allow a limited number of hunters in designated areas on Saturdays and Sundays. At Sacramento Refuge we would allow only 4-5 mentored hunters and at Delevan we would allow 2-3 mentored hunters. Saturday and Sunday spring turkey hunting would alternate between Sacramento and Delevan Refuges. While spring turkey hunting would take place in existing hunt units on the Sacramento Refuge, we would open approximately 651 acres of the northern sanctuary (an area that is currently closed to the public) on Delevan Refuge to spring turkey hunting. The habitats on Delevan Refuge that would be open to this limited public use are a combination of managed wetlands, perennial grassland, and vernal pool/alkali meadow complex. However, the limited number of hunters and timeframe of the hunt (2-3 hunters on alternate weekends during the spring) are unlikely to substantially affect these habitats.

Alternative B - Expanded Spring Wild Turkey Hunt

In addition to the effects described under Alternative A, under Alternative B, we would also open the Colusa and Sutter Refuges to a spring turkey hunt. On Colusa Refuge we would open 303 acres of the current sanctuary area to wild turkey hunting and on Sutter Refuge we would open 78 acres to wild turkey hunting. The 303 acres on Colusa Refuge are in annual grassland and alkali meadow habitats. The spring turkey hunt on Sutter Refuge would take place in annual grassland and valley oak riparian forest habitats. Opening part of the sanctuary on Colusa and Sutter refuges would have minimal impacts to vegetation and habitats on these refuges. The number of hunters allowed during the spring hunt on Colusa and Sutter Refuges would be small

(2-4 hunters at Colusa and 1-2 hunters at Sutter) and we would alternate the spring turkey hunts on Sacramento and Delevan Refuges with those on Sutter and Colusa.

Alternative C - No Action

Impacts to the vegetation and habitats on Sacramento, Delevan, Colusa, and Sutter Refuges would not differ from current conditions.

Fish and Wildlife:

Alternative A - Proposed Action

The direct effects of hunting include mortality, wounding, and disturbance. While wild turkey mortality will occur from this recreational use, the California Department of Fish and Wildlife (CDFW) sets the overall harvest limit at a level to ensure population-level effects on wild turkeys are not impacted. The fall hunt occurs only on Wednesdays, Saturdays, and Sundays. As the hunting of wild turkey's during the fall turkey season would occur within existing hunt units and on existing hunt days, there would not be an increase in hunting pressure and the impacts associated with fall wild turkey hunting would be negligible.

The spring turkey hunt on both Sacramento and Delevan is limited to alternate weekends and a small number of mentored hunters. On Sacramento Refuge, spring turkey hunting would take place within the existing free roam and pheasant only units. This means that wild turkeys would be able to relocate to other parts of the refuge where hunting is not allowed. In addition, we would allow a maximum of 5 hunters on alternating weekends. On Delevan Refuge, the Service would open about 651 acres of the closed zone and 150 acres in the existing free roam unit to spring turkey hunts. However, the number of hunters allowed in these areas would be limited to a maximum of 3 mentored hunters on alternating weekends.

Colonial waterbirds are also known to roost and nest in the areas proposed for spring turkey hunts at Sacramento and Delevan refuges. As the hunt period coincides with the nesting season for colonial waterbirds, hunting could negatively affect nesting success in the hunt area. To minimize impacts to colonial waterbird rookeries, a half-mile radius around rookery sites would be closed to hunting and access. Refuge staff will continue to monitor rookery locations and, if necessary, refuge staff will adjust hunting to minimize disturbance.

Bald eagles (*Haliaeetus leucocephalus*) are known to nest in the areas proposed for spring turkey hunts. As the hunt period coincides with the nesting season for bald eagles, hunting could negatively impact nesting success in the hunt area. To minimize impacts to bald eagles, a half mile radius around know bald eagle nests would be closed to hunting and access

In summary, impacts to wild turkeys and other wildlife on both Sacramento and Delevan Refuges are minimized by the intermittent hunt schedule, presence of closed zones around colonial waterbirds and bald eagle nests, maintenance of sanctuary areas, and a limited number of mentored hunters.

Alternative B - Expanded Spring Wild Turkey Hunt

Under Alternative B, the spring wild turkey hunt would be expanded to include Colusa and Sutter Refuges. Under this alternative there would be a fall wild turkey hunt and spring wild turkey hunt on each of the four refuges. In addition to the effects described under Alternative A, the Service would open 303 acres on Colusa Refuge and 78 acres on Sutter Refuge to spring wild turkey hunts, allowing 2-4 mentored hunters on the Colusa Refuge and 1-2 mentored hunters on the Sutter Refuge. To minimize disturbance related impacts to wildlife, the spring turkey hunts on Colusa and Sutter Refuges would be on alternate weekends to those on Sacramento and Delevan Refuges. As described under Alternative A, to minimize impacts to bald eagle nests and colonial waterbird rookeries, a half-mile radius around these sites would be closed to hunting and access.

On the Sutter Refuge, wild turkeys are primarily found in the oak savannah habitat in the northernmost part of the refuge sanctuary. In order to access the spring turkey hunt area, hunters would have to drive along refuge administrative roads to access areas of the Refuge inhabited by wild turkeys. These administrative roads bisect the few areas of sanctuary for migratory waterfowl in the Sutter Basin.

Alternative C - No Action

Under Alternative C, wild turkey mortality would not occur from hunting.

Threatened and Endangered Species:

Alternative A - Proposed Action

The Service would continue its habitat management program to support and improve habitat conditions for all threatened and endangered species occurring on the Refuges. Federal and State listed species that could be affected by wild turkey hunting on the refuge are the giant garter snake and species associated with vernal pool/alkali meadow habitats. However, hunting is an existing use on Sacramento, Delevan, Colusa, and Sutter Refuges and has not adversely affected any Federal or State listed species. In 1999, the Service completed Intra-agency Formal Section 7 Consultation on Management, Operations, and Maintenance of the Sacramento National Wildlife Refuge Complex, Willows, California (Service File No. 1-1-98-F-0013) and amended this consultation in 2002 (Service File No. 1-1-02-F-0206). In 2008, the Service reviewed the activities proposed in the CCP/EA, and determined that no new activities were proposed that may have adverse effects on listed species. Since the CCP was issued in 2009, the Service designated the western yellow-billed cuckoo as a threatened species under the Federal Endangered Species Act. The western yellow-billed cuckoo requires dense, large tracts of riparian woodlands with well-developed understories for breeding. Comprehensive surveys conducted between 1999 and 2000, located cuckoos at Sutter Refuge (Isola 2000), but not in the existing hunt area. Under the Proposed Action, we would only allow a fall turkey hunt on Sutter Refuge and this hunt would take place within the existing hunt area. Therefore, the Proposed Action would have no effect on the western yellow-billed cuckoo.

The proposed fall and spring wild turkey hunts are consistent with the consultation on operation and maintenance of the Sacramento National Wildlife Refuge Complex. No new activities are proposed that could adversely affect listed species on the refuges.

Alternative B - Expanded Spring Wild Turkey Hunt

The effects to threatened and endangered species under Alternative B would be similar to the Proposed Action. However, under Alternative B, we would open 78 acres of the sanctuary at the northern part of Sutter Refuge to a spring turkey hunt. Although spot surveys have not located any, this area of the Refuge does provide habitat for the western yellow-billed cuckoo. Thus, the expanded spring wild turkey hunt may affect, but is not likely to adversely affect, the western yellow-billed cuckoo.

Alternative C - No Action

Under Alternative C, the Service would not open Sacramento, Delevan, Colusa, and Sutter refuges to wild turkey hunting. The Service would continue its habitat management program to support and improve habitat conditions for all threatened and endangered species occurring on the Refuges. This alternative is also consistent with the existing Intra-Service Section 7 Consultation completed in 1999, and amended in 2002.

Recreational Uses:

Alternative A - Proposed Action

The hunting of wild turkeys during the fall will result in no impacts to visitor services; hunting for wild turkeys during the fall would be subject to the normal CDFW hunting requirements and would not result in additional hunters utilizing the four refuges.

Hunting of Wild Turkeys during the spring season on Sacramento and Delevan would represent minor impacts to other visitor services. Currently, upon the completion of the hunt season, portions of the Sacramento Refuge hunt area is opened to visitors for wildlife observation and photography through access via walking trails. Access to these trails would be closed on Saturdays and Sundays to ensure visitor safety. Because hunting would alternate between Sacramento and Delevan Refuges during the spring season, the public access trails at Sacramento Refuge would be closed on alternating weekends during the 6 week spring hunting season.

Alternative B - Expanded Spring Wild Turkey Hunt

There would be no impacts to visitor services during the fall wild turkey hunt as described under Alternative A. Impacts to visitor service from a spring wild turkey hunt on the Sacramento Refuge would also be the same as described under Alternative A. However, under Alternative B, there would be impacts to visitor services on Colusa Refuge. Wild turkeys are primarily found in the upland habitats located in the northern part of the Refuge sanctuary where the auto tour route and hiking trails are located. In order to ensure the safety of visitors recreating on Colusa Refuge, we would need to close the auto tour and hiking trails on weekends during the spring wild turkey hunts. This would reduce visitor access to the auto tour route and hiking trails every other weekend from the end of March to the beginning of May.

Alternative C - No Action

Under Alternative C there would be no changes to visitor services at any of the refuges. The Service would continue to provide hunting, wildlife observation, wildlife photography,

environmental education and interpretation activities on the Refuges. Access to walking trails located in the hunt area would continue to be authorized 7 days a week after the waterfowl hunting season ends.

Cumulative Impact Analysis:

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

For more information on the national cumulative impacts of the Service's hunting and fishing program on the National Wildlife Refuge System, see Cumulative Impacts Report, 2019-2020 National Wildlife Refuge and National Fish Hatchery Proposed Hunting and Sport Fishing Openings (Appendix III).

Regional Analysis

The wild turkey is native to much of North America, but not California. The first record of wild turkey introduction into California was in 1877 (CDFG 2004b). The first introduction attempts of wild turkeys in California by the Commission were made in June of 1908 (CDFG 2004a). Many releases have been made since that time and have resulted in establishing viable populations in approximately 54 counties.

The CDFG (2004a) objectives include maintaining healthy resident game bird populations including wild turkeys and providing public hunting opportunities through regulated harvest. These objectives are consistent with the wildlife conservation policy adopted by the State Legislature in Section 1801 of the Fish and Game Code. The State's wildlife conservation policy, among other items, contains the objective of providing for the harvest of wildlife resources where such use is consistent with maintaining healthy wildlife populations.

Wild turkeys populations have grown tremendously and are estimated to occupy 29,168 square miles (18.5%) of California (CDGF 2004a). This figure does not include the potentially occupied range where turkeys may exist, but at very low population densities. Densities vary between 4 and 15 acres per bird in portions of their range (Lehmann 1957, Hewitt 1967), however in California; the densities are lower and estimated to be between 60 and 120 acres per bird. The wild turkey population (adults in spring) in California is estimated to be between 147,329 birds (CDFG 2004a) and 242,000 birds (CDFG 2004b).

The first hunting season for wild turkeys in California was in 1968. As turkey populations continued to grow, other counties were gradually opened to hunting, and by 1979 both spring and fall seasons were opened statewide, with the exception of San Diego County in the fall (CDFG 2004b). The spring gobbler season has become more popular with hunters than the fall season. Of the two seasons, spring hunting is considered more biologically sustainable, allowing for harvest of up to 30% of the male population annually with no effects to population growth (Vanguilder 1992). However, studies in the Midwest have shown that harvest of more than 10% of the fall population will usually result in population declines, primarily because females are also harvested (Vanguilder and Kurzejeski 1995, Little et al. 1990). Some states have eliminated

fall hunting entirely, in favor of the spring season. Regulations were changed in California in 1998, reducing the fall season from 30 to 16 days with a one bird season limit, and increasing the spring season limit from two to three bearded turkeys. The goal of this change was to shift the focus of the harvest from the fall season to the spring, primarily in an effort to protect populations on public lands.

Currently, the spring season is open statewide for bearded turkeys, with a one bird per day, 3 per season limit, starting the last Saturday in March and extending for 37 days, with an additional 14 days available for archers and junior hunters. An early junior hunt is also offered the weekend before the general season opening. The fall season is open in all counties except San Diego, with a one either-sex bird per day and two per season limit, starting the second Saturday in November and extending for 30 consecutive days.

It is estimated that the sex ratio of wild turkeys is 50 percent (Gwynn 1964, Gainey 1955). Nesting success is 45 percent, the average number of eggs per clutch is 10.59, and the egg hatching rate is 87 percent (Dickson 1992). Brood mortality is 66 percent and adult mortality is 58 percent (Dickson 1992). Total annual mortality (natural) is estimated to be at least 284,784 from a premortality population of at least 449,349 birds.
The 2015 Hunter Survey (CDFW 2015) reports the 2015 harvest of wild turkey to be 28,728 birds (18,877 in the spring and 9,842 in the fall). The number of turkey hunters statewide in spring 2015 was 29,884 and was 19,695 in the fall. During 2015, the spring wild turkey harvest for CDFW's North Central Region was 7,370 (CDFG 2015). The fall wild turkey harvest was 3,818. The number of hunters for the North Central Region in spring was 11,955 and 7,529 in the fall.

Local Analysis

Throughout the wild turkey's range, suitable habitat contains a combination of three key components: trees, open grasslands and moisture (CDFG 2004b). The Refuges consist mostly of managed wetlands and uplands, with much smaller amounts of unmanaged wetlands (mostly vernal pools) and riparian forest. This diversity of vegetation provides wild turkeys with high quality breeding (nesting) habitat, which provides abundant and diverse food items such as seeds, legumes, and acorns; escape cover to provide safety from predators including humans; shelter from weather related elements; roosting habitat (tall trees); water; and high quality winter habitat, which provides similar food, escape, shelter, roosting, and water needs.

Conclusion

The CDFG (2004a) determined that the removal of individual animals from resident game bird populations statewide will not significantly reduce those populations and will, therefore, not have a significant environmental impact on resident game birds. The CDFG (2004a) also determined that the resident game bird hunting will not have a significant impact on other aspects of the natural environment.

The CDFG (2004a) demonstrates the adult turkey population in the spring can more than sustain annual mortality, including hunting mortality whether or not the harvest is considered compensatory or additive. The CDFG (2004a) determined there are no significant adverse impacts to the wild turkey population expected as a result of existing hunting regulations.

The Service believes that hunting on Sacramento, Delevan, Colusa, and Sutter Refuges will not have a significant impact on local populations or statewide populations of wild turkey.

Summary of Analysis

The purpose of this EA is to briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Alternative A – Proposed Action Alternative

As described above, impacts to vegetation and habitats, fish and wildlife, as well as threatened and endangered species under the Proposed Action would be minimal. Hunting for wild turkeys during the fall would occur within existing hunt units on these refuges, resulting in no additional impacts to these resources. The spring turkey hunt opened under the Proposed Action would have minimal effects to these resources because we would allow only a limited number of hunters on alternate weekends. Although a portion of the northern sanctuary on Delevan would be opened under this alternative the limited number of hunters allowed and the timeframe of the hunt (2-3 hunters on alternate weekends during the spring) are unlikely to substantially affect these resources. The Proposed Action is consistent with the Intra-agency Formal Section 7 Consultation on Management, Operations, and Maintenance of the Sacramento National Wildlife Refuge Complex, Willows, California (Service File No. 1-1-98-F-0013) and as amended in 2002 (Service File No. 1-1-02-F-0206). In reviewing the Proposed Action, the Service determined there would be no effect on the western yellow-billed cuckoo. The Proposed Action would have minor effects on visitors participating in other types of wildlife dependent recreation such as wildlife photography and observation on the Sacramento Refuge. Under the Proposed Action we would close access to walking trails on the Sacramento Refuge during the spring turkey hunt to ensure visitor safety. Because hunting would alternate between Sacramento and Delevan Refuges during the spring season, the public access trails at Sacramento Refuge would be closed on alternating weekends during the 6 week spring hunting season.

This alternative helps meet the purpose and needs of the Service as described above, because it provides additional wildlife-dependent recreation opportunities on the refuge. The Service has determined that the proposed action is compatible with the purposes of the Sacramento, Delevan, Colusa, and Sutter Refuges and the mission of the NWRS. The Compatibility Determination is in Appendix II.

Alternative B –Expanded Spring Hunt

Under Alternative B, the spring wild turkey hunt would be expanded to include Colusa and Sutter Refuges. All other aspects of this alternative would be the same as the Proposed Action. Expanding the spring hunt of Colusa and Sutter Refuges would open 303 acres on Colusa Refuge and 78 acres on Sutter Refuge sanctuary areas to hunting. Impacts to habitats and wildlife in these sanctuary areas would be minimized by limiting the number of hunters allowed and by limiting the spring hunt to alternate to those on Sacramento and Delevan Refuges. Although we would work to minimize impacts to non-hunted wildlife, opening the Sutter Refuge to a spring

hunt means that hunters would have to drive on administrative roads that bisect the few areas of sanctuary for migratory waterfowl in the Sutter Basin. In addition, the spring hunt on Sutter Refuge would take place in habitat that is suitable for the federally listed threatened western yellow-billed cuckoo.

The expanded spring hunt would also impact visitor services on Colusa Refuge. Wild turkeys are primarily found in the upland habitats located in the northern part of the Refuge sanctuary where the auto tour route and hiking trails are located. In order to ensure the safety of visitors recreating on Colusa Refuge, we would need to close the auto tour and hiking trails on weekends during the spring wild turkey hunts. This would reduce visitor access to the auto tour route and hiking trails every other weekend from the end of March to the beginning of May.

Although this alternative also meets the purpose and needs of the Service as described above, it would have additional impacts to non-hunted wildlife on the Sutter Refuge and would reduce visitor access to the auto tour route and hiking trails on Colusa Refuge every other weekend from the end of March to the beginning of May.

Alternative C – No Action

Alternative C would not meet the purpose and need for action.

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List of Preparers:

Curt McCasland, Project Leader
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Patricia Roberson, NEPA and Policy Coordinator

State Coordination:

Because of their expertise and/or experience in hunting, and/or protection of wildlife and habitat, the following parties were contacted regarding our proposal to open the Refuges to hunting of wild turkeys:

1. California Department of Fish and Wildlife
2. Local hunters

Tribal Consultation:

The Service is coordinating with the Grindstone Indian Rancheria and the Colusa Indian Community Council.

Public Outreach:

The draft Environmental Assessment was available for public and agency review between June 25 2019 and July 25 2019. The Service did not receive any public comments on the EA. Additionally, on June 26, 2019, the Service published the draft 2019–2020 Refuge-Specific Hunting and Sport Fishing Regulations in the Federal Register. The National Wild Turkey Federation sent a letter of support in response to the publication of the draft 2019-2020 Refuge-Specific Hunting and Sport Fishing Regulations. The National Wild Turkey Federation supports the expansion of public access for outdoor recreation, including the acreage opened to turkey hunting. The Service did not receive public comments specific to Wild Turkey Hunt Plan and EA for Sacramento, Delevan, Colusa, and Sutter Refuges.

Determination:

This section will be filled out upon completion of any public comment period and at the time of finalization of the Environmental Assessment.

☑ The Service's action will not result in a significant impact on the quality of the human environment. See the attached **"Finding of No Significant Impact".**

☐ The Service's action **may significantly affect** the quality of the human environment and the Service will prepare an Environmental Impact Statement.

Preparer Signature: Patricia Roberson Date: 8/28/2019

Name/Title/Organization: Patricia Roberson

NEPA/Policy Coordinator

Reviewer Signature: Mark Pelz Date: 8/28/19

Name/Title: Mark Pelz Chief, Natural Resources Div.

Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges

Wild Turkey Hunt Plan

August 2019

U.S. Fish and Wildlife Service

Sacramento National Wildlife Refuge Complex

752 County Road 99W

Willows, California 95988

Submitted By:
Project Leader

Signature _____ Date 8/29/2019

Concurrence:

Refuge
Supervisor

Signature _____ Date 8/29/19

Approved:

Regional Chief,
National Wildlife
Refuge System

Signature _____ Date 8.25.19

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SACRAMENTO, DELEVAN, COLUSA, AND SUTTER NATIONAL WILDLIFE REFUGES
WILD TURKEY HUNTING PLAN

1. Introduction

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

Sacramento National Wildlife Refuge was established pursuant to Executive Order 7562, February 27, 1937. Delevan National Wildlife Refuge was established pursuant to the Migratory Bird Conservation Act of 1929. Colusa and Sutter National Wildlife Refuges were established pursuant to the Migratory Bird Conservation Act of 1929 and the Lea Act of 1948.

The primary purpose of Sacramento National Wildlife Refuge is to provide a refuge and breeding ground for migratory birds and other wildlife (Executive Order 7562, February 27, 1937, provide an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d (Migratory Bird Conservation Act of 1929)), to conserve fish, wildlife, and/or plants which are listed as endangered species or threatened species (16. U.S.C. 1534 (Endangered Species Act of 1973)), provide suitable incidental fish and wildlife oriented recreational development (16 U.S.C 460k-2 (Refuge Recreation Act of 1962)), and develop, advance, mange, conserve, and protect fish and wildlife resources (16 U.S. C 742f(a)(4) (Fish and Wildlife Act of 1956).

The primary purpose of Delevan National Wildlife Refuge is to provide an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d (Migratory Bird Conservation Act of 1929)) and to conserve fish, wildlife, and/or plants which are listed as endangered species or threatened species (16. U.S.C. 1534 (Endangered Species Act of 1973)).

The primary purpose of Colusa National Wildlife Refuge is to provide an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d (Migratory Bird Conservation Act of 1929)), manage and control migratory waterfowl and other wildlife (16 U.S.C. 695 (Lea Act of 1948), and to conserve fish, wildlife, and/or plants which are listed as endangered species or threatened species (16. U.S.C. 1534 (Endangered Species Act of 1973)).

The Primary purpose of Sutter National Wildlife Refuge is to provide an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d (Migratory Bird Conservation Act of 1929)), manage and control migratory waterfowl and other wildlife (16 U.S.C. 695 (Lea Act of 1948), to conserve fish, wildlife, and/or plants which are listed as

endangered species or threatened species (16. U.S.C. 1534 (Endangered Species Act of 1973)), provide suitable incidental fish and wildlife oriented recreational development (16 U.S.C 460k-2 (Refuge Recreation Act of 1962)), and develop, advance, mange, conserve, and protect fish and wildlife resources (16 U.S. C 742f(a)(4) (Fish and Wildlife Act of 1956).

Sacramento, Delevan, Colusa, and Sutter NWRs were established for the conservation and enhancement of migratory birds, and other fish and wildlife management conservation and protection. The refuges consists of summer wetlands, seasonally flooded wetlands, unmanaged wetlands, alkali meadows, vernal pools, grasslands, and riparian forests. The wetlands of the refuges are critical to waterfowl of the Pacific Flyway. Currently, approximately 44 percent of the Pacific Flyway waterfowl population winters in the Sacramento Valley where these four refuges are located (2009 CCP). The four refuges play a significant role in achieving the objectives of the North American Waterfowl Management Plan (NAWMP), Central Valley Joint Venture Implementation Plan, United States Shorebird Conservation Plan, and Waterbird Conservation Plan of North America.

The mission of the NWRS, as outlined by the National Wildlife Refuge System Administration Act (NWRSAA), as amended by the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd et seq.), is to:

"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The NWRSAA mandates the Secretary of the Interior in administering the System to (16 U.S.C. 668dd(a)(4):

- Provide for the conservation of fish, wildlife, and plants, and their habitats within the NWRS;
- Ensure that the biological integrity, diversity, and environmental health of the NWRS are maintained for the benefit of present and future generations of Americans;
- Ensure that the mission of the NWRS described at 16 U.S.C. 668dd(a)(2) and the purposes of each refuge are carried out;
- Ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the States in which the units of the NWRS are located;
- Assist in the maintenance of adequate water quantity and water quality to fulfill the mission of the NWRS and the purposes of each refuge;
- Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the NWRS through which the American public can develop an appreciation for fish and wildlife;
- Ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; and
- Monitor the status and trends of fish, wildlife, and plants in each refuge.

Therefore, it is a priority of the Service to provide for wildlife-dependent recreation opportunities, including hunting and fishing, when those opportunities are compatible with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System.

The four refuges are currently open to the hunting of ducks, geese, moorhens, coots, snipe and ring-necked pheasants. The hunting program for the four refuges is administered by the Service in Cooperation with the California Department of Fish and Wildlife (CDFW). The Service manages the refuge's land, habitat, and facilities; and the CDFW selects and processes the refuge hunters and operates the hunter check stations on the four refuges during waterfowl and pheasant season.

2. Statement of Objectives

The objectives of a wild turkey hunting program on Sacramento, Delevan, Colusa, and Sutter NWRs are to provide:

- The public with a recreational opportunity to experience wildlife on more refuge lands and increase opportunities for hunters, especially youth and novice hunters.
- Wildlife-dependent public recreation as mandated by and according to Service law and policy.
- Partner with CDFW, National Wild Turkey Federation, and other user groups in the Recruitment, Retention, and Reactivation of hunters in California.

Hunting is consistent with the refuges' Comprehensive Conservation Plans larger visitor services and partnership goals. Visitor services goals identified the need to implement a high quality hunting program, which includes allowing turkey hunting opportunities. Partnership goals identified the need to maintain and enhance partnerships among Federal, State, local agencies, organizations, schools, corporations, and private landowners to promote the understanding and conservation of the refuges' resources, activities, and management. Partnership strategies include actively looking for partnering opportunities with local and regional conservation groups; wild turkey hunting allows us to work with partners to recruit, retain, and reactivate hunters by providing mentored turkey hunting opportunities.

3. Description of Hunting Program

A. Areas to be Opened to Hunting

Fall turkey hunting would occur in the free roam and pheasant only areas of Sacramento, Delevan, Colusa, and Sutter refuges. Wild turkey hunting would occur on Wednesdays, Saturdays, and Sundays during the fall wild turkey season determined by CDFW. Spring turkey hunting would occur on Saturday and Sundays at Sacramento and Delevan refuges during the spring wild turkey season determined by CDFW; hunting would occur on alternating weekends at Sacramento and Delevan refuges to rest the birds and ensure mentored hunters have a high

probability of successfully harvesting a wild turkey. Spring turkey hunting would occur in the existing hunting area of Sacramento refuge. At Delevan refuge, the spring turkey hunting would occur in the northern sanctuary wetland and upland units and in portions of the existing hunting area. See attached Maps (Figures 1-4):

- *Figure 1 - Sacramento NWR Fall Turkey Hunt in Free Roam areas; spring turkey hunt area*
- *Figure 2 - Delevan NWR Fall Turkey Hunt in Free Roam areas; spring turkey hunt area*
- *Figure 3 - Colusa NWR Fall Turkey Hunt in Free Roam areas*
- *Figure 4 - Sutter NWR Fall Turkey Hunt in Free Roam areas*

B. Species to be Taken, Hunting periods, Hunting Access

- UPLAND GAME HUNTING: Wild turkey hunting during the fall turkey season in the free roam and pheasant only units at Sacramento, Delevan, Colusa, and Sutter Refuges. The hunt will occur in all of the free roam and pheasant only units on Wednesdays, Saturdays, and Sundays during the CDFW fall turkey season. Hunting hours are during legal shooting hours, hunter numbers will be determined by daily free roam quotas, and will be administered by CDFW. Hunters will self-navigate to their locations. Wild turkey hunting during the spring turkey season will occur in the hunt units of the Sacramento refuge and in the northern units of the sanctuary and existing hunting units of the Delevan refuge. Hunting will take place on alternating weekends between Sacramento and Delevan during the regular CDFW spring turkey season. 4-5 mentored hunters will utilize Sacramento refuge and 2-3 mentored hunters will utilize Delevan refuge. Hunting hours are during legal shooting hours, a maximum of 4-5 hunters on Saturday and Sunday on the Sacramento refuge and a maximum of 2-3 hunters on alternating Saturday and Sundays on the Delevan refuge. Take limit will be set at one bearded wild turkey per hunter per weekend.

- Hunter Permit Requirements (if applicable): Hunters will be required to possess a valid California hunting license and upland bird validation.

Hunters during the fall season would apply for a reservation, enter the lottery, or enter the first come first serve list to access one of the hunting areas. All of these processes are run by CDFW. Hunters would be required to purchase either an Annual Pass, one day pass, or two day pass for CDFW Type A Areas. Hunters during the spring season would apply for reservations through the spring turkey hunt drawing application on the CDFW online reservation website. To apply for the hunts applicants would be required to be novice hunters. Type A area passes will not be required to participate in this hunting opportunity.

C. Consultation and Coordination with the State

The refuge reviewed the operations and regulations for neighboring State wildlife management areas and refuges to find consistency where possible. The refuge first reached out to the State on the January 28, 2019, to discuss this Hunt Plan. We worked with the local wildlife area managers early in the development of the plan. On February 14, 2019, we asked for review by the Gray Lodge Wildlife Management Area to help adjust our plan to align, where possible, with State management goals. We specifically asked the State if they could include the refuge in the State reservation program to ensure consistency and reduce operation costs.

D. Law Enforcement

Enforcement of refuge violations normally associated with management of a National Wildlife Refuge is the responsibility of commissioned Federal Wildlife Officers. Other officers, Special Agents, and State game wardens often assist the Sacramento NWRC full time federal wildlife officers.

The following methods are used to control and enforce hunting regulations:

- Refuge and hunt area boundaries will be clearly posted;
- The Refuge will provide a brochure that shows the hunt areas;
- Sacramento NWRC law enforcement staff will randomly check hunters for compliance

E. Funding and Staffing Requirements

Annual hunt administration costs, for Sacramento NWRC including salary, equipment, law enforcement, brochures, collection of hunt data and analysis of biological information, etc. totals approximately $100,000. Sacramento NWRC funds are used to conduct hunts on Sacramento, Delevan, Colusa, Sutter, and Sacramento River Refuges. Funding specifically for hunts has not been allocated, although funds are available through the Complex's annual budget. Incurred salary and other related operational costs for the administration of the reservation, lottery and check stations are incurred by CDFW. It is anticipated that funding would continue to be sufficient to continue the hunting program at Sacramento NWRC in the future.

4. Conduct of the Hunting Program

A. Hunter Permit Application, Selection, and/or Registration Procedures (if applicable)

During the Fall Turkey Season, hunters may gain entry to hunt for wild turkeys through a prioritized, three-tier system process. The daily hunter quotas are filled through the check station in the following sequence: first the reservation card holders are processed, then the lottery card holders, and then first-come, first-served hunters. Refilling the hunting area quotas is accomplished using a waiting list. These systems establish the order of entry and hunters are required to purchase either an annual, one day, or two day pass for CDFW Type A areas.

Resident, junior, and non-resident hunters may apply for the fall turkey season.

Reservation applicants may purchase a one day ($1.34) or season long application. Hunters may apply as many times per season as desired, but no more than once of each area for each hunt day. Application forms are available through the CDFW offices, licensed agents, and the online reservation application website. The Reservation application needs to be received 17 days prior to the requested hunt date. On Sacramento, Delevan, Colusa, and Sutter Refuges, each reservation assures entry for up to four individuals, whether adult hunters, junior hunters, or non-hunters.

The CDFW will hold an on-site lottery drawing for non-reservation hunters at each refuge during the fall turkey season. Non-reservation hunters may enter a lottery drawing on every refuge on the night before each hunt date. This applies to all members of the hunting party. A maximum of three additional names may be placed on the back of the lottery card. This includes adult hunters, junior hunters (no more than two juniors per adult) and non-hunters. A lottery fee is not required at this time.

If reservation and lottery hunters do not fill the hunt area, CDFW will allow hunters arriving at the refuge check station after the lottery drawing to sign-up to enter on a first-come, first-served list. A fee is not required at this time for first-come, first-served.

During the Spring Turkey Season, hunters may gain entry to hunt for wild turkeys on Sacramento and Delevan refuges through CDFW's Reservation Application process. Applicants would apply through the spring turkey hunt drawing application ($2.42) for the entire regular spring turkey season. Applicants must be novice hunters to apply. Application forms are available through the CDFW offices and licensed agents. The Reservation application needs to be received 17 days prior to the requested hunt date. Each reservation assures entry for one hunter.

Selected hunters will be notified by CDFW indicating their status as being drawn for the hunt. This reservation will serve as their permit to hunt. Drawn youth hunters must be accompanied by an adult at least 18 years of age or older upon check-in at the refuge.

The Sacramento NWR Complex will be partnering with the National Wild Turkey Federation (NWTF) to implement the spring turkey hunt program on Sacramento and Delevan refuges. NWTF will provide funding for one staff member to work from the first Monday in March until the last Friday in May. This staff member will be responsible for overseeing the daily hunting logistics during the spring season on Sacramento and Delevan refuges. NWTF will also recruit volunteer guides to mentor selected hunter participants.

Selected hunters will meet at the designated refuge (Sacramento or Delevan) check station the day of the hunt 2 hours before legal shoot time. At the check station, staff will check licenses and validations and team the selected hunter with their volunteer guide for the weekend. Once the hunter and guide have been paired up, they will be given their designated hunting location for the

day. Staff will then lead the hunters and guides to their designated parking areas and direct them to their hunting locations. All designated locations will have a blind location set in highly productive areas for the hunting party to hunt out of. Once the hunters have concluded hunting for the day, they will return to the check station to check out. If they were unsuccessful in harvesting a turkey, they may return the following day to continue hunting.

B. Refuge-Specific Hunting Regulations

Listed below are refuge-specific regulations that pertain to hunting on Sacramento, Delevan, Colusa, and Sutter Refuges as of the date of this plan. These regulations may be modified as conditions change or if refuge expansion continues/occurs.

A. Migratory Game Bird Hunting. We allow hunting of goose, duck, coot, moorhen, and snipe on designated areas of the refuge in accordance with State regulations and subject to the following conditions:

1. You must obtain a State of California Department of Fish and Wildlife entry permit from the check station prior to entering the hunt area.
2. You must return the State-issued entry permit and vacate the refuge no later than 1½ hours after legal sunset unless participating in an overnight stay in accordance with A14.
3. Junior hunters age 15 or younger must be accompanied by, and remain within sight and normal voice contact of, an adult (age 18 or older) at all times while hunting.
4. Hunters may use shotguns only. No shotguns larger than 12 gauge.
5. Hunters may possess no more than 25 shotgun shells while in the field.
6. We restrict hunters assigned to the spaced blind area to within 100 feet (30.5 meters) of their assigned hunt site except for retrieving downed birds, placing decoys, or traveling to and from the area.
7. We allow portable gas stoves in designated parking/overnight stay areas.
8. We allow overnight stays in vehicles, motor homes, and trailers at the check station parking areas on Tuesdays, Fridays, and Saturdays (closed on Federal holidays) during waterfowl season.

B. Upland Game Hunting. We allow hunting of pheasant and turkey only in the free-roam areas of the refuge in accordance with State regulations subject to the following conditions:

1. We allow pheasant hunting in the assigned pond/spaced blind area during a special 1-day-only pheasant hunt on the first Monday after the opening of the State pheasant hunting season.
2. Conditions A3 through A8 apply.

C. Big Game Hunting. [Reserved]
D. Sport Fishing. [Reserved]

C. Relevant State Regulations

- **Hunter Safety Training** – Eligible hunters must have passed a state certified hunter education program.

D. Other Refuge Rules and Regulations for Hunting

5. Public Engagement

A. Outreach for Announcing and Publicizing the Hunting Program

The Complex has a standard list of local media contacts for news releases. The Service will utilize the Complex's website, kiosks, brochures, and flyers to provide current and accurate information regarding the Refuges' hunt program.

B. Anticipated Public Reaction to the Hunting Program

Based on the comments received during the CCP (2009) hunting has already been allowed on Sacramento, Delevan, Colusa, and Sutter NWR's for more than 30 years and little negative public reaction is expected. We included a discussion of a hunt for wild turkeys during the spring season in our CCP (2009). Hunting is an important economic and recreational use of California's natural resources.

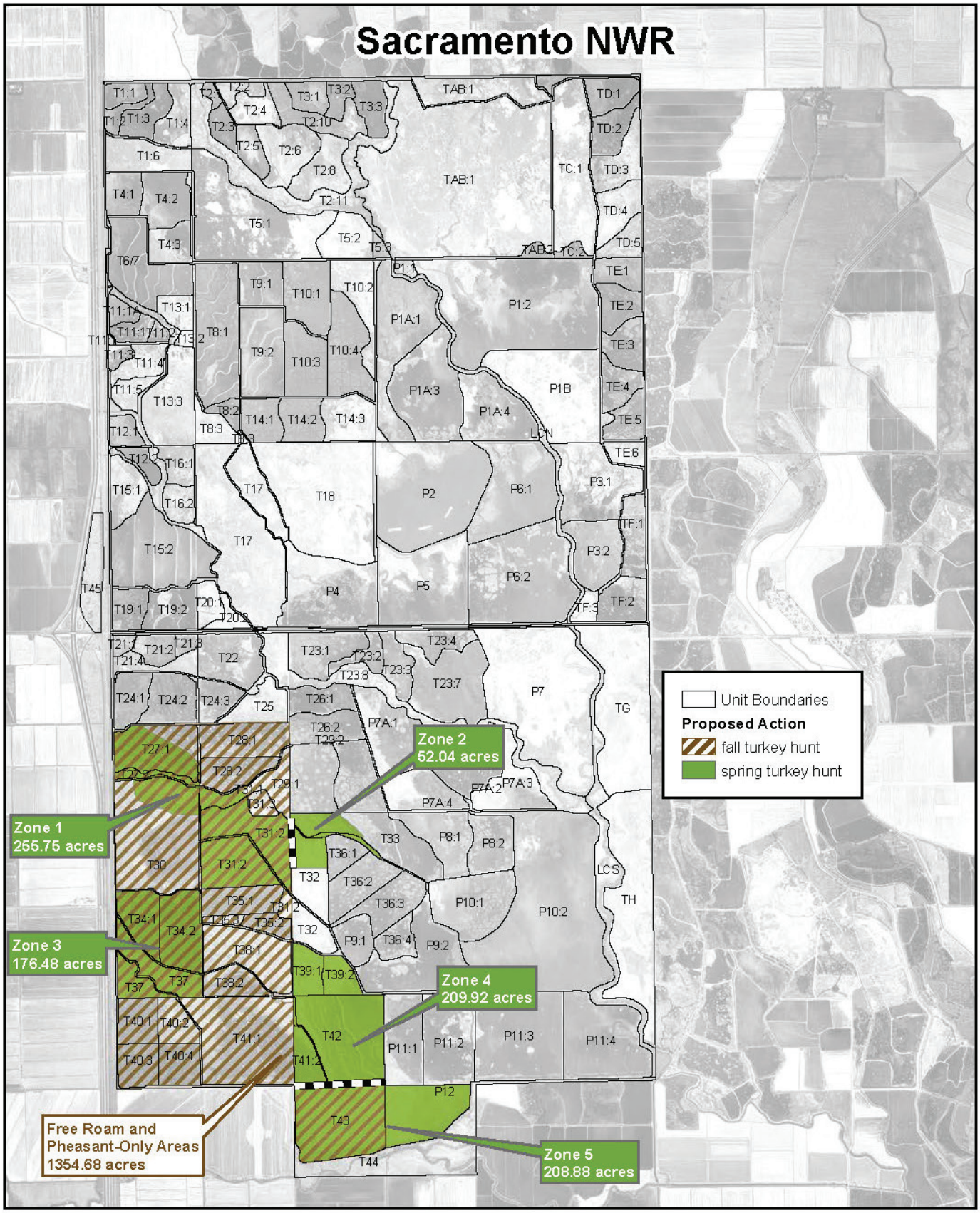
C. How Hunters Will Be Informed of Relevant Rules and Regulations

General information regarding hunting and other wildlife-dependent public uses can be obtained at Sacramento NWRC headquarters at 752 County Road 99W, Willows, CA 95988 or by calling (530) 934-2801. Dates, hunting unit directions, maps, and permit requirements about the hunt will be available on the station website at: www.fws.gov/refuge/sacramento/ and at the Refuge Visitor Center.

6. Compatibility Determination

Hunting and all associated program activities proposed in this plan are compatible with the purposes of the refuge. See attached Hunting Compatibility Determination for Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges.

Figure 1. Proposed Action - Sacramento National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

0 0.25 0.5 1 Miles

0 0.25 0.5 1 Kilometers

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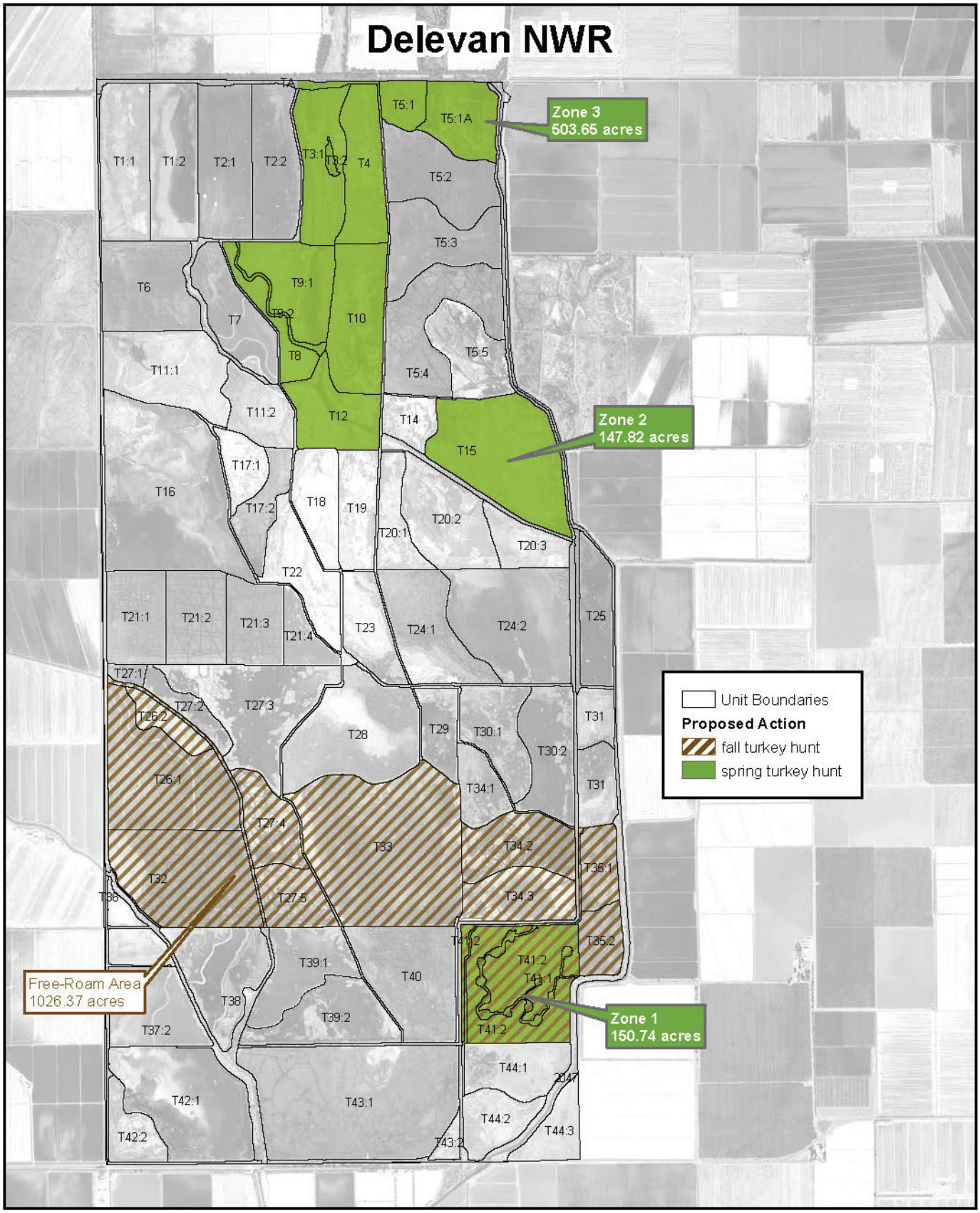
Figure 2. Proposed Action - Delevan National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

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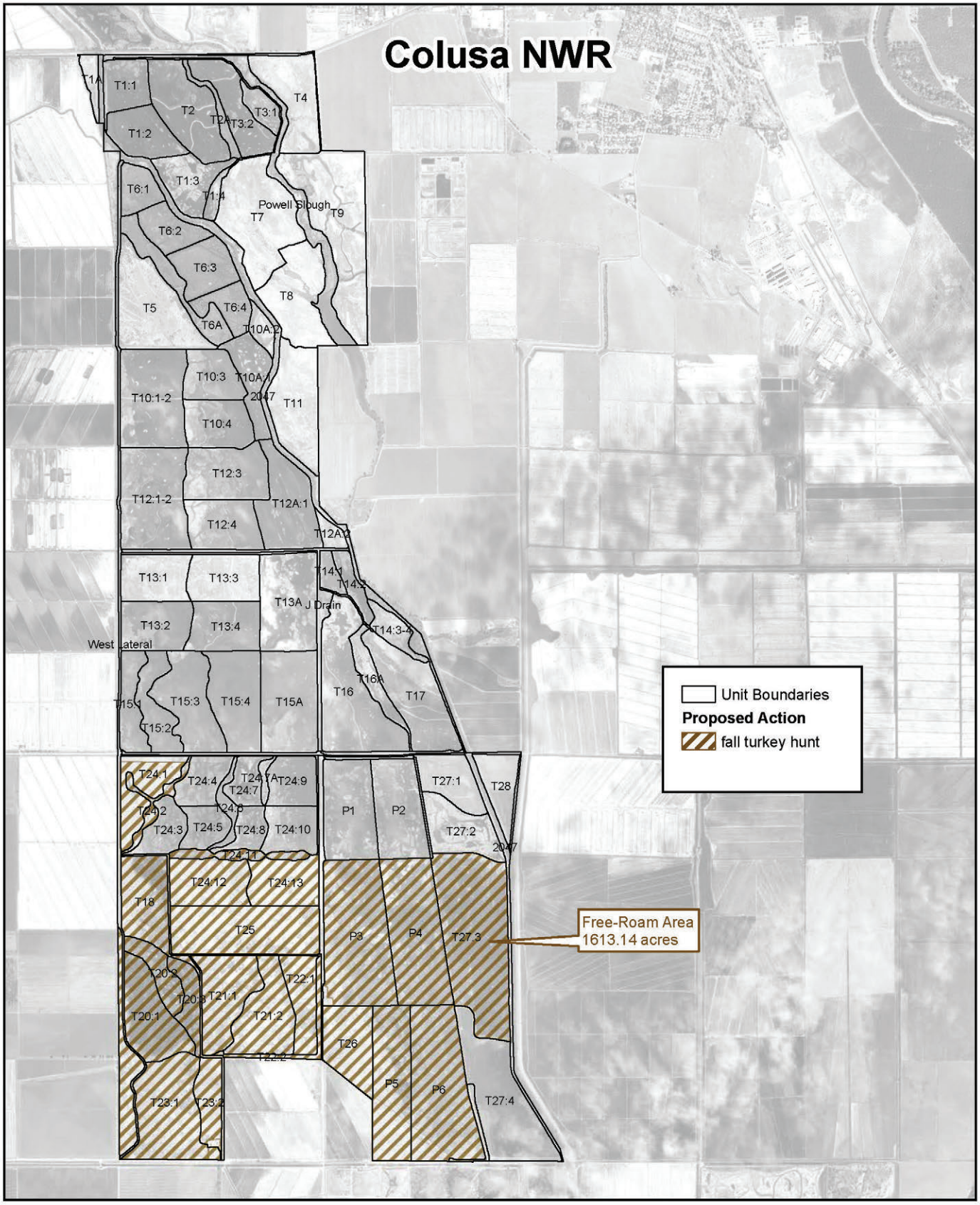
0 0.2 0.4 0.8 Kilometers

N

Figure 3. Proposed Action - Colusa National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

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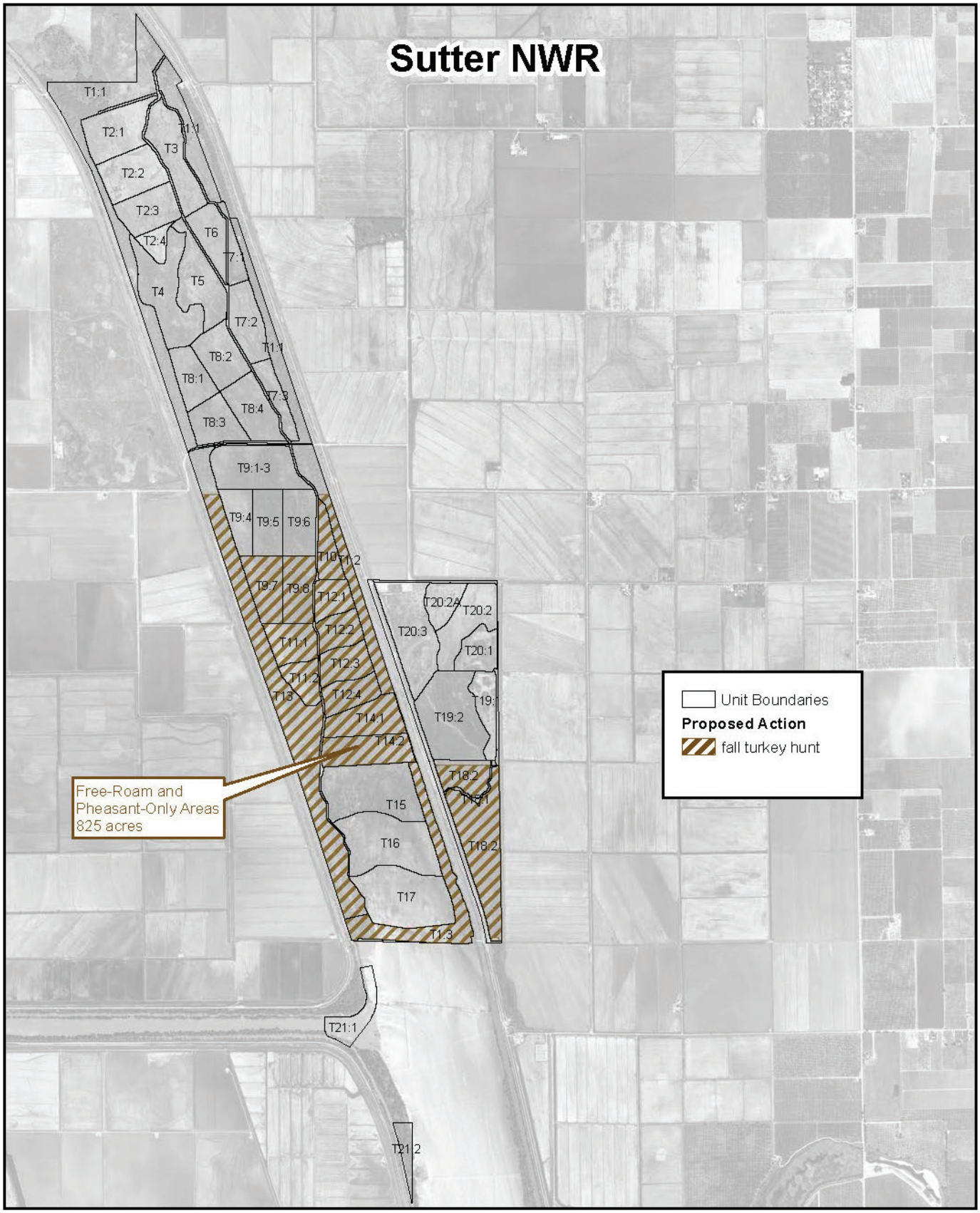
0 0.225 0.45 0.9 Kilometers

N

Figure 4. Proposed Action -Sutter National Wildlife Refuge



Produced by Sacramento NWRC
Projection: UTM Zone 10N
Datum: NAD 83

0 0.25 0.5 1 Miles

0 0.25 0.5 1 Kilometers

N

Appendix II

COMPATIBILITY DETERMINATION

Use:
Hunting

Refuge Name:
Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges, located in Glenn, Colusa, and Sutter Counties, California.

Establishing and Acquisition Authority(ies):
Sacramento National Wildlife Refuge (Refuge) was established in 1937. Legal authorities include: Executive Order 7562, February 27, 1937, Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended, the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742).

Delevan Refuge was established in 1962. Legal authority includes: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d).

Colusa Refuge was established in 1945. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Lea Act of 1948 (16 U.S.C. 695), the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742).

Sutter Refuge was established in 1945. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d), Lea Act of 1948 (16 U.S.C. 695), and the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543: 87 Statute 884).

Refuge Purpose(s):

Sacramento Refuge purposes include:

"... as a refuge and breeding ground for migratory birds and other wildlife..." Executive Order 7562, February 27, 1937.

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ..." 16 U.S.C. 1534 (Endangered Species Act of 1973).

"... suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 (Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended).

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

Delevan Refuge purposes include:

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

Colusa Refuge purposes include:

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"... for the management and control of migratory waterfowl and other wildlife ..." 16 U.S.C. 695 (Lea Act of 1948).

"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ..." 16 U.S.C. 1534 (Endangered Species Act of 1973).

Sutter Refuge purposes include:

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"... for the management and control of migratory waterfowl and other wildlife ..." 16 U.S.C. 695 (Lea Act of 1948).

"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ..." 16 U.S.C. 1534 (Endangered Species Act of 1973).

National Wildlife Refuge System Mission:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

Description of Use:

Hunting is identified in the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-ee) as a priority use for refuges when it is compatible with the refuge purposes and mission of the Refuge System. As a result, the Service is proposing to allow waterfowl, coot, common moorhen, snipe, pheasant, and wild turkey hunting on approximately 9,395 acres of Sacramento, Delevan, Colusa, and Sutter Refuges. The Proposed Action (Alternative C) analyzed in the Final Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) (USFWS 2009a), Environmental Assessment: Wild Turkey Hunting on Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges (2019), and the Hunt Plan (USFWS 2019), which are incorporated by reference, contain maps and Refuge descriptions where hunting will be allowed. The hunting program will provide high quality, safe, and cost-effective hunting opportunities, and will be carried out

consistent with State regulations. The guiding principles of the Refuge System's hunting programs (Service Manual 605 FW 2) are to:

- Manage wildlife populations consistent with Refuge System-specific management plans approved after 1997 and, to the extent practicable, State fish and wildlife conservation plans;
- Promote visitor understanding of and increase visitor appreciation for America's natural resources;
- Provide opportunities for quality recreational and educational experiences consistent with criteria describing quality found in 605 FW 1.6;
- Encourage participation in this tradition deeply rooted in America's natural heritage and conservation history; and
- Minimize conflicts with visitors participating in other compatible wildlife dependent recreational activities.

The Hunt Plan (USFWS 2019, 2009b) was developed to provide safe hunting opportunities, while minimizing conflicts with other priority wildlife-dependent recreational uses. The Refuges' hunting program will comply with the Code of Federal Regulations Title 50, 32.1 and be managed in accordance with Service Manual 605 FW2, Hunting.

Hunting will be permitted in accordance with State and Federal regulations and seasons (Table 1 gives an example of annual State hunt seasons for areas within the Refuges) to ensure that it will not interfere with the conservation of fish and wildlife and their habitats. Therefore, the sport hunting of migratory birds and upland game birds on the Refuges is in compliance with State regulations and seasons, the National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-ee), and the Refuge Recreation Act of 1962 (16 U.S.C. 460k).

Table 1. Sacramento, Delevan, Colusa, and Sutter Refuges, Hunting Season Bag Limit Summary for 2019-2020

Species	Dates	Daily Bag Limits
Waterfowl – Ducks	Third Saturday in October extending for 100 consecutive days	Up to 7 ducks; see below; possession triple the bag limit*

Waterfowl – Geese	October - concurrent with duck season EXCEPT in Sacramento Valley (West) Special Management Area where the season will be open from the last Saturday in October through December 14	Up to 8 geese any species; possession triple the bag limit**
American Coot and Common Moorhen	October - concurrent with duck season	25/day, 25 in possession, either all of one species or a mixture of these species
Snipe	Third Saturday in October extending for 107 days	8/day; possession triple the bag limit
Pheasants – General	Second Saturday in November extending for 44 days	2 – males first two days; 3 males thereafter; possession triple the bag limit
Turkey	Fall Season - Second Saturday in November extending for 30 days Spring Season- The Last Saturday in March extending for 37 days	Fall Season - either sex; 2 per season Spring Season - 1 bearded turkey per day; 3 combined

*Duck Bag Limits: 7 ducks/ but not more than 2 hen mallards, 2 pintail, 2 redhead, 2 canvasback 3 scaup
**Goose Bag Limit: 30 geese/ but not more than 20 white geese, 10 dark geese. In the Sacramento Valley (West) Special Management Area, only 3 white-fronted geese may be taken.

The hunting program is administered by the Service in cooperation with the California Department of Fish and Wildlife (CDFW). The Service manages the Refuges' land, habitat and facilities; and the CDFW selects reservations and processes the Refuge hunters and operates the hunter check stations. A valid California hunting license, including appropriate stamps, is required for taking any bird. Entry permits are issued and collected at the check stations, which are used to track daily hunter quotas, hunter refill, and bird species harvest.

Hunting is permitted on designated portions of Sacramento, Delevan, Colusa and Sutter Refuges (Figures 11-14 in the CCP). Hunting of waterfowl, coot, common moorhen, snipe, pheasant, and wild turkey is permitted on Saturdays, Sundays, and Wednesdays during hunting seasons established by the California Fish and Game Commission. Pheasants may only be hunted in the free roam and pheasant only

areas, except for the Special Monday Pheasant Hunt, which is held the first Monday after the opening day of pheasant season on Sacramento, Delevan and Colusa Refuges. On this day, the entire hunting area is opened to pheasant hunting, including the spaced blind and assigned pond areas. During the fall, wild turkey may only be hunted in the free roam areas. During the spring wild turkey season, wild turkey may only be hunted in designated areas of Sacramento and Delevan Refuges.

Hunting areas are divided into designated areas— free roam, spaced hunt blind, spaced hunt site (island), or assigned pond (Figures 11-14 in the CCP). The overall harvest success, as measured by the number of birds per hunter per day, has remained relatively constant (approximately 2.0 birds per hunter) since the hunting programs were established. This consistency has occurred despite rather significant fluctuations in total birds harvested annually for the Complex and trends on individual Refuges. Harvest data indicate that ducks make up 85 percent of the hunter bag. The top six species of ducks harvested are green-winged teal (24.4 percent), shoveler (18.6 percent), gadwall (16.5 percent), American wigeon (13.1 percent), northern pintail (10 percent), and mallard (9.2 percent). Geese harvested include snow (47.1 percent), white-fronted (33 percent), and Ross's (13.3 percent). The majority of the goose harvest occurs on Sacramento and Delevan Refuges.

The Refuges have approximately 18,000-22,000 annual hunting visits, including up to 400-500 annual visits by hunters with disabilities. Hunters must report take of waterfowl, pheasants and turkeys (during the fall season) to the check station located at Sacramento Refuge south of Road 68, at Delevan Refuge off of Four Mile Road, at Colusa Refuge south of Abel Road, and at Sutter Refuge south of Hughes Road (Figures 11-14 in the CCP). Field checks by refuge law enforcement officers will be planned, conducted, and coordinated with staff and other agencies to maintain compliance with regulations and assess species and number harvested. Dogs will be required to be kept on a leash, except for hunting dogs engaged in authorized hunting activities and under the immediate control of a licensed hunter.

The Refuge Hunting Program Working Group was established in 1991 to exchange ideas and information regarding the Complex's hunting program. The Disabled Access Working Group was established in 1999 to discuss disabled hunting access issues on the Complex. In 2006, we combined the groups to form the Complex Hunting Program Working Group. We reestablished the Hunters with Disabilities Working Group in 2017 to gain feedback on how the program could be improved. The State game wardens and Federal law enforcement officers also attend the Working Group meeting.

Although the number of waterfowl hunters have not been declining in recent years, waterfowl hunters make up an ever smaller part of the state population. In order to recruit, retain, and reactivate hunters, it is important to offer opportunities for new hunters to experience quality refuge hunting. In the early 1990s, the Service began hosting a one-day, in-season junior waterfowl hunt on Sacramento and Delevan Refuges. The spaced hunt site areas were reserved for junior hunters (age 16 and younger). These hunts resulted in up to 145 junior hunt visits annually. In the late 1990s, post season youth only hunts (age 15 and younger) began on Sacramento and Colusa Refuges and were later added to Delevan and Sutter Refuges. These hunts have resulted in up to 372 annual junior hunter visits. The Complex continues to offer in-season Jr. Waterfowl hunts at Sacramento and Delevan Refuges and post season youth hunts on all four hunting areas. The age for Jr. hunters has changed to 18 years of age or younger and the youth hunter age is now 17 years of age or younger. A special one day veteran's hunt was established at Colusa NWR in 2018. All of the assigned ponds are reserved for veterans for the day. Many local partners (i.e. California Waterfowl Association, Willows Rotary, Willows Kiwanis, and National Wild Turkey Federation) have also assisted by providing free morning beverages, barbecue lunches, raffles, and educational displays and activities.

Sacramento Refuge

Hunting is allowed on 3,586 acres south of Road 68 (Table 2).

Table 2. Hunt area acreage and hunter quotas for Sacramento Refuge

	Spaced Blind Area	Assigned Pond Area (# parties)	Free Roam Area	Pheasant Only
Acres dry	245	205	319	115
Acres flooded	954	807	819	
Total acres	1,191	1,012	1,138	126
Number of blinds	29			
Number of assigned ponds		21		
Maximum adult hunter quota	116	84	54	
Maximum hunter quota spring turkey season	5			
Wetland acres	32.8/blind	38.4/party	15.1/hunter	

Sacramento Refuge has spaced blinds, assigned ponds, free roam, and pheasant only areas that consist of managed wetland, watergrass, permanent pond,

grassland, and vernal pool/alkali meadow habitats. Blinds are in-ground, concrete pits spaced 250-400 yards apart. Hunters must remain within 100 feet of their assigned blind. Free roam and assigned pond hunters move unrestricted within the signed hunting area boundary. Directional signs guide hunters to their respective hunting areas, while additional reflective stakes direct hunters to their assigned blind. The hunting areas are accessible by foot only from four parking areas.

Pheasant, wild turkey, and snipe may be hunted on waterfowl hunt days in the free roam and pheasant only areas. Pheasant may also be hunted on the first Monday of the season in free roam, spaced blind, and assigned pond areas. Maximum quota for this day is 100 hunters. During the spring turkey season, Wild turkeys may be hunted every other Saturday and Sunday (alternating weekends between Sacramento and Delevan Refuges) on 803 acres in designated portions of the free roam, pheasant only, and spaced blind/assigned pond areas.

Hunter quotas are based on acres of available wetland habitat and are adjusted depending upon water conditions. Fully-flooded conditions provide up to 29 blinds (up to four people per blind), 21 assigned ponds (up to four people per pond), and up to 54 free roam hunters (15.1 wetland acres/hunter). In addition to quotas, hunter distribution is influenced by habitat management, pond size, daily weather conditions, and waterfowl flight patterns.

Sacramento Refuge has four spaced blinds/assigned ponds (Blinds 5D, 9D, 23D, and 27D) designated for hunters with disabilities. These sites may be accessed by motor vehicle, all terrain-vehicle (ATV), or boat from the parking areas. Additionally, a parking area to access Blinds 23D and 27D and a designated accessible boat launch in the free roam area (Tract 38) is available. In 2018-19, there were 154 visits by 88 individual hunters with disabilities.

Delevan Refuge

Hunting of waterfowl, snipe, pheasant, and wild turkey (during the fall season) is allowed on 1,922 acres within the south half of Delevan Refuge; hunting of wild turkey is allowed on 771 acres within the north half and existing hunting area of Delevan Refuge during the spring season (Table 3).

Table 3. Hunt area acreage and hunter quotas for Delevan Refuge.

	Spaced Hunt Area	Assigned Pond Area (# parties)	Free Roam Area
Acres dry	41	13	223

Acres flooded	439	419	781
Total acres	480	549	1,004
Number of blinds	18		
Number of assigned ponds		11	
Maximum adult hunter quota	72	44	50
Maximum hunter quota spring turkey season	3		
Wetland acres	24.3/party	49.9/party	15.6/hunter

Delevan Refuge has spaced hunt sites, assigned pond, and free roam areas that consist of managed wetland, watergrass, permanent pond, grassland, and vernal pool/alkali meadow habitats. Hunt sites consist of a dirt island (approximately 10'x20') surrounded by cattail or bulrush, concrete pit blinds, and stand up blinds constructed out of tree branches. Hunters must remain within 100 feet of their assigned hunt site. Free roam and assigned pond hunters move unrestricted within the signed hunting area boundary. Directional signs guide hunters to their respective hunting areas, while additional reflective stakes direct hunters to their assigned hunt site. The hunting areas are accessible by foot only from three parking areas.

Pheasant, wild turkey, and snipe may be hunted on waterfowl hunt days in the free roam areas. Pheasant may also be hunted on the first Monday of the season in free roam, spaced hunt sites, and assigned pond areas. Maximum quota for this day is 50 hunters. During the spring turkey season, Wild turkeys may be hunted every other Saturday and Sunday (alternating weekends between Sacramento and Delevan Refuges) in wetland and upland areas of the north unit and the existing hunting area of the refuge.

Hunter quotas are based on acres of available wetland habitat and will be adjusted depending upon water conditions. Fully-flooded conditions provide up to 18 blind sites (up to four people per hunt site), 11 assigned ponds (up to four people per pond) and up to 50 free roam hunters (15.6 wetland acres/hunter). The free roam quotas at Delevan are split between east and west sides with each having a 25-hunter quota. In addition to quotas, hunter distribution is influenced by habitat management, pond size, daily weather conditions, and waterfowl flight patterns.

Delevan Refuge has three spaced blinds (Blinds 13D, 29D, and 30D) designated for disabled hunters. These blinds may be accessed by motor vehicle or ATV from the parking areas. . Additionally, there are designated accessible boat launches in the free roam area of Tract 33 and Tract 34.3. In 2018-19, there were 172 visits by 85 individual hunters with disabilities.

Colusa Refuge

Hunting is allowed on 2,000 acres south of Abel Road (Table 4).

Table 4. Hunt area acreage and hunter quotas for Colusa Refuge.

	Assigned Pond Area (# parties)	Free Roam Area - Westside	Free Roam Area - Eastside
Acres dry	0	466	119
Acres flooded	391	404	615
Total acres	391	870	734
Number of assigned ponds	13		
Maximum adult hunter quota	52	14	34
Wetland acres	30/party	28.8/hunter	18/hunter

Colusa Refuge has assigned pond and free roam areas that consist of managed wetland, watergrass, permanent pond, grassland, and vernal pool/alkali meadow habitats. Free roam and assigned pond hunters move unrestricted within the signed hunting area boundary. Directional signs guide hunters to their respective hunting areas. The hunting areas are accessible by foot only from four parking areas. Disabled hunters may access P2A and P2B from the disabled parking area via a boat ramp or access roads. In 2018-19, P2A and P2B had 120 visits by 60 individual hunters with disabilities.

Pheasant, wild turkey, and snipe may be hunted on waterfowl hunt days in the free roam areas only. Pheasant may also be hunted on the first Monday of the season in free roam and assigned pond areas. Maximum quota for this day is 15 hunters on the east side and 30 hunters on the westside.

Hunter quotas are based on acres of available wetland habitat and are adjusted depending upon water conditions. Fully-flooded conditions provide up to 13 assigned ponds and up to 48 free roam hunters. A hunting party includes a maximum of 4

individuals. Assigned ponds 3, 4, 5, 7, 8, 9, and 10, allow one party per pond, Pool 1 allows up to three parties per pond and has been divided using U channel posts and signs to designate pond locations. P2 allows up to three parties, two of which are designated for hunters with disabilities. In addition to quotas, hunter distribution is influenced by habitat management, pond size, daily weather conditions, and waterfowl flight patterns.

The westside free roam area has one hunter per 28.8 wetland acres at its maximum quota of 14. The westside free roam area is not in as strong a flight path and thus the hunter density allowed is lower. The eastside free roam area has one hunter per 18 wetland acres at its maximum quota of 34 hunters.

Sutter Refuge

Currently hunting is allowed on 1,116 acres on the south half of Sutter Refuge (Table 5).

Table 5. Hunt area acreage and hunter quotas for Sutter Refuge.

	Assigned Pond Area (# parties)	Free Roam Area	Pheasant Only Area
Acres dry	0	260	123
Acres flooded	405	367	
Total acres	406	396	123
Number of assigned ponds	12		
Maximum adult hunter quota	48	25	2 parties
Wetland acres	33.7/party	14.7/hunter	4
* T13 (199 acres) is not included in the total acres or acres flooded for the free roam area.			

Sutter Refuge has assigned pond and free roam areas that primarily consist of managed wetland, watergrass, and grassland habitats. Free roam and assigned pond hunters move unrestricted within the signed hunting area boundary. Directional signs guide hunters to their respective hunting areas. The hunting areas are accessible by foot only from two parking areas. In addition, there is a designated boat launch with a parking area available to hunters with disabilities in the northeast corner of assigned pond 6D.

Pheasant, wild turkey, and snipe can be hunted in the free roam and pheasant only areas on the Refuge on waterfowl hunt days.

Hunter quotas are based on acres of available wetland habitat and are adjusted depending upon water conditions. Fully-flooded conditions provide up to 12 assigned ponds and up to 25 free roam hunters. Assigned ponds 4 and 5 allow one party per pond; Assigned pond 6D is designated for hunters with disabilities. T15-17 allow up to three parties per pond and has been split using U channel posts and signs to designate the pond boundaries. A hunting party includes a maximum of 4 individuals. A disabled hunting party must include at least one disabled hunter. In addition to quotas, hunter distribution is influenced by habitat management, pond size, daily weather conditions, and waterfowl flight patterns.

The free roam area has 1 hunter per 14.7 wetland acres at its maximum quota of 25 hunters. Tract 18 will remain as a pheasant hunting only area and will have a quota of 2 hunting parties.

Availability of Resources:
The following funding/annual costs (based on FY 2019 costs) would be required to administer and manage hunting activities as described above:

	Annual Costs
Printing (brochures, signs, posters, etc)	$3,000
Law Enforcement (permit compliance, access control, protection)	$22,000
Maintenance (check stations, blinds, disking, mowing, etc.)	$36,000
Personnel Services (managerial, biological, clerical, etc.)	$39,000
TOTAL	**$100,000**

Funds are currently available to operate and maintain the hunt program. To defray expenses connected with the operation and maintenance of the hunting program, the CDFW is authorized to charge and retain a fee from each adult hunter. Hunter fees are determined annually in advance of the hunting season by the California Fish and Wildlife Commission. At present, the Refuge entry permit fees are: one-

day $21.60, two-day $35.13, or a season pass with a one-time, base fee of $163.90. These fees are adjusted annually, as required under Fish and Game Code Section 713. Holders of valid junior hunting licenses and non-shooters are exempt from these fees.

Anticipated Impacts of Use:

Direct effects of hunting include mortality, wounding, and disturbance (De Long 2002). Hunting can alter behavior (i.e. foraging time), population structure, and distribution patterns of wildlife (Owens 1977, Raveling 1979, White-Robinson 1982, Thomas 1983, Bartelt 1987, Madsen 1985, and Cole and Knight 1990). There also appears to be an inverse relationship between the numbers of birds using an area and hunting intensity (DeLong 2002). In Connecticut, lesser scaup were observed to forage less in areas that were heavily hunted (Cronan 1957). In California, the numbers of northern pintails on Sacramento Refuge non-hunt areas increased after the first week of hunting and remained high until the season was over in early January (Heitmeyer and Raveling 1988). Following the close of the hunting season, ducks generally increased their use of the hunt area; however, use was lower than before the hunting season began. Human disturbance associated with hunting includes loud noises and rapid movements, such as those produced by shotguns and boats powered by outboard motors. This disturbance, especially when repeated over a period of time, compels waterfowl to change food habits, feed only at night, lose weight, or desert feeding areas (Madsen 1995, Wolder 1993).

These impacts can be reduced by the presence of adjacent sanctuary areas where hunting does not occur, and birds can feed and rest relatively undisturbed. Sanctuaries or nonhunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et. al 1992). Prolonged and extensive disturbances may cause large numbers of waterfowl to leave disturbed areas and migrate elsewhere (Madsen 1995, Paulus 1984). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries (Madsen 1995). Over a 5-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increased 4 to 20 fold within the sanctuary (Madsen 1995). Thus, sanctuary and non-hunt areas are very important to minimize disturbance to waterfowl populations to ensure their continued use of the Refuges.

Intermittent hunting can be a means of minimizing disturbance, especially if rest periods in between hunting events are weeks rather than days (Fox and Madsen 1997). It is common for Refuges to manage hunt programs with non-hunt days. At Sacramento Refuge, 3-16 percent of pintails were located on hunted units during non-hunt days, but were almost entirely absent in those same units on hunt days (Wolder 1993). In addition, northern pintails, American wigeon, and northern

shovelers decreased time spent feeding on days when hunting occurred on public shooting areas, as compared to non-hunt days (Heitmeyer and Raveling 1988). The intermittent hunting program of three hunt days per week at Sacramento Refuge resulted in lower pintail densities on hunt areas during nonhunt days than non-hunt areas (Wolder 1993). However, intermittent hunting may not always greatly reduce hunting impacts.

The impacts addressed here are discussed in detail in the EA (Appendix A) for the Final CCP (USFWS 2009a) and the Environmental Assessment (2019) which is incorporated by reference. Biological conflicts will be minimized by following proper zoning and regulations. Refuge seasons will be designated to minimize negative impacts to wildlife.

Hunting is a highly regulated activity, and generally takes place at specific times and seasons (fall and winter) when the game animals are less vulnerable, reducing the magnitude of disturbance to the Refuges' wildlife. Managed and regulated hunting will not reduce species populations to levels where other wildlife-dependent uses will be affected.

The use of retrieving dogs would be permitted and encouraged in all areas open to waterfowl hunting. These dogs would be required to be under control at all times. Any hunter who allows his/her dog to disturb wildlife is not well received by other hunters who do not want waterfowl disturbed on the ponds that they are hunting. Law enforcement officers will enforce regulations requiring owners to maintain control over their dogs while on the Refuges. Although the use of dogs is not a form of wildlife-dependent recreation; they do in this case support a wildlife dependent use and reduce crippling loss. Implementing the prescribed restrictions outlined in the Stipulations section should alleviate any substantial impacts.

Hunting is an appropriate wildlife management tool that can be used to manage wildlife populations. Some wildlife disturbance will occur during the hunting seasons. Proper zoning, regulations, and Refuge seasons will be designated to minimize any negative impacts to wildlife populations using the Refuges. Harvesting these species, or any other hunted species, would not result in a substantial decrease in biological diversity on the Refuges.

Conflicts between hunting and other public uses will be minimized by the following:

- Physically separate non-hunting and hunting acres to spatially divide the activities.
- Hunting will be limited to occur only on Wednesdays, Saturdays, and Sundays during hunting seasons established by the California Fish and Wildlife Commission.

- Boundary and hunting area signs will be maintained to clearly define the designated hunting areas.
- Allow vehicle traffic only on designated roads and parking areas.
- Parking areas will be signed and gated to allow only pedestrian access.
- The hunting program will be highly regulated and managed in strict accordance with all applicable Federal laws (Code of Federal Regulations, Title 50 subchapter C) and to the extent practicable, consistent with applicable State laws.
- Field checks by refuge law enforcement officers will be planned and coordinated with staff and other agencies to maintain compliance with regulations and assess species and number harvested.
- Provide information about the Refuges' hunting program through signs, kiosks, brochures, and Complex's website (http://sacramentovalleyrefuges.fws.gov).
- No camping or tents are allowed on the Refuges.

Wildlife populations on the Refuges are able to sustain hunting and support other wildlife dependent priority uses. To manage the populations to support hunting, the Refuges adopt harvest regulations set by the State within Federal framework guidelines.

By its very nature, hunting has very few positive effects on the target species while the activity is occurring. However, in our opinion, hunting has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving their habitat, which has ultimately contributed to the Refuge System mission. Furthermore, despite the potential impacts of hunting, a goal of the Sacramento, Delevan, Colusa, and Sutter Refuges is to provide visitors of all ages an opportunity to enjoy wildlife-dependent recreation. Of key concern is to offer a safe and quality program and to ensure adverse impacts remain at an acceptable level.

Recreational hunting will remove individual animals, but does not negatively affect wildlife populations. To assure that populations are sustainable, the California Fish and Game Commission, in consultation with the CDFG, annually review the population censuses to establish season lengths and harvest levels. Each year the refuge staff conducts habitat management reviews of each unit on the Complex to evaluate wildlife population levels, habitat conditions and public use activities. The areas closed to various hunting activities provide adequate sanctuaries for wildlife.

The Service believes that there will be minimal conflicts between hunters and the other wildlife-dependent recreational uses. The uses are not occurring on the same area at the same time.

The hunting program has been designed to avoid or minimize impacts anticipated to Refuge resources and Refuge visitors. Section 7 consultations were completed with the Service (2008) and NOAA-Fisheries (2008) on the Draft CCP/EA for the following species: palmate-bracted bird's beak, hairy Orcutt grass, Greene's tuctoria, Hoover's spurge, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant garter snake, winter-run Chinook salmon, spring-run Chinook salmon, Central Valley steelhead, fall-run Chinook salmon, and late fall-run Chinook salmon. Since the CCP was issued in 2009, the Service designated the western yellow-billed cuckoo as a threatened species under the Federal Endangered Species Act. The western yellow-billed cuckoo requires dense, large tracts of riparian woodlands with well-developed understories for breeding. Comprehensive surveys conducted between 1999 and 2000, located cuckoos at Sutter Refuge (Isola 2000), but not in the hunt area. Accordingly, we determined that hunting would have no effect on the western yellow-billed cuckoo.

Public Review and Comment:

Public review of this compatibility determination was concurrent with the Environmental Assessment. No public comments were received.

Determination:

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility:

Refuge Specific Regulations. Hunting of Migratory Game Birds: We allow the hunting of geese, ducks, coots, moorhens, and snipe on designated areas of the refuge subject to the following conditions [for Sacramento Refuge (see regulations 1-13 below), Delevan Refuge (see regulations 1-13 below), Colusa Refuge (see regulations 4-13 below), and Sutter Refuge (see regulations 4-13 below)]:

1. You must unload firearms while transporting them between parking areas and spaced blind areas.
2. We do not allow snipe hunting in the spaced blind area.
3. We restrict hunters to the spaced blind unit to within 100 feet (30 m) of their assigned hunt site except for retrieving downed birds, placing decoys, or traveling to and from the parking area.
4. You may possess only approved nontoxic shot while in the field.
5. You may possess no more than 25 shells while in the field.

6. Access to the hunt area is by foot traffic only. We do not allow bicycles and other conveyances. Mobility-impaired hunters should consult the refuge manager for allowed conveyances.
7. No person may build or maintain fires, except in portable gas stoves.
8. You may enter or exit only at designated locations.
9. Vehicles may stop only at designated parking areas. We prohibit the dropping of passengers or equipment or stopping between designated parking areas.
10. We require dogs to be kept on a leash, except for hunting dogs engaged in authorized hunting activities and under the immediate control of a licensed hunter (see 50 CFR 26.21(b).
11. We allow only electric motors on boats used by hunters with disabilities.
12. Consumption or possession of an open container of alcohol within public areas on the Refuges is prohibited.

Upland Game Hunting: We allow hunting of pheasant and wild turkey on designated areas of the refuge subject to the following conditions [for Sacramento Refuge (see regulations 1-9 below), Delevan Refuge (see regulations 1-9 below), Colusa Refuge (see regulations 2-9 below), and Sutter Refuge (see regulations 2-9 below)]:

1. We do not allow pheasant in the spaced blind and assigned pond areas except during a special 1 day only pheasant hunt on the first Monday after the opening of the State pheasant hunting season.
2. We do not allow wild turkey hunting in the space blind and assigned pond areas.
3. You may possess only approved nontoxic shot while in the field.
4. Access to the hunt area is by foot traffic only. We do not allow bicycles and other conveyances. Mobility-impaired hunters should consult the refuge manager for allowed conveyances.
5. You may possess no more than 25 shells while in the field.
6. No person may build or maintain fires, except in portable gas stoves.
7. You may enter or exit only at designated locations.
8. Vehicles may stop only at designated parking areas. We prohibit the dropping of passengers or equipment or stopping between designated parking areas.

9. We require dogs to be kept on a leash, except for hunting dogs engaged in authorized hunting activities and under the immediate control of a licensed hunter.
10. Consumption or possession of an open container of alcohol within public areas is prohibited.

- All hunting activities and operations will be reviewed annually to ensure compliance with all applicable laws, regulations, and policies.
- Population censuses will be reviewed annually with the CDFW to ensure that harvest from hunting is not unacceptably impacting the targeted populations. The program will be modified accordingly.
- Each year the Refuge staff will conduct habitat management reviews of each unit to evaluate wildlife use, habitat conditions and public use activities.
- Refuge specific hunting information will be available via signs, information panels, brochures and the website (http://sacramentovalleyrefuges.fws.gov).
- Refuge law enforcement officers will patrol, monitor, and collect data on hunting activities in the field to assure that it does not interfere with wildlife resources and other wildlife dependent uses on a weekly basis. The program will be modified accordingly.
- Dog training on the Refuges will not be allowed.
- Harvest will be recorded at each of the Refuges' check stations.

Justification:
Hunting is a wildlife-dependent recreational use listed in the National Wildlife Refuge System Improvement Act. Providing a quality hunting program contributes to achieving one of the Refuges' goals (Goal 3, Objective 3.1, Chapter 4 of the CCP). By facilitating this use on the Refuges, we will increase the visitors' knowledge and appreciation of fish and wildlife, which may lead to increased public stewardship of wildlife and their habitats on the Refuges. Increased public stewardship will support and complement the Service's actions in achieving the Refuges' purposes and the mission of the National Wildlife Refuge System. Approximately 15,448 acres will be closed to hunting and 11,152 acres will be closed to all public use to ensure an adequate amount of high-quality feeding and resting habitat (USFWS 2008a).

Based upon impacts described in the 2019 Wild Turkey Hunt Plan and Environmental Assessment (USFWS 2019), the Hunt Plan and the Final Comprehensive Conservation Plan and Environmental Assessment (USFWS 2009a, b), it is determined that hunting within the Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges, as described herein, will not materially interfere

with or detract from the purposes for which the Refuges were established or the mission of the Refuge System. In our opinion, hunting as described above will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the Refuges.

Mandatory Re-Evaluation Date:

__X__ Mandatory 15-year Re-Evaluation

_____ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

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Refuge Determination

Prepared by: _____ (Signature) 8/29/2019 (Date)

Refuge Manager/
Project Leader
Approval: _____ (Signature) 8/29/2019 (Date)

Concurrence

Refuge Supervisor: _____ (Signature) 8/29/19 (Date)

Assistant Regional
Director, Refuges: _____ (Signature) 8.29.19 (Date)

Appendix III
Cumulative Impacts Report
2019-2020 National Wildlife Refuge and National Fish Hatchery Proposed Hunting and Sport Fishing Openings
U.S. Fish and Wildlife Service

I. INTRODUCTION

Purpose and Scope

The headquarters of the National Wildlife Refuge System (Refuge System) and National Fish Hatchery System (Hatchery System), U.S. Fish and Wildlife Service (Service), conducted a national-level review of station-specific Environmental Assessments (EAs) and Categorical Exclusions (CatExs) developed for the proposed expansion of hunting and/or sport fishing activities on 74 national wildlife refuges (NWRs) and 15 national fish hatcheries (NFHs) (stations) from the 2019-2020 proposed rule. This proposed rule includes the opening of five refuges to hunting, the opening of five refuges to sport fishing, the opening of 13 hatcheries to sport fishing, the opening of three hatcheries to hunting, and the expansion of hunting and/or sport fishing activities at 67 refuges. We reviewed the station-specific EAs and CatExs for the 89 stations to identify and assess the direct, indirect, and cumulative impacts of the proposed hunting and/or sport fishing activities on hunted populations of migratory birds and resident wildlife; non-hunted migratory and resident wildlife; Threatened and Endangered (T&E) Species; plant and habitat resources; other wildlife-dependent recreational uses; physical resources including air, soil and water; cultural resources; station facilities; solitude; and socioeconomics. We also assessed impacts of the proposed opening or expansion of hunting and/or sport fishing activities on the 74 refuges by evaluating Compatibility Determinations (CDs) prepared by each refuge for their respective hunting and/or sport fishing programs (16 U.S.C. 668dd(a)(3), 50 C.F.R. 32) and on the 15 hatcheries by determining that their respective hunting and/or sport fishing programs were not detrimental to the propagation and distribution of fish or other aquatic wildlife (16 U.S.C. 460k, 50 C.F.R. 71) . Intra-Service consultations on the effects of hunting and/or sport fishing on Threatened and Endangered Species were conducted for each refuge and hatchery hunting and/or sport fishing program as required by Section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884).

We provide an overview of hunting and sport fishing on NWRs and NFHs in the context of federal management for migratory birds and state management of resident wildlife in Section II of this report. We document the detailed findings of the national level review and assessment of impacts, including cumulative impacts, in Section III, and provide discussion and conclusions in Sections IV and V.

This report covers the proposed seven new hunting and sport fishing openings on NWRs and 15 new hunting and sport fishing openings on NFHs in 2019-2020 and the expansion or redesign of programs on 67 other NWRs:

- At Bandon Marsh NWR in the State of Oregon, we are expanding existing sport fishing to new acres.
- At Bill Williams River NWR in the State of Arizona, we are expanding method of take for existing migratory game bird hunting and upland game hunting to further align with state regulations.
- At Billy Frank Jr. Nisqually NWR in the State of Washington, we are expanding existing waterfowl hunting to new acres.
- At Bitter Lake NWR in the State of New Mexico, we are expanding method of take and season date ranges for existing migratory game bird hunting and method of take for existing upland game hunting to further align with state regulations.
- At Bond Swamp NWR in the State of Georgia, we are expanding season date ranges for existing upland game hunting to further align with state regulations and expanding existing big game hunting by increasing quota numbers to increase access.
- At Bosque del Apache NWR in the State of New Mexico, we are expanding method of take and hunting hours for existing migratory game bird hunting and existing upland game hunting to further align with state regulations, and expanding number of tags for existing youth turkey hunting to increase access.
- At Boyer Chute NWR in the State of Nebraska, we are opening wild turkey hunting for the first time on acres already open to other hunting. We are also expanding existing migratory game bird hunting to acres already open to other hunting and expanding season dates for existing big game hunting.
- At Buenos Aires NWR in the State of Arizona, we are expanding method of take and season date ranges for existing upland game hunting and existing big game hunting to further align with state regulations.
- At Cedar Point NWR in the State of Ohio, we are expanding existing sport fishing to new acres.
- At Cherry Valley NWR in the State of Pennsylvania, we are opening sport fishing for the first time on acres already open to other activities.
- At Cibola NWR in the State of Arizona, we are expanding method of take and hunting hours for existing migratory game bird hunting and expanding method of take for existing upland game hunting to further align with state regulations, and expanding existing big game hunting to new units already open to other activities.
- At Clarks River NWR in the State of Kentucky, we are expanding season date range for existing coyote hunting to align with state regulations.
- At Colusa NWR in the State of California, we are opening to wild turkey hunting for the first time on acres already open to other hunting.
- At Crab Orchard NWR in the State of Illinois, we are opening coot, snipe, rail, woodcock, crow, mourning and white-winged dove, bobcat, skunk, woodchuck, Hungarian partridge, and pheasant for the first time on acres already open to hunting. We are also expanding existing migratory game bird, upland game, big game hunting to

further align with state regulations and offer special opportunities for targeted demographics.

- At Craig Brook NFH in the State of Maine, we are formally opening to sport fishing for the first time.
- At Crane Meadows NWR in the State of Minnesota, we are opening migratory game bird hunting (duck, geese, coot, merganser, moorhen, rail, snipe, mourning dove, and crow) and upland game hunting (rabbit, squirrel, raccoon, fox, badger, pheasant, opossum, weasel, bobcat, grouse, coyote, and skunk) for the first time in alignment with state regulations on new acres and acres already open to hunting. We are also expanding existing big game hunting to new acres.
- At Cross Creeks NWR in the State of Tennessee, we are opening coyote and beaver hunting for the first time on acres already open to other hunting. We are also expanding method of take and season date ranges for existing big game hunting to further align with state regulations.
- At Currituck NWR in the State of North Carolina, we are expanding hunting hours for existing migratory game bird hunting and expanding method of take and bag limits for existing big game hunting to further align with state regulations.
- At Cypress Creek NWR in the State of Illinois, we are opening rail, crow, bobcat, skunk, woodchuck, Hungarian partridge, and pheasant hunting for the first time on new acres and acres already open to hunting. We are also expanding existing migratory game bird, upland game, and existing big game hunting to new acres.
- At Deep Fork NWR in the State of Oklahoma, we are opening geese, coot, and merganser hunting for the first time on acres already open to other hunting. We are also expanding season date ranges for existing big game hunting to further align with state regulations.
- At Delevan NWR in the State of California, we are opening to wild turkey hunting for the first time on acres already open to other hunting.
- At Desoto NWR in the States of Iowa and Nebraska, we are expanding season date ranges for existing big game hunting to further align with state regulations.
- At Dexter NFH in the State of New Mexico, we are formally opening to migratory game bird (duck, coot, sandhill crane, and dove) and upland game hunting (Eurasian-collared dove and band-tailed pigeon) for the first time.
- At Edenton NFH in the State of North Carolina, we are formally opening to sport fishing for the first time.
- At Entiat NFH in the State of Washington, we are formally opening to sport fishing for the first time.
- At Grand Bay NWR in the States of Mississippi and Alabama, we are expanding season date ranges for existing migratory game bird hunting to align with state regulations.
- At Great Bay NWR in the State of New Hampshire, we are opening turkey hunting for the first time on acres already open to other hunting. We are also expanding method of take and season date ranges for existing white-tailed deer hunting to further align with state regulations.

- At Great River NWR in the States of Illinois and Missouri, we are expanding season date ranges and method of take for existing big game hunting and expanding season date ranges for existing upland game hunting to align with state regulations.
- At Green Bay NWR in the State of Wisconsin, we are opening big game hunting (white-tailed deer) and sport fishing for the first time.
- At Hackmatack NWR in the States of Illinois and Wisconsin, we are opening sport fishing for the first time on acres already open to other activities.
- At Hagerman NWR in the State of Texas, we are expanding existing migratory game bird, upland game, and big game hunting to new acres.
- At Harrison Lake NFH in the State of Virginia, we are formally opening to sport fishing for the first time.
- At Havasu NWR in the State of Arizona, we are expanding hours and season date ranges for existing migratory game bird hunting to further align with state regulations.
- At Hotchkiss NFH in the State of Colorado, we are formally opening to sport fishing for the first time.
- At Hutton Lake NWR in the State of Wyoming, we are opening to migratory game bird hunting (duck, mergansers, geese, and coot) for the first time.
- At Imperial NWR in the State of Arizona, we are expanding method of take for existing migratory game bird hunting and expanding method of take and season date ranges for existing upland game hunting to further align with state regulations.
- At Inks Dam NFH in the State of Texas, we are formally opening to sport fishing for the first time.
- At Iron River NFH in the State of Wisconsin, we are formally opening to migratory game bird (duck, geese, coot, mourning dove, snipe, woodcock, rail, and crow), upland game (rabbit, grouse, squirrel, fox, raccoon, pheasant, Hungarian partridge, quail, bobcat, and coyote), and big game (white-tailed deer, black bear, and turkey) hunting for the first time.
- At Key Cave NWR in the State of Alabama, we are opening snipe, woodcock, crow, fox, bobcat, coyote, white-tailed deer, and feral hog hunting for the first time on acres already open to other hunting.
- At Kirwin NWR in the State of Kansas, we are expanding existing migratory game bird hunting to acres already open to other hunting.
- At Kofa NWR in the State of Arizona, we are expanding method of take and season date ranges for existing upland game hunting to further align with state regulations.
- At Laguna Atascosa NWR in the State of Texas, we are expanding method of take for existing big game hunting to further align with state regulations.
- At Las Vegas NWR in the State of New Mexico, we are expanding the bag limit for existing migratory game bird hunting to further align with the state.
- At Leadville NFH in the State of Colorado, we are formally opening to migratory game bird (duck), upland game (grouse), and big game (mule deer and elk) hunting for the first time and we are formally opening to sport fishing for the first time.
- At Leavenworth NFH in the State of Washington, we are formally opening to sport fishing for the first time.

- At Little River NWR in the State of Oklahoma, we are opening coyote hunting for the first time on acres already open to other hunting. We are also expanding existing turkey hunting to include youth turkey hunting opportunities.
- At Little White Salmon NFH in the State of Washington, we are formally opening to sport fishing for the first time.
- At Lower Rio Grande Valley NWR in the State of Texas, we are expanding method of take for existing big game hunting to further align with state regulations.
- At Marin Islands NWR in the State of California, we are opening to sport fishing for the first time.
- At Mashpee NWR in the State of Massachusetts, we are opening to migratory game bird (duck, geese, coot, snipe, rail, woodcock, and crow), upland game (squirrel, pheasant, quail, grouse, fox, coyote, raccoon, and opossum), and big game (white-tailed deer and wild turkey) hunting for the first time.
- At Mattamuskeet NWR in the State of North Carolina, we are expanding season date ranges for existing big game hunting to further align with state regulations and offer youth hunt.
- At McKay Creek NWR in the State of Oregon, we are opening mourning dove, wild turkey, and big game (elk, white-tailed deer, and mule deer) hunting for the first time on acres already open to other hunting.
- At Medicine Lake NWR in the State of Montana, we are opening coot, crane, and tundra swan hunting on acres already open to other hunting. We are also expanding season date range for existing sport fishing to further align with state regulations.
- At Middle Mississippi River NWR in the States of Illinois and Missouri, we are expanding existing upland game hunting and existing sport fishing to new acres. We are also expanding method of take for existing big game hunting to further align to state regulations.
- At Minidoka NWR in the State of Idaho, we are opening big game hunting (elk) for the first time on acres already open to other hunting. We are also expanding existing sport fishing by extending the boating season.
- At Monomoy NWR in the State of Massachusetts, we are opening to migratory game bird (duck, geese, and coot) and upland game (coyote) hunting for the first time.
- At Neal Smith NWR in the State of Iowa, we are expanding existing migratory game bird, upland game, and big game hunting to new acres.
- At Nestucca Bay NWR in the State of Oregon, we are opening sport fishing for the first time on acres already open to other activities.
- At Northern Tallgrass Prairie NWR in the States of Iowa and Minnesota, we are opening sport fishing for the first time on new acres and acres already open to other activities. We are also expanding existing migratory game bird, upland game, and big game hunting to new acres.
- At Okefenokee NWR in the State of Georgia, we are expanding method of take and season date ranges for existing big game hunting to further align with state regulations.
- At Orangeburg NFH in the State of South Carolina, we are formally opening to sport fishing for the first time.

- At Ottawa NWR in the State of Ohio, we are expanding existing sport fishing to new acres.
- At Ozark Plateau NWR in the State of Oklahoma, we are opening to upland game (squirrel and rabbit) and big game (white-tailed deer and feral hog) hunting for the first time.
- At Parker River NWR in the State of Massachusetts, we are opening to upland game hunting (squirrel, rabbit, pheasant, turkey, grouse, fox, coyote, raccoon, and opossum) for the first time on new acres and acres already open to other hunting. We are also expanding existing migratory game bird hunting to new acres and expanding season dates for existing big game hunting on new acres and acres already open to hunting.
- At Patoka River NWR in the State of Indiana, we are expanding existing migratory game bird, upland game, and big game hunting and sport fishing to new acres.
- At Patuxent Research Refuge in the State of Maryland, we are expanding existing big game hunting to new acres.
- At Piedmont NWR in the State of Georgia, we are expanding season date range for existing raccoon, opossum, and big game hunting to further align with state regulations.
- At Sacramento NWR in the State of California, we are opening to wild turkey hunting for the first time on acres already open to other hunting.
- At Salt Plains NWR in the State of Oklahoma, we are opening coot, white-winged dove, beaver, Eurasian-collared and rock dove, wild turkey, and feral hog hunting for the first time. We are also expanding existing migratory game bird, upland game, and big game hunting to new acres.
- At San Bernardino NWR in the State of Arizona, we are expanding method of take for existing migratory game bird hunting to further align with state regulations.
- At Sand Lake NWR in the State of South Dakota, we are expanding season date range for existing big game hunting to further align with state regulations.
- At San Juan Islands NWR in the State of Washington, we are opening sport fishing for the first time on acres already open to other activities.
- At San Pablo Bay NWR in the State of California, we are expanding season date ranges and method of take for existing migratory game bird hunting to further align with state regulations.
- At Seedskadee NWR in the State of Wyoming, we are opening white-tailed deer and elk hunting for the first time on acres already open to other hunting.
- At Sequoyah NWR in the State of Oklahoma, we are opening wild turkey and feral hog hunting for the first time on acres already open to other hunting.
- At Silvio O. Conte NWR in the States of Massachusetts and Connecticut, we are formally opening migratory game bird (duck, geese, woodcock, snipe, rail, and crow), upland game (squirrel, rabbit, pheasant, grouse, bobcat, fox, coyote, raccoon, and opossum), big game (white-tailed deer, black bear, turkey) hunting, and sport fishing for the first time.
- At Spring Creek NFH in the State of Washington, we are formally opening to sport fishing for the first time.

- At St. Marks NWR in the State of Florida, we are expanding existing upland game and big game hunting to new acres.
- At Stone Lakes NWR in the State of California, we are opening sport fishing for the first time on acres already open to other activities.
- At Sutter NWR in the State of California, we are opening to wild turkey hunting for the first time on acres already open to other hunting.
- At Tamarac NWR in the State of Minnesota, we are opening rail, crow, mourning dove, wild turkey, and bobcat hunting on acres already open to other hunting.
- At Tishomingo NWR in the State of Oklahoma, we are opening to migratory game bird (duck, geese, and coot), wild turkey, and feral hog hunting for the first time on acres already open to other hunting and new acres. We are also expanding existing white-tailed deer hunting to new acres.
- At Tishomingo NFH in the State of Oklahoma, we are formally opening to sport fishing for the first time.
- At Trinity River NWR in the State of Texas, we are expanding method of take for existing upland game hunting and season date ranges for existing big game hunting to further align with state regulations. We are also moving all refuge hunts including existing migratory game bird hunting to State lottery system.
- At Valentine NWR in the State of Nebraska, we are expanding the season date range for existing coyote hunting to further align with state regulations.
- At Valley City NFH in the State of North Dakota, we are formally opening to sport fishing for the first time.
- At Washita NWR in the State of Oklahoma, we are opening mourning and white-winged hunting for the first time on new acres and acres already open to hunting, and Eurasian-collared dove hunting on acres already open to hunting. We are also expanding existing migratory game bird hunting to new acres.
- At Whittlesey Creek NWR in the State of Wisconsin, we are opening sport fishing for the first time on acres already open to other activities.
- At Wichita Mountains NWR in the State of Oklahoma, we are opening to migratory game bird (duck, geese, coot, and merganser), upland game (coyote), wild turkey, and feral hog hunting for the first time on acres already open to other hunting.

II. Overview of Hunting on National Wildlife Refuges

1. Migratory Bird Hunting

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703–712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any * * * bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after

giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds" and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the Service as the lead Federal agency for managing and conserving migratory birds in the United States. Migratory game bird management is a cooperative effort of State, Tribal, and Federal governments.

The Service develops migratory game bird hunting regulations by establishing the frameworks, or outside limits, for season lengths, bag limits, and areas for migratory game bird hunting. Acknowledging regional differences in hunting conditions, the Service has administratively divided the Nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. The Flyway Councils, established through the Association of Fish and Wildlife Agencies (AFWA), also assist in researching and providing migratory game bird management information for Federal, State, and Provincial governments, as well as private conservation entities and the general public.

The process for adopting migratory game bird hunting regulations, located at 50 CFR part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rulemaking process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation.

For the regulatory cycle, Service biologists gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties. Because the Service is required to take abundance of migratory game birds and other factors into consideration, the Service undertakes a number of surveys throughout the year in conjunction with Service Regional Offices, the Canadian Wildlife Service, and State and Provincial wildlife-management agencies. To determine the appropriate frameworks for each species, we consider factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest. After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks, but never more liberal.

The programmatic document, "Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Hunting of Migratory Birds (FSES 88–14)," filed with the Environmental Protection Agency (EPA) on June 9, 1988, addresses National Environmental Policy Act (NEPA) compliance by the Service for issuance of the annual framework regulations for hunting of migratory game bird species. We published a Notice of Availability in the Federal Register on June 16, 1988 (53 FR 22582), and our Record of Decision on August 18, 1988 (53 FR 31341). We also address NEPA compliance for waterfowl hunting frameworks through the

annual preparation of separate Environmental Assessments, as in the "Duck Hunting Regulations for 2012-13" with its corresponding August 23, 2012 Finding of No Significant Impact.

Further, in a notice published in the September 8, 2005, Federal Register (70 FR 53376), the Service announced its intent to develop a new Supplemental Environmental Impact Statement for the migratory bird hunting program. We held public scoping meetings in the spring of 2006, as announced in a March 9, 2006, Federal Register notice (71 FR 12216). We published the 2010 Draft Supplemental Environmental Impact Statement in the Federal Register on July 9, 2010 (73 FR 39577). The public comment period closed on March 26, 2011. On May 31, 2013, we published a Notice of Availability in the Federal Register (78 FR 32686) announcing a Second Final Supplemental Environmental Impact Statement for the Issuance of Annual Regulations Permitting the Hunting of Migratory Birds. The programmatic document was filed with the EPA on May 24, 2013, pursuant to the NEPA. The public review period ended July 1, 2013.

We allow migratory bird hunting on refuges and hatcheries on designated areas only if we have determined such activity to be compatible with the establishment purpose(s) of the refuge and the mission of the (Refuge System), as required by the National Wildlife Refuge System Administration Act (NWRSAA, 16 U.S.C. 668dd-668ee).

2. Hunting and Sport Fishing of Resident Wildlife

Individual states regulate hunting and sport fishing of resident wildlife, including upland game, big game, and fish. On a state-by-state basis, they annually establish hunting and sport fishing regulations with a goal of providing the public recreational opportunities while maintaining harvests at sustainable levels. Many states manage big game populations on a zonal basis (typically called Game Management Units), recognizing that discrete populations of resident big game species typically exist within a given state. States typically also manage resident small game and upland game on a statewide or zonal basis. States are generally responsible for fishery management within their borders, and coastal states have management authority that extend out to three miles beyond their coastline.

We allow hunting and sport fishing of resident wildlife on NWRs only if we have determined such activity compatible with the establishment purpose(s) of the refuge and the mission of the Refuge System, as required by the NWRSAA. We allow hunting and sport fishing of resident wildlife on NFHs only if we have determined such activity is not detrimental to the propagation and distribution of fish or other aquatic wildlife. Hunting and sport fishing on NWRs and NFHs generally occur consistent with state regulations, including seasons and bag limits. Station-specific hunting and sport fishing regulations can be more restrictive (but not more liberal) than state regulations - and often are.

III. DESCRIPTION AND EVALUATION OF CUMULATIVE IMPACTS

A cumulative impact is defined as an impact on the environment that results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future action regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can "accumulate" spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time. Sometimes different actions counterbalance one another, partially canceling out each other's effects on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

All uses of Service lands and waters result in impacts to refuge wildlife and habitats, to other uses of the stations, and to other station resources. As we initiate or expand wildlife-dependent recreational activities for the public on NWRs and NFHs, there is an increased potential for adverse cumulative impacts to occur on individual refuges and hatcheries, and on Service lands as a whole. There are currently 340 NWRs and approximately 7,000 waterfowl production areas in 37 wetland management districts open to hunting of migratory birds, upland game and/or big game wildlife species. For the 2019-2020 season, the Service proposes to open and/or expand hunting and/or sport fishing opportunities on 74 NWRs and 15 NFHs.

Through the station-specific EAs for the respective proposed actions, we identified and analyzed the direct, indirect, and cumulative impacts of the proposed actions on populations of hunted (migratory birds, upland game, big game) and fished wildlife, non-hunted migratory and resident wildlife, habitats and plant resources, other wildlife-dependent recreational programs, refuge and hatchery users, station environment (air and water resources, soils, cultural resources and solitude), and station infrastructure and facilities. This national-level review and assessment evaluates the cumulative impacts of the proposed actions to the aforementioned components for all 74 refuges and 15 hatcheries combined and for Service lands as a whole.

Some of the proposed or expanded refuge and hatchery hunting and sport fishing programs examined in this review were more restrictive than the hunting seasons allowed on nearby lands by State regulation. For the remaining refuges and hatcheries in the rulemaking, we operate in accordance with state regulations. Station-specific regulations proposing hunting and sport fishing of resident wildlife included restrictions on the number of days we allowed hunting and sport fishing within the state season, restricting the use of trailing dogs, specifying which equipment is permissible (e.g. bow and arrow, muzzle-loading rifles, rod and reel), and shortening the daily hunting and sport fishing hours. We would expect all of these restrictions to result in fewer animals being harvested, and by inference, would be well within sustainable harvest levels of resident and migratory wildlife populations.

The conclusions in the refuge-specific EAs that there would not be any significant adverse direct, indirect, or cumulative impacts on wildlife populations, other recreational uses, other refuge

resources, and other aspects of the human environment were further supported by the Compatibility Determinations (CDs) and Section 7 evaluations. The CD process examines the anticipated impacts of a proposed activity on biological resources, and considers impacts to other wildlife-dependent recreational programs and other refuge resources. All CDs we reviewed determined that the hunting and sport fishing programs were compatible with refuge establishment purposes and the mission of the Refuge System. Hatcheries follow the same regulations and policies as refuges for opening to hunting or sport fishing. However, instead of a Compatibility Determination, hatcheries must only make a determination that the hunting or sport fishing opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife" or that sport fishing "...is not detrimental to the propagation and distribution of fish or other animal life" (50 CFR 71) for the activity to be allowed. All of the Section 7 consultations determined that the proposed activities would have “No Effect” or were “Not Likely to Adversely Affect” T&E species.

Many of the EAs specifically stated that changes in station conditions, such as sizeable increases in refuge or hatchery acreage or public uses, would trigger new hunt planning, NEPA, CD, and Section 7 evaluation processes. Many of the EAs also noted that the Service may reevaluate compatibility at any time if conditions warrant. These required planning processes ensure that adverse cumulative impacts will not accumulate over time.

1. Cumulative Impacts to Migratory Birds – Hunted Species

For some stations, the projected harvest as a result of the proposed action results in no, or minim, harvest. For these refuges and hatcheries, we estimate that expansion of a hunting program will result in no, or minimal, harvest. In many areas, numbers of hunters have been steadily decreasing, and we estimate that the additional hunting opportunity will not result in an additional number of hunters, or additional harvest of the species being analyzed.

Six of the stations proposing to open or expand migratory game bird hunting (Currituck, Mashpee, Monomoy, Silvio O. Conte, Great Bay, and Parker River NWRs) lie within the Atlantic Flyway. For the period of 2016-2017, annual duck harvests for the Atlantic Flyway averaged 1,572,500 (±8%) ducks and during the same period, annual goose harvests for the Atlantic Flyway averaged 663,400 (±7%) geese (Raftovich et al. 2018). Projected harvests of migratory waterfowl resulting from the proposed actions at the six stations are as follows: Currituck NWR- 0 ducks and 0 geese; Mashpee NWR- 20ducks and 5 geese; Monomoy NWR- 150 ducks and 6 geese; Silvio O. Conte NWR- 75 ducks and 50 geese; Great Bay NWR- 0 ducks and 0 geese; and Parker River NWR- 50 ducks and 12 geese.
One station in the Atlantic Flyway is opening to dove hunting (Mashpee NWR). Projected harvests of dove resulting from the proposed action is 0 doves. For the period of 2016-2017, average annual mourning dove harvests for Massachusetts was 142,900 (±37%) doves. During the same period, averages for the Atlantic Flyway were 4,606,000 (±9%) doves for the Eastern Unit (Raftovich et al. 2018).

Five stations in the Atlantic Flyway are expanding coot hunting (Currituck, Mashpee, Monomoy,

Great Bay, and Parker River NWRs). Projected harvests of coots resulting from the proposed actions are as follows: Currituck NWR- 0 coots; Mashpee- 0 coots; Monomoy NWR- 22 coots; Great Bay NWR- 0 coots; and Parker River NWR- 0 coots. For the period of 2016-2017, average annual coot harvest for North Carolina (Currituck NWR) was 8,800 (± 196%), for Massachusetts (Mashpee, Monomoy, and Parker River NWRs) was <50 (±174%), and for New Hampshire (Great Bay NWR) was 100 (± 195%). The average for the Atlantic Flyway was 16,700 (± 112%) coots (Raftovich et al. 2018).

Three stations in the Atlantic Flyway are expanding woodcock hunting (Mashpee, Silvio O. Conte, and Parker River NWRs). Projected harvests of woodcock resulting from the proposed actions are as follows: Mashpee NWR- 10 woodcocks; Silvio O. Conte NWR- 10 woodcocks; and Parker River NWR- 5 woodcocks. For the period of 2016-2017, average annual woodcock harvest for Massachusetts (Mashpee, Silvio O. Conte and Parker River NWRs) was 1,900 (± 46%), and for Connecticut (Silvio O. Conte NWR) was 1,600 (± 69%). The average for the Eastern Region was 62,700 (± 24%) woodcocks (Raftovich et al. 2018).

Three stations in the Atlantic Flyway are expanding snipe hunting (Mashpee, Silvio O. Conte, and Parker River NWRs). Projected harvests of snipe resulting from the proposed actions are as follows: Mashpee NWR- 1 snipe; Silvio O. Conte NWR- 4 snipe; and Parker River NWR- 2 snipe. For the period of 2016-2017, average annual snipe harvest for Massachusetts (Mashpee, Silvio O. Conte and Parker River NWRs) was 100 (± 174%), and for Connecticut was <50 (±164%) snipe. The average for the Atlantic Flyway was 28,500 (± 82%) snipe (Raftovich et al. 2018).

Three stations in the Atlantic Flyway are expanding rail hunting ((Mashpee, Silvio O. Conte, and Parker River NWRs). Projected harvests of rail resulting from the proposed actions are as follows: Mashpee NWR- 1 rails; Silvio O. Conte NWR- 4 rails; and Parker River NWR- 2 rails. For the period of 2016-2017, average annual rail harvest for Massachusetts (Mashpee, Silvio O. Conte, and Parker River NWRs) was <50 (±176), and for Connecticut was 100 (± 114%) rail. The averages for the Atlantic Flyway were 11,800 (± 42%) rails (Raftovich et al. 2018).

Ten of the stations proposing to open or expand migratory game bird hunting (Tamarac, Neal Smith, Northern Tallgrass Prairie, Crane Meadows, Patoka River, Cypress Creek, Crab Orchard, Key Cave, and Grand Bay NWRs and Iron River NFH) lie within the Mississippi Flyway. For the period of 2016-2017, annual duck harvests for the Mississippi Flyway averaged 5,339,800 (±5%) ducks and during the same period, annual goose harvests for the Mississippi Flyway averaged 1,350,000 (±8%) geese (Raftovich et al. 2018). Projected harvests of migratory waterfowl resulting from the proposed actions at the nine stations are as follows: Tamarac NWR- 0 ducks and 0 geese; Neal Smith NWR- 20 ducks and 10 geese; Northern Tallgrass Prairie NWR- 50 ducks and 25 geese; Crane Meadows NWR- 900 ducks and 105 geese; Patoka River NWR- 100 ducks and 10 geese; Cypress Creek NWR- 0 ducks and 0 geese; Crab Orchard NWR- 0 ducks and 0 geese; Key Cave NWR- 0 ducks and 0 geese; Grand Bay NWR- 12 ducks and 0 geese; and Iron River NFH- 0 ducks and 0 geese.

Five stations in the Mississippi Flyway are expanding dove hunting (Neal Smith, Northern Tallgrass Prairie, Patoka River, Cypress Creek, and Grand Bay NWRs) and four stations in the Mississippi Flyway are opening dove hunting (Tamarac, Crane Meadows, and Crab Orchard NWRs and Iron River NFH). The projected harvest of doves resulting from the proposed actions is as follows: Neal Smith NWR- 50 doves; Northern Tallgrass Prairie NWR- 9 doves; Patoka River NWR- 12 doves; Cypress Creek NWR- 0 doves; Grand Bay NWR- 0 doves; Tamarac NWR- 150 doves; Crane Meadows NWR- 213 doves; Crab Orchard NWR- 450 doves; and Iron River NFH- 0 doves. For the period of 2016-2017, average annual dove harvest for Iowa was 134,900 (±16%), for Indiana was 122,100 (±20%), for Illinois was 344,900 (±29%), for Minnesota was 39,100 (±30%), for Wisconsin was 40,800 (±37%), for Alabama was 483,600 (±30%) doves, and for Mississippi was 316,500 (±25%). The averages for the Eastern Unit was 4,783,300 (±8%) doves (Raftovich et al. 2018).

Four stations in the Mississippi Flyway are expanding coot hunting (Northern Tallgrass Prairie, Patoka River, Cypress Creek, and Grand Bay NWRs) and three stations in the Mississippi Flyway are opening coot hunting (Crane Meadows and Crab Orchard NWRs and Iron River NFH). Projected harvests of coots resulting from the proposed actions are as follows: Northern Tallgrass Prairie NWR- 0 coots; Patoka River NWR- 2 coots; Cypress Creek NWR- 0 coots; Grand Bay NWR- 0 coots; Crane Meadows NWR- 45 coots; Crab Orchard NWR- 0 coots; and Iron River NFH- 0 coots. For the period of 2016-2017, average annual coot harvest for Mississippi was 0, for Indiana was 6,000 (±193%), for Illinois was 1,200 (±195%), for Minnesota was 4,900 (±117%), for Wisconsin was 33,800 (±184%), and for Iowa was 300 (±104%) coots. The average for the Mississippi Flyway was 75,900 (±92%) coots (Raftovich et al. 2018).

Three stations in the Mississippi Flyway are expanding woodcock hunting (Northern Tallgrass Prairie, Patoka River, and Cypress Creek NWRs) and three stations in the Mississippi Flyway are opening woodcock hunting (Crab Orchard and Key Cave NWRs and Iron River NFH). Projected harvests of woodcock resulting from the proposed actions are as follows: Northern Tallgrass Prairie NWR- 0 woodcocks; Patoka River NWR- 2 woodcocks; Cypress Creek NWR- 2 woodcocks; Crab Orchard NWR- 10 woodcocks; Key Cave NWR- 0 woodcocks; and Iron River NFH- 0 woodcocks. For the period of 2016-2017, average annual woodcock harvest for Iowa was 1,900 (±179%), for Indiana was 1,500 (±142%), for Illinois was 400 (±142%), for Minnesota was 26,700 (±37%), for Wisconsin was 31,100 (±29%), and for Alabama was 600 (±90%) woodcocks. The average for the Central Region was 140,900 (±22%) woodcocks (Raftovich et al. 2018).

Three stations in the Mississippi Flyway are expanding snipe hunting (Northern Tallgrass Prairie, Patoka River, and Cypress Creek NWRs) and four stations in the Mississippi Flyway are opening snipe hunting (Crane Meadows, Crab Orchard, and Key Cave NWRs and Iron River NFH). Projected harvests of snipe resulting from the proposed actions are as follows: Northern Tallgrass Prairie NWR- 0 snipe; Patoka River NWR- 2 snipe; Cypress Creek NWR- 0 snipe; Crane Meadows NWR- 1 snipe; Crab Orchard NWR- 4 snipe; Key Cave NWR- 0 snipe; and Iron River NFH- 0 snipe. For the period of 2016-2017, average annual snipe harvest for Iowa was 100

(±116%), for Indiana was 200 (±94%), for Illinois was 800 (±195%), for Minnesota was 100 (±195%), for Wisconsin was 1,100 (±196%), and for Alabama was 200 (±195%) snipe. The average for the Mississippi Flyway was 5,700 (±66%) snipe (Raftovich et al. 2018).

Two stations in the Mississippi Flyway are expanding rail hunting (Northern Tallgrass Prairie and Patoka River NWRs) and five stations in the Mississippi Flyway are opening rail hunting (Tamarac, Crane Meadows, Cypress Creek, and Crab Orchard NWRs and Iron River NFH). Projected harvests of rail resulting from the proposed actions are as follows: Tamarac NWR- 100 rails, Northern Tallgrass Prairie NWR- 0 rails, Patoka River NWR- 2 rails; Crane Meadows NWR- 3 rails, Cypress Creek NWR- 4 rails, Crab Orchard NWR- 4 rails, and Iron River NFH- 0 rails. For the period of 2016-2017, average annual rail harvest for Iowa was 2,700 (±182%), for Minnesota was 0 rails, for Indiana was 0, for Illinois was 0, and for Wisconsin was 0. The averages for the Mississippi Flyway were 2,800 (±176%) rails (Raftovich et al. 2018).

Sixteen of the stations proposing to open or expand migratory game bird hunting (Deep Fork, Wichita Mountains, Hagerman, Bitter Lake, Bosque del Apache, Las Vegas, Trinity River, Tishomingo, Washita, Salt Plains, Boyer Chute, Hutton Lake, Medicine Lake, and Kirwin NWRs and Dexter and Leadville NFHs) lie within the Central Flyway. For the period of 2016-2017, annual duck harvests for the Central Flyway averaged 2,429,000 (±14%) ducks and during the same period, annual goose harvests for the Central Flyway averaged 1,061,500 (±11%) geese (Raftovich et al. 2018). Projected harvests of migratory waterfowl resulting from the proposed actions at the sixteen stations are as follows: Deep Fork NWR- 15 ducks and 32 geese; Wichita Mountains NWR- 150 ducks and 200 geese; Hagerman NWR- 0 ducks and 0 geese; Bitter Lake NWR- 12 ducks and 0 geese; Bosque del Apache NWR- 0 ducks and 0 geese; Las Vegas NWR- 0 ducks and 20 geese; Trinity River NWR- 0 ducks and 0 geese; Tishomingo NWR- 100 ducks and 200 geese; Washita NWR- 0 ducks and 0 geese; Salt Plains NWR- 0 ducks and 0 geese; Boyer Chute NWR- 83 ducks and 128 geese; Hutton Lake NWR- 699 ducks and 174 geese; Medicine Lake NWR- 0 ducks and 0 geese; Kirwin NWR- 1458 ducks and 4800 geese; Dexter NFH- 0 ducks and 0 geese; and Leadville NFH- 0 ducks and 0 geese..

Two stations in the Central Flyway are expanding dove hunting (Hagerman and Bosque del Apache NWRs) and three stations in the Central Flyway are opening dove hunting (Washita and Salt Plains NWRs and Dexter NFH). The projected harvest of doves resulting from the proposed actions is as follows: Hagerman NWR- 200 doves; Bosque del Apache NWR- 150 doves; Washita NWR- 1000 doves; Salt Plains NWR- 100 doves; and Dexter NFH- 0 doves. For the period of 2016-2017, average annual dove harvest for New Mexico was 73,900 (±51%), for Texas was 3,469,500 (±14%), and for Oklahoma was 315,600 (±29%). The average for the Central Unit was 5,462,800 (±10%) doves (Raftovich et al. 2018).

Three stations in the Central Flyway are expanding coot hunting (Bitter Lake, Boyer Chute, and Kirwin NWRs) and seven stations in the Central Flyway are opening coot hunting (Deep Fork, Wichita Mountains, Tishomingo, Salt Plains, Hutton Lake, and Medicine Lake NWRs and Dexter NFH). Projected harvests of coots resulting from the proposed actions are as follows: Bitter Lake NWR- 2 coots; Boyer Chute NWR- 82 coots; Kirwin NWR- 3,645 coots; Deep Fork

NWR- 0 coots; Wichita Mountains NWR- 0 coots; Tishomingo NWR- 0 coots; Salt Plains NWR- 0 coots; Hutton Lake NWR- 216 coots; Medicine Lake NWR- 15 coots; and Dexter NFH- 0 coots. For the period of 2016-2017, average annual coot harvest for New Mexico was 100 (±113%), for Nebraska was 400 (±196%), for Oklahoma was 0, for Wyoming was 300 (±113%), for Kansas was 0, and for Montana was 500 (±180%) coots. The average for the Central Flyway was 6,000 (±78%) coots (Raftovich et al. 2018).

Seven of the stations proposing to open or expand migratory game bird hunting (McKay Creek, Billy Frank Jr. Nisqually, Bill Williams River, Cibola, Havasu, San Bernardino, and San Pablo Bay NWRs) lie within the Pacific Flyway. For the period of 2016-2017, annual duck harvests for the Pacific Flyway averaged 2,720,200 (±10%) ducks and during the same period, annual goose harvests for the Pacific Flyway averaged 518,000 (±10%) geese (Raftovich et al. 2018). Projected harvests of migratory waterfowl resulting from the proposed actions at the seven stations are as follows: McKay Creek NWR- 0 ducks and 0 geese; Billy Frank Jr. Nisqually NWR- 840 ducks and 310 geese; Bill Williams River NWR- 0 ducks and 0 geese; Cibola NWR- 150 ducks and 55 geese; Havasu NWR- 250 ducks and 550 geese; San Bernardino NWR- 0 ducks and 0 geese; and San Pablo Bay NWR- 0 ducks and 0 geese.

Four stations in the Pacific Flyway are expanding dove hunting (Bill Williams River, Cibola, Havasu, and San Bernardino NWRs) and one station in the Pacific Flyway is opening dove hunting (McKay Creek NWR). Projected harvests of doves resulting from the proposed actions are as follows: Bill Williams River NWR- 10 doves; Cibola NWR- 20 doves; Havasu NWR- 900 doves; San Bernardino NWR- 6 doves; and McKay Creek NWR- 100 doves. For the period of 2016-2017, average annual dove harvest for Arizona was 350,700 (±11%) and for Oregon was 19,700 (±47%). The averages for the Western Unit was 1,315,000 (±9%) doves (Raftovich et al. 2018).

Four stations in the Pacific Flyway are expanding coot hunting (Billy Frank Jr. Nisqually, Cibola, Havasu, and San Pablo Bay NWRs). Projected harvests of coots resulting from the proposed actions are as follows: Billy Frank Jr. Nisqually NWR- 100 coots; Cibola NWR- 25 coots; Havasu NWR- 25 coots; and San Pablo Bay NWR- 0 coots. For the period of 2016-2017, average annual coot harvest for California was 10,300 (±66%), for Arizona was 0, and for Washington was 1,800 (±67%) coots. The average for the Pacific Flyway was 18,400 (±41%) coots (Raftovich et al. 2018).

Two stations in the Pacific Flyway are expanding snipe hunting (Cibola and Havasu NWRs). Projected harvests of snipe resulting from the proposed actions are: Cibola NWR- 15 snipe and Havasu NWR- 2 snipe. For the period of 2016-2017, average annual snipe harvest for Arizona was <50 (±193%) snipe. The average for the Pacific Flyway was 4,300 (±64%) snipe (Raftovich et al. 2018).

Total duck and goose harvest in the United States from 2016-2017 was estimated at 12,115,800 (±4%) ducks and 3,602,500 (±5%) geese. For the same period, the estimated average national harvest of coots was 117,100 (±62%), of mourning doves was 11,561,100 (±6%), of rails was

14,600 (±48%), of snipe was 42,400 (±57%), and of woodcocks was 203,500 (±17%) (Raftovich et al. 2018).

Collectively, for the proposed actions on these thirty-six refuges and three hatcheries, our estimates indicate that the proposed harvests of each species will constitute a negligible component of the national harvests.

2. Cumulative Impacts to Resident Wildlife

National wildlife refuges proposing to open or expand hunting or sport fishing programs for resident wildlife occur in Alabama (Key Cave NWR), Arizona (Bill Williams River, Buenos Aires, Cibola, Imperial, and Kofa NWRs), California (Colusa, Delevan, Marin Islands, Sacramento, Stone Lakes, and Sutter NWRs), Florida (St. Marks NWR), Georgia (Bond Swamp, Okefenokee, and Piedmont NWRs), Idaho (Minidoka NWR), Illinois (Crab Orchard, Cypress Creek, Great River, Middle Mississippi River, and Hackmatack NWRs), Indiana (Patoka River NWR), Iowa (Neal Smith, Northern Tallgrass Prairie, and Desoto NWRs), Kentucky (Clarks River NWR), Maryland (Patuxent Research Refuge), Massachusetts (Mashpee, Monomoy, and Parker River NWRs), Minnesota (Crane Meadows and Tamarac NWRs), Montana (Medicine Lake NWR), Nebraska (Boyer Chute and Valentine NWRs), New Hampshire (Great Bay NWR), New Mexico (Bitter Lake and Bosque del Apache NWRs), North Carolina (Currituck and Mattamuskeet NWRs), Ohio (Cedar Point and Ottawa NWRs), Oklahoma (Deep Fork, Little River, Ozark Plateau, Salt Plains, Sequoyah, Tishomingo, Washita, and Wichita Mountains NWRs), Oregon (Bandon Marsh, McKay Creek, and Nestucca Bay NWRs), Pennsylvania (Cherry Valley NWR), South Dakota (Sand Lake NWR), Tennessee (Cross Creeks NWR), Texas (Hagerman, Laguna Atascosa, Lower Rio Grande Valley, and Trinity River NWRs), Washington (San Juan Islands NWR), Wisconsin (Green Bay and Whittlesey Creek NWRs), and Wyoming (Seedskadee NWR). National fish hatcheries proposing to expand hunting or sport fishing programs for resident wildlife occur in Colorado (Hotchkiss and Leadville NFHs), Maine (Craig Brook NFH), New Mexico (Dexter NFH), North Carolina (Edenton NFH), North Dakota (Valley City NFH), Oklahoma (Tishomingo NFH), South Carolina (Orangeburg NFH), Texas (Inks Dam NFH), Virginia (Harrison Lake NFH), Washington (Entiat, Leavenworth, Little White Salmon, and Spring Creek NFHs), and Wisconsin (Iron River NFH). We have considered the cumulative impacts of harvest of resident wildlife species on NWRs and NFHs open to upland game hunting, big game hunting, and sport fishing on a national scale, and have concluded that consideration of cumulative impacts is most relevant at a more local geographic scale because of the discrete nature of these populations.

The proposed actions involve opening or expanding opportunities for hunting resident wildlife at 64 refuges and 3 hatcheries and sport fishing at 16 refuges and 13 hatcheries. Minidoka, Green Bay, Northern Tallgrass Prairie, Patoka River, Silvio O. Conte, and Medicine Lake NWRs are expanding both hunting and sport fishing opportunities. The station-specific EAs and CatExs evaluated impacts of harvest of resident wildlife species on refuge and hatchery populations as well as populations at the appropriate geographic scale which best defines the discrete populations (i.e., state or zone within a state, or body of water).

States have the primary trust responsibility for managing resident wildlife. Each state manages its resident wildlife slightly differently. However, Congress charges all states with managing and perpetuating resident wildlife for the citizens of their respective states. State wildlife agencies provided much of the harvest and population information on resident wildlife contained in the station-specific EAs to the Service. All of the refuges and hatcheries had close working relationships with state wildlife agencies and consulted with them in developing their hunting and sport fishing proposals. Most refuges and hatcheries have annual meetings with state wildlife agencies to review and make adjustments to their hunting and sport fishing programs.

States concurred with and supported all of the proposed hunting and sport fishing seasons for resident wildlife on refuges and hatcheries. Refuge and hatchery hunting and sport fishing seasons may be more restrictive than state-set seasons but never more liberal. Some refuge and hatchery hunting and sport fishing seasons examined in this review were more restrictive than seasons allowed on nearby lands by state regulation. Station-specific regulations on those refuges and hatcheries proposing hunting of resident wildlife included restrictions on the number of days we allowed hunting within the State season, controlling the number and/or age (such as youth-only seasons) of hunters, authorizing the use of hunting dogs, limiting equipment use (such as modern, high-powered rifles, archery or muzzle-loading rifles, use of boats), shortening the daily hunting and sport fishing hours, and placing size-limits on fish catches. We would expect all of these restrictions to result in hunters and anglers harvesting fewer animals.

Most state wildlife agencies subdivide their states into discrete "game management units" (GMUs) as a means to improve the management of big game species. State agencies use several different terms to describe GMUs. These units have population goals as well as harvest goals. Many units have either extended or restricted seasons and/or bag limits depending on the population and management objective of that particular unit. All of the state big-game hunting programs are designed to manage and maintain big-game populations at sustainable levels. Individual refuges and hatcheries generally occupy only a small fraction, or subset, of land area of any state-determined GMU. Big-game populations and harvests on refuges and hatcheries are also subsets of population and harvest goals of that particular GMU. While not all refuges and hatcheries provided numerical harvest estimates for big game, they all coordinated their seasons with state wildlife agencies.

Typically, big-game harvests on refuges and hatcheries were modest, representing a small fraction of the harvest in a GMU. Known, estimated, or projected refuge and hatchery harvests were well within the sustainable harvest levels determined by the states. As they did with big-game seasons, all of the refuges and hatcheries consulted with state wildlife agencies in developing their hunting proposals. State wildlife agencies concurred with, and supported, all of the proposed hunting seasons for resident wildlife on refuges and hatcheries.

Small and upland game seasons are generally, but not always, set on a statewide basis. We also design small and upland game seasons to manage and maintain small and upland game populations at sustainable levels. While not all refuges and hatcheries provided numerical

harvest estimates for small and upland game, they all coordinated their seasons with state wildlife agencies. Those numerical harvest estimates provided indicated that known, estimated, or projected refuge and hatchery harvests were a very minor component of statewide harvests and well within sustainable harvest levels as determined by the states.

The specific species being proposed for hunting varied widely among refuges and hatcheries and will result in low numbers of take for the various species. Therefore, the annual and long-term cumulative impacts to resident wildlife populations of fox (gray and red), coyote, raccoon, squirrel (red, fox, and gray), deer (white-tailed and mule), elk, nilgai antelope, black bear, feral hog, rabbit (cottontail), jackrabbit (black-tailed and white-tailed), snowshoe hare, elk, opossum, beaver, ring-necked pheasant, grouse (ruffed and sharp-tailed), wild turkey (Eastern and Rio Grande), quail (bobwhite and Gambel's), partridge (gray and Hungarian), woodchuck, crow, skunk, porcupine, weasel, coyote, bobcat, and badger from the additional harvest of these species under the proposed actions will be negligible. We anticipate that the impacts of hunting on resident wildlife on any one or combination of refuges and hatcheries will have negligible effect on any or all of the other stations. Resident wildlife proposed for sport fishing included bass (striped, spotted, white, largemouth, and smallmouth), channel catfish, flathead catfish, shiner perch, northern pike, bluegill, sunfish, common carp, pike, trout (brown, cutthroat, and rainbow), black crappie, bullhead, yellow perch, winter steelhead, salmon (coho and chinook), striped surf perch, shellfish, and white sturgeon, among other legal fish species to be harvested in the states of Pennsylvania, Maine, Massachusetts, Virginia, North Carolina, South Carolina, Minnesota, Ohio, Illinois, Indiana, Iowa, Missouri, Wisconsin, Colorado, Montana, North Dakota, Oklahoma, Texas, California, Washington and Oregon.

We did not determine or expect any of the known, estimated, or projected harvests of big game, upland game, or fish species resulting from the proposed activities on refuges and hatcheries to have significant adverse direct, indirect, or cumulative impacts to any hunted or fished wildlife population.

3. Cumulative Impacts to Non-hunted Migratory and Resident Wildlife

The primary impact to non-hunted migratory and resident wildlife identified in the station-specific EAs and CatExs was localized, temporary disturbance of individual animals, or groups of animals, caused by the mere presence of hunters and anglers (people), by hunters and anglers traveling to and from their destinations, and by conducting the hunting or sport fishing activity. We identified disturbance related to accessing hunting or sport fishing areas as likely being greater when using motorized vehicles or boats than by walking or using non-motorized means. We also note disturbance caused by the noise of gunshots and the presence and use of hunting dogs.

None of the EAs and CatExs reviewed identified any significant adverse cumulative impacts to non-hunted migratory and resident wildlife due to disturbance related to the proposed hunting or sport fishing activities. We based these findings on localized, temporary nature of the hunting and sport fishing activities, and the fact that we minimize or offset disturbance impacts on

refuges and hatcheries by specific management of the hunting and sport fishing programs on stations:

- Establishing sanctuaries and closed areas. We recognize establishing sanctuaries as the most effective mechanism to minimize disturbance. All of the refuges involved in the review established sanctuaries and closed areas to allow wildlife undisturbed areas to feed and rest. Birds, particularly, are very mobile and will move to areas of little disturbance. In addition, refuge and hatchery areas supporting sensitive species and/or habitats are not opened to hunting or sport fishing.
- Promulgating and enforcing station-specific regulations, such as limited entry regulations, which restrict the number of allowed hunters, restrictions on access modes, designating travel corridors, and restrictions on season length and hours open. For example, waterfowl hunting on refuges often closes at noon, and we allow it only a few days per week.
- Providing educational materials and programs to hunters, anglers, and other refuge and hatchery users to keep them informed on how to minimize impacts to non-hunted wildlife.

We also note other factors related to hunting or sport fishing activities, which minimize disturbance impacts to non-hunted migratory and resident wildlife:

- The home ranges of many species, particularly small mammals, are often restricted. This limits the potential for local disturbance, as well any regional impact that any disturbance may cause.
- Many species are nocturnal and, therefore, would be only minimally impacted by any daytime activity.
- Hunting seasons often take place during the colder months of the year. Many species, such as small mammals, reptiles, and amphibians are hibernating or in torpor states that limits their interactions with hunters.
- Many species are migratory and have already passed through the refuge or hatchery before hunting seasons take place. In northern and mid-latitude refuges and hatcheries, many migratory bird species are no longer in the area when hunting seasons take place.
- The number of hunters or anglers is often self-limited because of difficult access or equipment needs, such as requiring a boat to access an area.
- Some refuge or hatchery hunting and sport fishing programs attract a very small number of participants. Often participation rates decline as a season progresses.
- The habitat may be difficult to traverse, requiring hunters or anglers to avoid areas such as thick vegetation and extensive mudflats, further localizing the disturbance and providing adequate escape cover even within areas open to hunting.

The EAs noted that most of the refuge and hatchery hunting programs would take place outside of the primary nesting and brood-rearing seasons for most migratory and resident non-hunted wildlife, and, therefore, have no or minimal impact on reproduction. However, some of the refuge hunting programs included spring turkey hunting, which does occur during the

reproductive season. We minimized impacts to reproductive success of nesting species from these activities on refuges through station-specific regulations, which limited the number of hunters. We also note that the nature of the hunt itself limits disturbance impacts of turkey hunting. Turkey hunters are particularly stealthy, often wearing camouflage and sitting motionless for long periods of time.

We also note illegal take of protected species as a potential impact of hunting or sport fishing activities on refuges and hatcheries. These are typically classified as rare, isolated, and negligible and not resulting in any significant adverse cumulative impacts to populations of non-hunted resident or migratory wildlife. We reduced the potential for this impact on the refuges and hatcheries through the enforcement of regulations protecting species that are not specifically authorized as being open for hunting or sport fishing from both illegal take and harassment.

On some refuges and hatcheries, we note potential beneficial impacts of hunting to non-hunted wildlife and sport fishing to non-fished wildlife. Reducing populations of overabundant ungulates (deer) and invasive species such as feral hog or common carp resulted in improved habitat conditions for other wildlife species by reducing browsing and grazing pressure on native plant communities. For example, reducing disturbance caused by hog wallowing also diminishes the resulting favorable conditions for the establishment of invasive plants. In addition, we note removal of meso-predators, such as raccoons and opossums, for its potential to increase reproductive success of birds, small mammals, reptiles, and amphibians. Deer, hogs, raccoons, and opossums can also be vectors of wildlife disease, so reducing their populations may reduce disease transmission to other species.

None of the EAs or CatExs reviewed identified any significant adverse cumulative impacts to non-hunted migratory and resident wildlife from any of the proposed hunting or sport fishing programs or significant adverse impacts from past, present, or foreseeable future hunts or sport fishing programs if we allowed impacts from these individual hunts or sport fishing programs to accumulate.

4. Cumulative Impacts to Threatened and Endangered Species

We examined station-specific EAs and CatExs for the 74 refuges and 15 hatcheries opening or expanding hunting and/or sport fishing programs to evaluate the impacts of the proposed hunting or sport fishing activities on federally listed T&E species. The Service also conducted intra-Service consultations on the proposed hunting and/or sport fishing activities, as required under Section 7 of the Endangered Species Act. We also assessed associated Section 7 reviews as part of this report.

The most common impact to T&E species that may have been present on the refuges and hatcheries during the hunting seasons documented in the EAs and CatExs was minor, localized, temporary disturbance of individual animals, or groups of animals caused by the mere presence of hunters (people), by hunters traveling to and from their hunting destinations, and by conducting the hunting activity. Most T&E species were not present in the open areas of the

refuges or hatcheries during the hunting season, because they were aquatic species not found on upland or near-shore areas that were hunted, had migrated off of the station prior to the start of the hunting season, were hibernating or in a torpid state, or were found in habitat types other than that which was going to be hunted. Because hunting seasons typically take place during the fall and winter, T&E plant species are normally in a dormant state that was not likely to be significantly impacted by minor trampling.

The EAs and CatExs reviewed determined that disturbance impacts would not result in significant adverse cumulative impacts to T&E species from any of the proposed hunting programs or significant adverse impacts from past, present or foreseeable future hunts if we allowed impacts from these individual hunts to accumulate. All of the Section 7 consultations determined that the proposed hunting activities would have "No Effect" or were "Not Likely to Adversely Affect" T&E species or designated critical habitat.

5. Cumulative Impacts to Habitats and Plant Resources

We examined the impacts of the proposed hunting activities on habitats and plant resources for the station-specific EAs for the 74 refuges and 15 hatcheries opening or expanding hunting and/or sport fishing programs. Trampling was most prevalent near parking lots and on footpaths leading to hunting and/or sport fishing areas. Most trampling would occur during plant-dormant periods in the fall and winter. Spring turkey seasons resulted in light trampling during the growing season. Local control of access points or limiting hunter numbers minimized these impacts. We prohibit cutting of vegetation on refuges and hatcheries. We found these impacts to be localized and minor, and hunting and/or sport fishing activities did not result in any significant adverse cumulative impacts to vegetation and habitats on any of the stations. We also considered impacts to habitats and plant resources at each refuge through the CD process.

In addition to providing compatible wildlife-dependent recreational opportunities, an objective of hunting and sport fishing resident wildlife and some migratory bird species on NWRs and NFHs and over broader areas is to maintain wildlife populations at levels consistent with the carrying capacity of habitats supporting these populations. Several EAs identified the benefits from hunting and sport fishing that could accrue to the habitats and vegetation as a result of controlling ungulate and invasive species populations through hunting and sport fishing. These benefits include improved vegetative cover, plant regeneration and abundance, particularly of highly preferred food plants (some of which may be rare or species of concern), and habitat structure. While most of these beneficial impacts would be localized, they could have cumulative impacts for ground- and shrub-understory nesting/dependent migratory birds and aquatic wildlife

Overpopulations of resident wildlife species such as white-tailed deer can result in damage to native habitats, reducing the value of these habitats to other wildlife. Nonnative invasive species such as feral hog can be especially damaging to native habitats and native wildlife. Overabundance of some migratory bird species can also adversely impact native habitats and other wildlife species. For example, overabundance of mid-continent snow geese in North America is currently resulting in substantial degradation of wetland habitats in the Arctic.

Overpopulations of wildlife often lead to increased disease outbreaks and excessive die-offs resulting from starvation or malnutrition.

None of the station-specific EAs determined that the effects of vegetation trampling and soil compaction resulting from hunting or sport fishing activities on the refuges or hatcheries would have significant adverse cumulative impacts on habitats and plant resources from any of the proposed hunting or sport fishing programs, or significant adverse impacts from past, present, or foreseeable future hunting or sport fishing programs if we allowed impacts from these individual activities to accumulate.

6. Cumulative Impacts to Other Wildlife-Dependent Recreational Uses

We examined the impacts of the proposed activities on other wildlife-dependent recreational uses for the 74 refuges and 15 hatcheries opening or expanding hunting or sport fishing programs. Hunting activities on some refuges and hatcheries required a closure of areas open to hunting to other uses while we conducted the hunts, resulting in an impact to those users. Another potential impact of hunting activities is that users may choose to not visit the station while the hunt was taking place. This seasonal displacement of refuge and hatchery users would be temporary and would not cause significant adverse cumulative impacts to other recreational users.

Most refuge and hatchery hunt programs have established station-specific regulations to improve the quality of the hunting or sport fishing experience as well as provide for quality wildlife-dependent experiences for other users. We adjust visitor use programs, as needed, to eliminate or minimize conflicts between users. Virtually all of the refuges and hatcheries open to hunting and other wildlife-dependent recreational uses use time and space zoning as an effective method to reduce conflicts between hunting and other uses. Eliminating or restricting overlap between hunt areas and popular areas for other wildlife-dependent recreation allows opportunities for other users to safely enjoy the refuge or hatchery in non-hunted areas during hunting seasons. We also frequently use restrictions on the number of hunters and the time in which they could hunt to minimize conflicts between user groups. We frequently use public outreach accompanying the opening of hunting and/or sport fishing seasons to make other wildlife-dependent recreational users aware of the seasons and minimize conflicts.

None of the station-specific EAs determined that the effects of hunting or sport fishing on the refuges or hatcheries would have significant adverse cumulative impacts on other wildlife-dependent recreational uses from any of the proposed hunting or sport fishing programs, or significant adverse impacts from past, present, or foreseeable future hunting or sport fishing programs if we allowed impacts from these individual activities to accumulate.

7. Cumulative Impacts on Physical Resources (air, water, soils), Cultural Resources, Station Facilities, and Solitude

Potential impacts to air and water quality and soils from the public's use of refuges and hatcheries for recreation include vehicle emissions, dust, runoff from roads and trails, and increased erosion if use is heavy enough to compact soils. Increased visitation to refuges and hatcheries could decrease opportunities for solitude. The station-specific EAs and CatExs analyzed impacts of the proposed actions on air and water quality, soils, cultural resources, and solitude and determined that these impacts were negligible. Refuge or hatchery actions taken to minimize impacts on the station environment include developing regulations which establish designated areas for use and access, controlling use levels, and monitoring of uses and law enforcement. Hunting is generally a dispersed activity that has minimal impact on the environment and causes no significant indirect, direct, or cumulative impacts on air, soil, water, habitats, plants, or other resources.

We identified additional automobile traffic and motorboat usage by hunters as sources of impact to air quality through emissions. We generally confined hunter and fisher vehicles to regularly traveled roads and waterways. Hunters and fishers make up a small portion of refuge and hatchery visitors, and we expect increases in either source of emissions to be minor.

We identified minor soil erosion and potential minimal increase in water turbidity, as a local issue in situations where we allowed hunters to travel on dirt roadways during sustained periods of wet weather and thereby cause rutting in the road surface. Dirt roads are common in many rural areas, including refuges and hatcheries. Any adverse impacts would be localized and would not likely cause any significant adverse cumulative impacts. We would manage these situations on a case-by-case situation by simply closing the road until conditions improved.

We also identified minor temporary soil disturbance from increased foot traffic on trails that hunters use. Any adverse impacts would be localized and would not cause any significant adverse cumulative impacts. These situations would generally self-correct during the next growing season.

We also identified some potential additional water turbidity stemming from the use of motorboats in shallow areas for waterfowl hunting and sport fishing. Any adverse impacts would be localized and would not cause significant adverse cumulative impacts. Hunters and fishers self-manage these situations by paddling their boats when they encounter shallow water.

Per Title 50 §32.2(k) "You may possess only approved nontoxic shot while in the field, which we identify in 50 CFR 20.21(j), while on Waterfowl Production Areas, or on certain other areas of the National Wildlife Refuge System as delineated on maps, leaflets and/or signs, available at each refuge headquarters or posted at each refuge, or as stated in refuge-specific regulations. Where we allow turkey and deer hunting, you may use slugs and shot containing lead to hunt these species unless prohibited by refuge-specific regulations and/or State law." On hatcheries, you also may possess only approved nontoxic shot while in the field as identified in 50 CFR 20.21, or as stated in special notices and/or station-specific regulations. (50 CFR 71.2).

Historically, the principal cause of lead poisoning in waterfowl was the collection of high

densities of lead shot in wetland sediments associated with migratory bird hunting activities (Kendall et al. 1996). In 1991, as a result of high bird mortality, the Service instituted a nationwide ban on the use of lead shot for hunting waterfowl and coots (50 CFR §32.2(k)). The Service requires any new shot types for waterfowl and coot hunting to undergo rigorous testing in a three-tier approval process that involves an ecological risk assessment and an evaluation of the candidate shot's physical and chemical characteristics, short- and long-term effects on reproduction in waterbirds, and potential toxic effects on invertebrates (50 CFR §20.134). Because of this rigorous testing, the *shot* toxicity issue of the past is substantially less of an ecological concern.

However, there remains a concern about the bioavailability of spent lead ammunition (bullets) and sinkers on the environment, endangered and threatened species, birds, mammals and humans or other fish and wildlife susceptible to biomagnification. Each of the hunting and sport fishing openers proposed in this package have carefully evaluated possible effects as part of the NEPA process. In addition, each refuge complied with section 7 of the Endangered Species Act, which requires Federal agencies to ensure that the actions they carry out, fund, or authorize do not jeopardize the continued existence of endangered or threatened species (''listed species'') (50 CFR §402). For each refuge, the Service determined that the proposed action was not likely to affect any listed species.

Non-toxic ammunition is becoming more available as the demand for this ammunition increases (Kelly et al. 2011). Copper ammunition is a good alternative since it is less toxic and frangible than lead ammunition (Hunt et al. 2006).

Although there is not a Service-wide ban on lead ammunition or lead sport fishing tackle, certain refuges have made refuge-specific regulations prohibiting these uses. The Service encourages refuge-State partnerships to reach decisions on usage, and will continue to encourage hunters and fishers to voluntarily use non-toxic ammunition and tackle for all harvest activities. The intent is to reduce the potential of lead poisoning to migratory birds and birds of prey, as well as lower the risk of lead exposure for humans ingesting wild game hunted on refuges.

Several documents identified the benefits from hunting and sport fishing that could accrue to the physical environment as a result of controlling ungulate and invasive species populations through hunting and sport fishing. These benefits include reducing soil erosion from heavily used game trails, improved vegetative cover, improved submerged and emergent aquatic vegetation, and reduced number of wallows caused by feral hogs. Beneficial impacts would also be localized and not likely to be significant at larger geographic scales.

Hunting and sport fishing activities on most refuges and hatcheries required minimal, if any, "facilities" beyond basic infrastructure such as roads, trails, and parking lots. This infrastructure would receive slightly more "wear and tear," but generally not to a significant extent. We created some seasonal, temporary parking lots, but any impacts would be local, and we anticipate no cumulative impacts. Some stations do construct duck blinds and check stations or boat ramps, but these structures tend to be "minimal" in their construction and would not result in any

significant cumulative impacts. We generally prohibit hunters from constructing permanent blinds or stands, prohibiting use of nails, spikes, or screws. Hunters must remove most temporary blinds/stands the end of each hunting day, unless otherwise authorized. Hunting activities did not result in significant adverse cumulative impacts to refuge facilities on any of the refuges or hatcheries.

Hunters and fishers, as well as other refuge and hatchery users, generally seek out solitude. Impact to solitude could arise from the sound of gunfire, but this impact is generally minimal, localized, and temporary. We expected no significant adverse cumulative impacts to solitude.

None of the EAs or CatExs reviewed identified any significant adverse cumulative impacts to physical resources, cultural resources, facilities, and solitude from any of the proposed hunting or sport fishing programs, or significant adverse impacts from past, present, or foreseeable future hunting or sport fishing programs if we allowed impacts from these individual activities to accumulate.

8. Cumulative Socioeconomic Impacts

Hunting seasons often attract people from outside of the immediate refuge or hatchery area. This results in positive economic activity. The magnitude of this activity is highly variable. Most refuges and hatcheries anticipated overall positive impacts on local economies. However, none of the refuge or hatchery hunting programs reviewed anticipated any significant boost in the local economy as a result of their hunting program. We also projected some decrease in economic activity in situations where other station users chose not to use the refuge or hatchery for other recreation during hunting season. We expect these impacts to be minimal. Hunting activities did not result in any significant adverse (or positive) cumulative impacts to local or regional economies.

Refuges and hatcheries reported that they worked closely with State, Federal, and private partners to minimize impacts to adjacent lands and its associated natural resources. We expected no significant adverse cumulative impacts to occur due to the hunting activities.

For example, McKay Creek NWR in Oregon is proposing an emergency elk hunt in coordination with the Oregon Department of Fish and Wildlife (ODFW) to address the negative impacts to McKay Creek NWR wildlife and habitat, address safety concerns of motorists using Highway 395, and reduce elk depredation on surrounding agricultural lands The objective of the proposed hunt would be to assist ODFW in ensuring McKay Creek NWR does not harbor elk during harsh winters, creating safety issues on Highway 395 and depredation on nearby residences and croplands. The number of landowners affected by elk damage is highly variable and dependent on

shows that six to seven landowners are negatively impacted due to elk damage each year. This damage includes impacts to crops such as winter wheat, canola, alfalfa, rangeland pasture grass, and existing fencing. One adjacent landowner estimates crop losses between $70,000 to $80,000 each year from elk damage to winter wheat (Greg Rimbach, ODFW Umatilla District Wildlife Biologist,

pers. comm., December, 2018).Therefore, the proposed emergency elk hunt will result in positive impacts to the agricultural segment of the local economy by reducing agricultural losses.

We occasionally cited wildlife damage to nearby lands from overabundant geese populations. These impacts are local, and we anticipate no significant cumulative impacts.

Some refuges and hatcheries noted potential impacts to public safety as a result of hunting activities. Analyses of these impacts cited low probability of hunting accidents. We determined controlling hunter numbers, restricting equipment (such as the use of modern high-powered rifles), establishing safety zones, area closures, hunting zones, and posting boundaries to be effective measures to minimize any safety concerns. Many areas have concerns regarding deer-auto collisions when the deer populations are higher than recommended. Reducing the deer population on a refuge or hatchery may help alleviate these issues on a local level. Due to these types of efforts put in place at specific stations to protect public safety, hunting activities did not result in any significant adverse cumulative impacts to public safety on any of the refuges or hatcheries.

We found providing affordable public hunting and/or sport fishing opportunities on refuges and hatcheries to have local and regional benefits. In some regions, hunting and sport fishing are important aspects of rural-based culture. We determined perpetuating hunting and sport fishing traditions to be important for cultural and recreational values, as well as having long-term conservation benefits. It is unknown if these benefits will cumulatively accrue beyond the region.

9. Cumulative Climate Change Impacts

Climate change is a change in climate, attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is in addition to natural climate variability observed over comparable time periods (UNFCCC 1992). These changes are expected to impact a variety of natural processes and resources. Using available and emerging science the Service continues to assess predictions of these complex effects. The effect of climate change and its influence on hunting and sport fishing include those national and regional impacts on migratory bird populations, fish and wildlife species pursued by anglers and hunters.

Climate Change effects on Migratory Birds

A serious concern is the impact global climate change will have on the remaining valuable migratory bird habitat. The rate of global climate change is accelerating, and many areas are predicted to experience extensive warming, changing precipitation patterns, shifts in vegetation, rising sea levels, increased frequency and intensity of severe weather events (e.g., fire, flood, drought), increased numbers of pests, pathogens, and invasive species, changes in the timing and length of the seasons, and declining snowpacks (MacCracken et al. 2000; Inkley et al. 2004; IPCC 2007). Climate model predictions, generally given for the year 2100, express that these effects are likely to have a significant impact on migratory bird species, either directly or

indirectly in the next 100 years. The specific effects will depend greatly upon local conditions and the ability of different species to respond to various components of the changing environment.

Predictions forecast climate and habitat changes for nearly every region important to migratory birds in North America. Recent studies suggest that factors such as timing of migration, range distribution, and productivity may all be affected by the changing climate (Crick 2004). For example, the Western Boreal Forest region of Alaska and northwestern Canada support a significant portion of the Nation's breeding waterfowl. This region is projected to be among the habitats most affected by global warming. Consequences of these temperature increases include melting permafrost, rising sea levels, extended ice-free seasons on lakes and rivers, early runoff, and shifts in vegetation (Inkley et al. 2004). The extent to which migratory birds will be able to adapt to these changes is not presently known and complete adaptation by all species is viewed as highly unlikely (Crick 2004).

Millions of birds migrate to and from the Arctic each year, but rapid climate change in the High North could strongly affect where species are able to breed, disrupting migratory connections globally. Scientists have modelled the climatically suitable breeding conditions of 24 Arctic specialist shorebirds and projected them to 2070. This study showed that climatically suitable breeding conditions could shift, contract and decline over the next 70 years, with 66–83% of species losing the majority of currently suitable area. Suitable climatic conditions are predicted to decline acutely in the most species rich region, Beringia (western Alaska and eastern Russia), and become concentrated in the Eurasian and Canadian Arctic islands. These predicted spatial shifts of breeding grounds could affect the species composition of the world's major flyways (Wauchope 2017).

Climate change may have an effect on rising sea levels in the future. Regions with coastal habitats that are critical to breeding and migrating bird species include the Pacific Northwest region, the Central California Coast, the Gulf Coastal Prairie, and the Mid-Atlantic Coast. Sea levels in these regions are expected to rise an average of 0.48 meters by the year 2100 (projected range 0.03-0.95 m) (U.S. Global Change Research Program 2000), and will have varying impacts on different coastal habitats. Of concern are the serious negative effects increased seawater levels and saltwater intrusion could have on tidal wetlands and marshes. A majority of these prime waterfowl habitats may be permanently lost, since extensive land development prohibits their reestablishment (U.S. Climate Change Science Program 2009). Of the thirty-six refuges and three hatcheries proposing to open or expand migratory bird hunting, six (Currituck, Mashpee, Monomoy, Silvio O. Conte, Great Bay, and Parker River NWRs) lie within the Atlantic Flyway. On the Atlantic coast, up to 45% of wetland habitat important to waterfowl is projected to be destroyed by rising sea levels by the year 2100 (Yaich and Wentz 2007). A similar scenario is expected on the Pacific coast, which could affect the hunting opportunities at San Pablo Bay NWR in California and Billy Frank Jr. Nisqually NWR in Washington in the future, as they lie within the Pacific Flyway. Regions of the Gulf Coast are projected to be so inundated by seawater that they may only support 1% of current populations by the year 2100 (Yaich and Wentz 2007). Refuges such as Kirwin NWR in Kansas, Patoka River NWR in

Indiana, Cypress Creek NWR in Illinois, Neal Smith NWR in Iowa, Northern Tallgrass Prairie NWR in Iowa and Minnesota, Tamarac Crane Meadows NWRs in Minnesota, and Grand Bay NWR in Missouri, lie in the Mississippi Flyway and these bird species may be affected by future rising sea levels on the Gulf Coast.

Other regions important to breeding, staging and wintering migratory birds, such as the Mississippi Alluvial Valley, Great Basin, southern Great Plains, and the Great Lakes region, are likely to encounter a different range of impacts. The changes in precipitation, higher temperatures, and increased evaporation predicted for these regions are likely to lead to lower water levels in streams, lakes, and in underground aquifers (Milly et al. 2005). Competition among domestic, industrial, and agricultural uses of water could increase, leaving even less water for wildlife related needs. It is estimated that lowering water levels in the Upper Great Lakes area could result in a 39% decrease in regional duck populations by the year 2100 (Yaich and Wentz 2007), which would affect the species at refuges such as Crane Meadows NWR in Minnesota, Patoka River NWR in Indiana, and Crab Orchard and Cypress Creek NWRs in Illinois.

Lastly, the Prairie Pothole Region (PPR) of the north central U.S. is an area of particular importance to waterfowl productivity in North America. A significant percentage of North America's ducks nest and are produced in the PPR. In fact, the PPR provides approximately 50% of the breeding habitat for North American ducks (Linduska 1964). Many waterfowl require 2.5 to 3.5 months of wetland habitat in order to raise their young to fledglings and for adult birds to complete their molt (Baldassarre and Bolen 1994). Climate models predict that increasing temperatures and shifting climate patterns associated with global warming may lead to reductions in water volume and longevity in wetland habitat, as well as changes in wetland vegetation. These changes likely would severely reduce the time available for waterfowl to use wetlands during the breeding season (Glick 2005; Johnson et al. 2010). In the PPR specifically, models indicate that a 4°C increase in temperature is likely to substantially decrease breeding waterfowl abundance in the PPR. This decrease could result as habitat in both the eastern and western prairie potholes becomes too dry to support historical levels of waterfowl (Johnson et al. 2010). The Service offers many hunting opportunities in the PPR, both on Wetland Management Districts and on refuges, which could be impacted by these changes. However, debate continues as to whether such a scenario will occur (Loesch et al. 2012).

Currently, these effects of climate change on migratory bird populations are based on model predictions. There is no definitive information on how exactly these changes in climate will impact species populations. The Service bases migratory bird hunting decisions (e.g., bag limits, season length, framework dates) for hunting seasons on the United States' Adaptive Harvest Management (AHM) program. The AHM approach provides a framework for making objective decisions in the face of incomplete knowledge concerning waterfowl population dynamics and regulatory impacts (USFWS 2016). Though the program was not created with the intent to respond to climate change, this adaptive approach to harvest management will contribute to the Service's ability to respond to future climate change impacts for migratory bird hunting season parameters. Changes in populations will be detected annually, and appropriate hunting season

adjustments will be made yearly based on the anticipated changes in migratory bird populations. If the Service detects early negative population trends, individual refuges may choose to restrict harvest opportunities (e.g., closing certain areas) for the species at issue.

In the station-specific hunt plans, each refuge and hatchery analyzed the harvest data for the hunted migratory bird populations to ensure that the numbers were still healthy and that current and proposed harvest management changes would not result in any adverse impacts to migratory bird populations. Because harvest data analysis will continue to be done on an annual basis, waterfowl hunting on refuges and hatcheries should not contribute to the adverse cumulative impacts of climate change on migratory birds in the United States. Station managers will continue to make adjustments as needed to mitigate for impacts to migratory bird populations from climate change.

Climate Change effects on Resident Game and Fish

A serious concern, but not so easily analyzed at a population level, is the impact climate change will have on resident fish, wildlife and their habitat. Refuge and hatchery ecosystems will respond to climate change in different ways and to varying extents, due in part to the heterogeneous impacts of climate change factors themselves and in part to other factors, such as the amount of stress an ecosystem may already be under and the adaptability of the species within it (Griffith et al. 2009). The ability of a species to adapt will depend on multiple factors such as species mobility, motility, degree of specialty, the extent to which life cycles are timed with natural events, and other characteristics. The rate of adaptation may or may not be enough to keep pace with the current and future rates of climate change (Parmesan 2006).

The complexity of ecological systems means that there is a tremendous amount of uncertainty about the impact climate change will actually have. In particular, the localized effects of climate change are still a matter of much debate. However, some refuges may be experiencing impacts from climate change. For example, sea level rise at Monomoy and Parker River NWRs in Massachusetts is impacting marsh elevation. This is already causing marsh migration, marsh inundation, and increased mortality in forests adjacent to salt marshes. These habitat changes may dramatically reduce the amount and quality of both forest for resident wildlife and salt marsh for migratory birds that are hunted. However, the refuges use an adaptive management approach for its hunt program, reviewing the hunt program annually and revising annually (if necessary), the Service's hunt program can be adjusted to ensure that it does not contribute further to the cumulative impacts on resident wildlife and migratory birds from possible climate change effects. The refuges have determined that their current hunting programs will not significantly add to the cumulative impacts on either resident wildlife or migratory waterfowl. .

Inland freshwater fisheries are also predicted to feel the effects of climate change in the future. A long-term (1973–2010) study of field patterns for Lake Erie yellow perch, *Perca flavescens*, showed that failed annual recruitment events (when a juvenile fish does not survive to be added to a population, by birth or immigration) followed short, warm winters. Subsequent laboratory

experimentation and field investigations revealed this was caused by reduced reproductive success. Following short winters, females spawn at warmer temperatures and produce smaller eggs that both hatch at lower rates and produce smaller larvae than females exposed to long winters. This research suggested that continued climate warming can lead to unanticipated, negative effects on temperate fish populations (Farmer 2015). Similarly, coldwater fish in the western United States could experience stress from the impacts of a changing climate. Drought, fires, and hot summer temperatures are putting stress on these fish, such as cutthroat trout, at an increasing risk (NPS 1995). In Yellowstone National Park, several tributaries critical for spawning native trout are now running dry in late summer, interrupting migration and making trout more vulnerable to predation. By the end of this century, native cutthroat trout across the western United States are expected to lose an additional 58% of their current habitat (Wenger et al. 2011). With coldwater fish species around the country experiencing similar declines, the number of days anglers participate in cold-water sport fishing is projected to decline by more than 1 million days by 2030 and by more than 6 million days by the end of the century (Jones et al. 2013).

Also, climate warming is influencing the cycle of snowmelt and already leading to major changes in arctic ecosystems, including redistributions of vegetation (Pearson et al. 2013) and changes in certain species' breeding habits (Grabowski et al. 2013). These changes can be seen as examples of impacts that may affect resident species of fish and wildlife in other parts of North America. For example, mammal species, such as beaver, American mink, muskrat, northern river otter, and arctic fox are projected to experience habitat losses of 5–33 percent over the century because of expected declines in rare habitat types (specific coastal habitats in the case of arctic fox) or declines in habitats associated with freshwater (wet meadows, lowland lakes, and riverine shrub habitat) (Marcot et. al 2015).

Several refuges and a hatchery are proposing to open or expand wild turkey hunting opportunities. The wild turkey is expected to lose 87% of its current winter range by 2080 (Audubon 2014). Stress caused by drought can affect turkey mating rate, thus hurting the overall population (Israel 2013) and with drought rates expected to increase as the climate warms, turkey populations may be impacted. However, currently these refuges have determined that their wild turkey populations are healthy and can support the increased hunting opportunities. For example, at McKay Creek NWR in Oregon, wild turkey are so overpopulated that they are causing damage to adjacent private property, so the refuge is coordinating with ODFW on proposing the hunt to bring the wild turkey population to a more sustainable level.

Several refuges (Buenos Aires NWR in Arizona; Hagerman, Laguna Atascosa, Lower Rio Grande Valley, and Trinity River NWRs in Texas; Ozark Plateau, Salt Plains, Sequoyah, Tishomingo, and Wichita Mountains NWRs in Oklahoma; Currituck NWR in North Carolina; Key Cave NWR in Alabama; Okefenokee NWR in Georgia; St. Marks NWR in Florida;) are opening or expanding feral hog hunting opportunities. Wild pigs were first brought to the southern United States in the 1500s as a source of food for early explorers and settlers and in the 1900s, the Eurasian or Russian wild boar was introduced for hunting. Today's invasive wild pigs, *Sus scrofa*, are the descendants of introduced wild boar, escaped domestic pigs, and

hybrids of the two. Invasive wild pigs cause substantial damage to property, agriculture and native ecosystems (Bates 2017). A recent study found the average rate of northward expansion increased from 6.5 to 12.6 km per year, suggesting most counties in the continental USA could be inhabited within the next 3–5 decades (Snow et al. 2017). The spread of invasive pigs was primarily associated with expansion into areas with similar environmental characteristics as their previous range, with the exception of spreading into colder regions. Climate change may assist this inconsistent spread into northern regions by generating milder winters with less snow. The rate of expansion places much of the United States and even southern Canada at risk of invasion by the species (Snow et al. 2017).

Global climate change may have an effect on the distribution of parasitic organisms, such as the meningeal worm, *Parel-aphostrongylosis tenuis*, a parasitic nematode commonly found in white-tailed deer in North America that causes damage to the central nervous system (Pickles et. al 2013). Parasite distribution is expected to shift with the overall habitat suitability of the parasite declining in the Great Plains and southeastern USA, but increasing in the Boreal Forest ecoregion, particularly in Alberta, Canada. These results have important implications for wildlife conservation and management due to the known pathogenicity of the "brain worms" to alternate hosts including moose, caribou and elk (Pickles et. al 2013). Increased winter tick infestations, due to higher temperatures and shorter winters that enhance winter tick survival, is the other major threat to North American deer and moose from climate change (Inkley et al. 2015). Severe infestations can cause high moose mortality, particularly in calves (Samuel 2007). Heavily infected moose may starve to death because they eat less when irritated by ticks, lose body heat due to hair loss, become vulnerable to infection, and suffer extensive blood loss to ticks (Cusick 2012). Deer are also susceptible to hemorrhagic disease (HD). Infected deer can rapidly become ill, losing their appetite and natural fear of humans, and develop a fever and extensive internal bleeding, often followed by death (MDNR 2017). HD is expected to thrive with climate change bringing warmer summers, longer droughts, and more intense rain events—the perfect environment for the midges that transmit HD (Diefenbach 2015). However, this information is predictive and there is no definitive information on how exactly these changes in climate will impact resident species populations in North America or on a specific refuge or hatchery.

Each refuge and hatchery analyzed the health of its resident fish and wildlife species to ensure that the populations are healthy and that current harvest management on the station, as well as any proposed changes to harvest management, would not result in any adverse impacts to resident fish or wildlife populations. Additionally, none of the proposed revisions to station-specific hunting and sport fishing regulations would result in a harvest strategy that is not sustainable. The Service will continue to base the annual level of harvest on the observed population size and habitat conditions. As discussed above, if results of monitoring programs indicate that resident fish and wildlife populations are unable to withstand the current harvest management strategies on a station, the regulations will be made more restrictive or seasons will be closed until the population can withstand the harvest pressure. Because monitoring will continue to be done on an annual basis, harvest management of resident game and fish on Service lands should not add to the adverse cumulative impacts of climate change on resident

fish, wildlife and their habitats, but rather be adjusted as needed to mitigate impacts on these species from climate change.

IV. DISCUSSION AND CONCLUSIONS

1. Migratory Birds – Hunted Species

The Service's proposed actions included expanding migratory bird hunting programs on thirty-six NWRs and three NFHs.

Known, estimated or projected harvests of migratory birds resulting from the proposed hunting activities on the refuges and hatcheries constituted a small percentage (all were less than 1% and many were less than a tenth of a percent) of the statewide and flyway-wide harvests of ducks, geese, doves, woodcock, and other migratory birds; and harvests on these refuges and hatcheries are well within sustainable harvest levels for these species' populations. While we determined impacts of the proposed hunting activities on several of the refuges and hatcheries to directly and indirectly affect migratory birds and other wildlife through disturbance and altering of habitat, we considered these impacts to be minor, localized, and temporary and were routinely minimized or offset through a variety of management activities conducted at each station.

We did not determine or expect any of the known, estimated, or projected harvests of migratory birds resulting from the proposed hunting activities on the refuges and hatcheries to have significant adverse direct, indirect, or cumulative impacts to any migratory bird population at local, statewide, flyway-wide, and national scales. Based upon our review of the station-specific EAs and CatExs, and for the following reasons, we conclude that the cumulative impacts of the additional migratory bird harvests on the aforementioned refuges and hatcheries, and combined harvests on all NWRs open to migratory bird hunting, will not negatively impact the short- or long-term viability of continental and Flyway migratory bird populations, Service land-wide migratory bird populations, and/or local migratory bird populations on refuges open to hunting. We also conclude that hunting on these refuges and hatcheries will not result in significant adverse cumulative impacts to migratory bird populations at relevant geographic scales when added to impacts from past refuge hunting and hunting that we reasonably expect will occur in the future. Finally, we anticipate that hunting on any one or combination of refuges and hatcheries will have negligible effect on migratory bird populations on any or all stations open to hunting.

- We annually develop federal regulatory frameworks governing harvest of migratory birds in the United States. We promulgate these regulations using extensive collection and analyses of migratory bird population, habitat, and harvest data. We adjust these annual regulations as needed to ensure sustainable harvests.
- The Service manages hunting of migratory birds on NWRs and NFHs under the federal framework regulations established for each Flyway (specifically, under regulations adopted by states within the flyways under the federal frameworks), and through station-

specific regulations that often are more restrictive than the state-adopted regulations. We adjust station-specific regulations annually, or as needed, to protect refuge and hatchery resources including migratory birds.

- Harvests of migratory birds on these 36 refuges and 3 hatcheries, individually and collectively, constitute a very minor percentage of the statewide, flyway-wide and national harvests, and are well within sustainable harvest levels for these species' populations.
- Before opening a refuge to hunting, we must determine whether the activity will be compatible with (will not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting on biological resources. We determined hunting to be compatible on the 36 refuges.
- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. Compatibility determinations for hunting programs must be completed at least every 15 years even if programs do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting program would trigger a new refuge hunt planning process with associated NEPA compliance.
- Before opening a hatchery to hunting, we must make a determination that the hunting opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the 3 hatcheries. Substantive changes in a hatchery hunting program would trigger a new hunt planning process with associated NEPA compliance.
- We annually conduct refuge and hatchery management activities on NWRs and NFHs that minimize or offset the disturbance and habitat impacts of hunting on migratory birds and other wildlife. These include establishment of non-hunted sanctuary areas, habitat management and restoration activities that increase the value of wetland and upland habitats for migratory birds and other wildlife, enforcement of station-specific hunting regulations, and public education.

2. Resident Wildlife – Hunted or Fished Species

The proposed actions involve opening or expanding opportunities for hunting resident wildlife at 64 refuges and 3 hatcheries and sport fishing at 16 refuges and 13 hatcheries. Resident wildlife species proposed for hunting on these refuges and hatcheries included fox (gray and red), coyote, squirrel (red, fox, and gray), deer (white-tailed, mule, and sika), moose, feral hog, rabbit (cottontail), jackrabbit (black-tailed and white-tailed), snowshoe hare, elk, opossum, beaver, ring-necked pheasant, grouse (ruffed and sharp-tailed), wild turkey (Eastern and Rio Grande), quail (bobwhite and Gambel's), partridge, woodchuck, crow, skunk, porcupine, weasel, coyote, bobcat, and badger. Resident wildlife proposed for sport fishing included bass (striped, spotted, white, largemouth, and smallmouth), channel catfish, flathead catfish, shiner perch, northern pike, bluegill, sunfish, common carp, pike, trout (brown, cutthroat, and rainbow), black crappie, bullhead, yellow perch, winter steelhead, salmon (coho and chinook), striped surf perch, shellfish, and white sturgeon, among other legal fish species to be harvested in the states of

Pennsylvania, Maine, Massachusetts, Virginia, North Carolina, South Carolina, Minnesota, Ohio, Illinois, Indiana, Iowa, Missouri, Wisconsin, Colorado, Montana, North Dakota, Oklahoma, Texas, California, Washington and Oregon.

The station-specific EAs evaluated impacts of refuge and hatchery harvests of resident wildlife species populations at the appropriate geographic scale for resident species, i.e. at statewide or state-designated management units within a state. On all of the refuges and hatcheries, known, estimated, or projected station harvests were a very minor component of overall statewide or zone-wide harvests. While we determined impacts of the proposed hunting or sport fishing activities on several of the refuges and hatcheries to directly and indirectly affect resident and migratory wildlife through disturbance and altering of habitat, we considered these impacts minor, localized and temporary, and routinely minimized or offset them through a variety of management activities conducted at each station.

We expect none of the known, estimated, or projected resident wildlife harvests resulting from these hunting and/or sport fishing activities on any of the refuges or hatcheries to have significant and adverse direct, indirect or cumulative impacts to resident wildlife species populations at relevant geographic scales (management units and/or statewide). Based on our evaluation of the station-specific EAs and for the following reasons, we conclude that hunting and/or sport fishing of resident wildlife on the refuges and hatcheries collectively will not result in significant and adverse cumulative impacts to resident wildlife populations at local, zonal (Game Management Unit, Management Zone, etc.) and statewide scales. We also conclude that hunting and/or sport fishing on these refuges and hatcheries will not result in significant adverse cumulative impacts to resident wildlife populations at relevant geographic scales when added to impacts from past hunting or sport fishing and hunting or sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing of resident wildlife on any one or combination of the refuges and hatcheries will have a negligible effect on resident wildlife populations at any or all other refuges and hatcheries open to hunting or sport fishing.

- The states regulate hunting and sport fishing of resident wildlife populations through an annual regulation setting process. We adjust these annual regulations as needed to ensure sustainable harvests.
- The Service manages hunting and sport fishing of resident wildlife on NWRs and NFHs under state and Federal regulations, and through station-specific regulations that often are more restrictive than the state regulations. Harvests of resident wildlife species on these refuges and hatcheries, individually and collectively within a state, constitute a very minor percentage of the zonal and/or statewide harvests and are well within sustainable harvest levels for these species' populations.
- Before opening a refuge to hunting or sport fishing, we must determine that the activity is compatible with (does not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting on biological resources. We determined hunting and sport fishing to be compatible on all of the refuges.

- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. Compatibility determinations for hunting programs must be completed at least every 15 years, even if programs do not change, and compatibility can be reevaluated at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting program would trigger a new refuge hunt planning process with associated NEPA compliance.
- Before opening a hatchery to hunting, we must make a determination that the hunting opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the hatcheries. Substantive changes in a hatchery hunting program would trigger a new hunt planning process with associated NEPA compliance.
- None of the station-specific EAs determined that disturbance and/or altering of habitats caused by hunting or sport fishing of resident wildlife and/or migratory birds on the 74 refuges and 15 hatcheries would have significant adverse cumulative impacts on hunted or fished resident wildlife populations. We annually conduct management activities on NWRs and NFHs that minimize or offset the disturbance and habitat impacts of hunting and/or sport fishing on resident and migratory wildlife. These include establishment of non-hunted sanctuary areas, habitat management and restoration activities that increase the value of wetland and upland habitats for resident wildlife and migratory birds, enforcement of station-specific hunting regulations, and public education.

3. Non-hunted Resident and Migratory Wildlife Species

Several of the station-specific EAs identified both direct and indirect impacts of migratory bird hunting, resident wildlife hunting and/or sport fishing to non-hunted wildlife. Direct impacts included disturbance, and indirect impacts included alteration of habitats such as vegetation trampling. We considered impacts from disturbance and alteration of habitat to be minor, localized and temporary, and we routinely minimized or offset them through a variety of management activities conducted at each refuge or hatchery. Illegal take is a potential impact associated with refuge and hatchery hunting and/or sport fishing activities. We expect incidences of illegal take of protected species to be rare and isolated and minimized through enforcement of federal, state, and station-specific regulations and public education.

None of the EAs reviewed identified any significant adverse cumulative impacts to non-hunted migratory and resident wildlife from any of the proposed hunting or sport fishing programs or significant adverse impacts from past, present, or foreseeable future programs if we allowed impacts from these individual activities to accumulate. Based upon our review of the station-specific EAs and for the following reasons, we conclude that cumulative impacts of hunting or sport fishing on the aforementioned refuges and hatcheries, including impacts which might accumulate over time, will not negatively impact non-hunted migratory wildlife populations or discrete populations of resident wildlife on these stations.

None of the station-specific EAs determined that the effects of disturbance, altering of habitats,

and/or potential illegal take of protected species associated with hunting and/or sport fishing on the refuges or hatcheries would have significant adverse cumulative impacts on non-hunted or non-fished wildlife populations. Based on our evaluation of the station-specific EAs and for the following reasons, we conclude that hunting and/or sport fishing of resident wildlife and/or migratory birds on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to non-hunted and non-fished wildlife populations on the stations and at larger geographic scales. We also conclude that hunting and/or sport fishing on these refuges and hatcheries will not result in significant adverse cumulative impacts to non-hunted and non-fished wildlife populations when added to impacts from past hunting and/or sport fishing on refuges and hunting and/or sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of the refuges and hatcheries will have negligible effect on non-hunted and non-fished wildlife populations on any or all refuges and hatcheries open to hunting and/or sport fishing.

- We would manage refuge and hatchery hunting and sport fishing programs proposed for opening and/or expansion with provisions in place to prevent significant adverse impacts to non-hunted and non-fished migratory and resident wildlife.
- We annually conduct management activities on NWRs and NFHs which minimize or offset the disturbance and habitat impacts of hunting and/or sport fishing on resident and migratory wildlife. These include establishment of non-hunted sanctuary areas, habitat management and restoration activities that increase the value of wetland and upland habitats for resident wildlife and migratory birds, enforcement of station-specific hunting regulations, and public education. We minimize illegal take of protected species through enforcement of Federal, State, and station-specific regulations and public education.
- Before opening a refuge to hunting or sport fishing, we must determine that the activity is compatible with (does not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting on biological resources. We determined hunting and/or sport fishing to be compatible on the 74 refuges.
- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. We must complete CDs for hunting programs at least every 15 years, even if they do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting or sport fishing program would trigger a new refuge hunt or fish planning process with associated NEPA compliance.
- Before opening a hatchery to hunting and/or sport fishing, we must make a determination that the hunting and/or sport fishing opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting and/or sport fishing would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the 15 hatcheries. Substantive changes in a hatchery hunting and/or sport fishing program would trigger a new hunt or fish planning process with associated NEPA compliance.

4. Threatened and Endangered Species

Several of the station-specific EAs identified both direct and indirect impacts of hunting and/or sport fishing on Threatened and Endangered (T&E) species when those species were present on the refuges or hatcheries during the hunting or sport fishing seasons. Direct impacts included disturbance, and indirect impacts included alteration of habitats such as vegetation trampling. We considered impacts from disturbance and alteration of habitats to be minor, localized, and temporary (short term); and we minimized or offset them through a variety of management activities conducted at each station.

Station managers must consider impacts of allowing hunting and/or sport fishing on a refuge or hatchery on T&E species and/or designated critical habitat(s) prior to opening the station for those activities. The station manager conducts an intra-Service consultation under Section 7 of the Endangered Species Act for any T&E species and/or critical habitat that we may impact. We also consider impacts from hunting and/or sport fishing to T&E species at each refuge through the CD process. For the vast majority of T&E species considered on these refuges and hatcheries, hunting and sport fishing programs did not have any impacts because the T&E species were not present on the station during the hunting or sport fishing seasons or because we prohibited hunting and/or sport fishing in areas that supported the T&E species.

None of the EAs reviewed determined that disturbance impacts would result in significant adverse cumulative impacts to T&E species. Most of the Section 7 consultations determined that the proposed hunting and/or sport fishing activities would have "No Effect" or were "Not Likely to Adversely Affect" T&E species or designated critical habitat. Based on our evaluation of the station-specific EAs and the Section 7 Intra-Service consultations, and for the following reasons, we conclude that hunting and sport fishing programs on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to T&E species on the refuges or hatcheries and at larger geographic scales. We also conclude that hunting and sport fishing programs on these refuges and hatcheries will not result in significant adverse cumulative impacts to T&E species when added to impacts from past refuge hunting and sport fishing and hunting and sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of the refuges and hatcheries will have a negligible effect on any T&E species or designated critical habitat on any or all refuges and hatcheries open to hunting and/or sport fishing.

- The Service prohibits hunting, sport fishing, or any other recreational activities on NWRs and NFHs where such activities could jeopardize a population of T&E species or designated critical habitat.
- We annually conduct management activities on NWRs and NFHs that minimize or offset the disturbance and habitat impacts of hunting and sport fishing on T&E species. These include establishment of non-hunted sanctuary areas, habitat management, and restoration activities that increase the value of wetland and upland habitats for T&E species and other wildlife, emergency closures of hunting and/or sport fishing on refuges or hatcheries when T&E species subject to accidental/illegal harvest are present (as is the

case with whooping cranes migrating through some refuges or hatcheries during the fall), enforcement of station-specific hunting regulations, and public education.

- Before opening a refuge to hunting or sport fishing, we must determine that the activity is compatible with (does not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting and/or sport fishing on biological resources, including T&E species. We determined hunting and/or sport fishing to be compatible on the74 refuges.
- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. We must complete compatibility determinations for hunting and sport fishing programs at least every 15 years even if they do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. We would require a new Section 7 consultation if changes occurred that resulted in a potential impact to a T&E species or designated critical habitat. Substantive changes in a refuge hunting and/or sport fishing program would trigger a new refuge hunt planning process with associated NEPA compliance.
- Before opening a hatchery to hunting and/or sport fishing, we must make a determination that the hunting and/or sport fishing opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting and/or sport fishing would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the 15 hatcheries. We would require a new Section 7 consultation if changes occurred that resulted in a potential impact to a T&E species or designated critical habitat. Substantive changes in a hatchery hunting and/or sport fishing program would trigger a new hunt or fish planning process with associated NEPA compliance.

5. Habitats and Plant Resources

The station-specific EAs identified impacts to habitats and plant resources from hunting and/or sport fishing activities on refuges and hatcheries to include vegetation trampling, spread of invasive species, and damage to trees and other vegetation. Most impacts were associated with accessing hunt or sport fishing areas by motorized vehicle, boat, or by walking, and impacts tended to be most pronounced in areas receiving high visitation. We considered impacts to habitats and plant resources to be minor, localized, and temporary (short term); and we minimized or offset them through a variety of management activities conducted at each station. Some station-specific EAs also identified actual and potential beneficial impacts of hunting and/or sport fishing to habitats and plant resources, particularly if hunting resulted in reducing population levels of some native and nonnative ungulate species.

None of the station-specific EAs determined that the effects of vegetation trampling and soil compaction resulting from hunting and/or sport fishing activities on the refuges or hatcheries would have significant adverse cumulative impacts on habitats and plant resources. Based upon our evaluation of the station-specific EAs and for the following reasons, we conclude that hunting and sport fishing programs on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to habitats and plant resources on the stations.

We also conclude that hunting and/or sport fishing on these refuges and hatcheries will not result in significant adverse cumulative impacts to habitats and plant resources when added to impacts from past refuge hunting and hunting that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of the refuges and hatcheries will have negligible effect on habitats and plant resources on any or all refuges and hatcheries open to hunting.

- We annually conduct management activities on NWRs and NFHs which minimize or offset impacts of hunting and/or sport fishing to plant and habitat resources. These include establishment of non-hunted sanctuary areas, restricting access to designated travel corridors, restricting hunter numbers, habitat management and restoration activities, enforcement of station-specific hunting and sport fishing regulations, and public education.
- Before opening a refuge to hunting or sport fishing, we must determine that the activity is compatible with (does not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting on biological resources. We determined hunting and/or sport fishing to be compatible on the 74 refuges.
- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. We must complete compatibility determinations for hunting programs at least every 15 years even if the programs do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting program would trigger a new refuge hunt planning process with associated NEPA compliance.
- Before opening a hatchery to hunting and/or sport fishing, we must make a determination that the hunting opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the 15 hatcheries. Substantive changes in a hatchery hunting and/or sport fishing program would trigger a new hunt or fish planning process with associated NEPA compliance.

6. Other Wildlife-Dependent Recreational Uses

The National Wildlife Refuge System Administration Act, as amended, (NWRSAA, 16 U.S.C. 668dd-668ee) established that hunting, sport fishing, wildlife observation and photography, environmental education, and interpretation were the six priority wildlife-dependent recreational uses of the Refuge System. Further, the NWRSAA mandated that the Service give these uses enhanced consideration over other uses in planning and management, and facilitate them wherever possible on refuges where the use(s) have been determined to be compatible with the refuge establishment purpose(s) and the Refuge System mission.

Station-specific EAs for some refuge hunting programs identified impacts to other recreational uses including temporary seasonal closures of parts or all of refuges to other public uses while hunts were ongoing, and impacts on perceptions of some refuge users that resulted in them not

visiting the refuges while the hunts were ongoing. We considered these impacts to be minor, and we could minimize or eliminate them through effective management of public use programs.

For this assessment, the Service evaluated the availability of opportunities for the other priority wildlife-dependent recreational uses on the 74 refuges on which we opened or expanded hunting and/or sport fishing programs. The Service provides opportunities for wildlife observation and photography, interpretation, and/or environmental education on the majority of the 74 refuges.

Other public entry and use on National Fish Hatcheries are administered and available under the provisions of 50 CFR Part 26 (50 CFR 70.6). These uses can include, but are not limited to, sightseeing, nature observation and photography, interpretive centers and exhibits, boating, camping, ice skating, and other similar activates.

None of the station-specific EAs determined that the effects of hunting and/or sport fishing on the refuges or hatcheries would have significant adverse cumulative impacts on other wildlife-dependent recreational uses. Based upon our evaluation of the station-specific EAs, we conclude that hunting and sport fishing programs on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to other wildlife-dependent recreational uses on the refuges. We also conclude that hunting and/or sport fishing on these refuges will not result in significant adverse cumulative impacts to other recreational programs when added to impacts from past refuge hunting and sport fishing and hunting and sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of the refuges will have negligible effect on recreational programs on any or all refuges open to hunting and/or sport fishing.

- We would manage all refuge hunting and/or sport fishing programs proposed for opening and/or expansion with provisions in place to prevent significant adverse impacts to other wildlife-dependent recreational uses.
- We annually conduct management activities on NWRs and hatcheries that minimize or offset impacts of hunting to other recreational uses, including establishing designated areas that spatially separate uses, establishing seasonal timeframes for uses, restricting levels of use to reduce potential conflicts, providing educational programs and materials for hunters, anglers, and other users, and conducting law enforcement activities.
- The Service provides opportunities for the other priority wildlife-dependent recreational uses including wildlife observation and photography, interpretation, and environmental education on the majority of the 74 refuges and 15 hatcheries.
- Before opening a refuge to hunting or sport fishing, we must determine that the activity is compatible with (does not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. The CDs must consider the impacts of hunting on other priority recreational uses. We determined hunting and/or sport fishing to be compatible on the 74 refuges.
- Before opening a hatchery to hunting or sport fishing with regard to compatibility, we must determine that such activity is not detrimental to the propagation and distribution of fish or other aquatic wildlife.

- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. We must complete CDs for hunting and sport fishing programs at least every 15 years, even if the programs do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting or sport fishing program would trigger a new refuge hunt planning process with associated NEPA compliance.

7. Refuge Environment – Air, Water, Soils, Cultural Resources, Refuge Facilities, Solitude

Station-specific EAs for refuge and hatchery hunting and/or sport fishing programs identified impacts to physical resources including air, water and soils, including motor emissions, dust, and compaction to surface soils. Impacts from public use of station facilities and infrastructure associated with hunting and/or sport fishing activities occurred on refuge roads, trails, boat ramps, and parking areas. Increased visitation resulting from opening new or expanding existing programs resulted in additional maintenance requirements for infrastructure and facilities. We note no impacts to cultural and historic resources. Increased visitation to refuges and hatcheries in some cases decreased opportunities for solitude. As we similarly manage hunting and sport fishing programs on Service lands and determine these uses compatible, we conclude that the cumulative impacts of these activities to physical resources, cultural resources, facilities, and solitude, including impacts which might accumulate over time, are negligible across Service managed lands and waters.

None of the station-specific EAs determined that the effects of hunting and/or sport fishing on the refuges or hatcheries would have significant adverse cumulative impacts on refuge and hatchery physical and cultural resources, station facilities, and solitude. Based upon our evaluation of the station-specific EAs and for the following reasons, we conclude that hunting programs on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to other refuge or hatchery physical and cultural resources, station facilities, and solitude. We also conclude that hunting and sport fishing on these refuges and hatcheries will not result in significant adverse cumulative impacts to these resources when added to impacts from past refuge hunting and sport fishing and hunting and sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of the refuges and hatcheries will have negligible effect on these resources on any or all refuges and hatcheries open to hunting and/or sport fishing.

- We would manage all refuge and hatchery hunting and/or sport fishing programs proposed for opening and/or expansion with provisions in place to prevent significant adverse impacts to these aspects of the refuge or hatchery and human environment. We annually conduct management activities on NWRs and NFHs which minimize or offset impacts of hunting and/or sport fishing on physical and cultural resources, including establishing designated areas for hunting, restricting levels of use, confining access and travel to designated locations, providing educational programs and materials for hunters,

anglers, and other users, and conducting law enforcement activities.

- Before opening a refuge to hunting or sport fishing, we must determine whether the activity will be compatible with (will not materially interfere with or detract from) accomplishing refuge purposes or the Refuge System mission. We determined hunting and/or sport fishing to be compatible on the 74 refuges.
- The Service's administrative processes serve as a safeguard to prevent the accumulation of adverse impacts over time. We must complete compatibility determinations for hunting and sport fishing programs at least every 15 years even if the programs do not change, and we can reevaluate compatibility at any time if conditions change and new factors warrant reconsideration. Substantive changes in a refuge hunting program would trigger a new refuge hunt planning process with associated NEPA compliance.
- Before opening a hatchery to hunting and/or sport fishing, we must make a determination that the opportunity "...is not detrimental to the propagation and distribution of fish or other aquatic wildlife." We determined hunting and/or sport fishing would not be detrimental to the propagation and distribution of fish or aquatic wildlife on the 15 hatcheries. Substantive changes in a hatchery hunting program would trigger a new hunt planning process with associated NEPA compliance.

8. Socioeconomic Impacts

Station-specific EAs for several of the74 refuges and 15 hatcheries identified minor beneficial impacts to local economies from visitors participating in refuge and hatchery hunting and sport fishing programs. There is the potential for some stations to experience minor adverse impacts to local economies from a temporary reduction in other visitors while hunts are conducted. We would expect that the cumulative economic impact resulting from the increased visitation to these refuges and hatcheries would be beneficial to local and regional economies. Most station-specific EAs noted the beneficial effects of providing hunting and sport fishing for the recreational value they provides. Refuges, hatcheries, and other public lands provide affordable hunting and sport fishing opportunities for the public.

9. Climate Change Impacts

The Service concludes that climate change will have negligible impacts on its hunting or sport fishing program, but refuges and hatcheries will continue to monitor hunted and fished species populations and make adjustments to hunting regulations in response to any declining populations. As analyzed in the cumulative impacts of climate change, none of the refuges or hatcheries proposed revisions to station-specific hunting and sport fishing regulations would result in a harvest strategy that is not sustainable. Climate change remains a major concern for refuge and hatchery species and habitats and recreational hunting and sport fishing opportunities enjoyed by Americans across Service lands and waters. The Service will continue to monitor changes and develop methods to combat climate change and ensure viable habitat for future refuge and hatchery species.

V. SUMMARY CONCLUSIONS

The headquarters of the National Wildlife Refuge System and National Fish Hatchery System, U.S. Fish and Wildlife Service, reviewed and evaluated station-specific Environmental Assessments for hunting and sport fishing programs on the 74 refuges and 15 hatcheries in order to identify the direct, indirect, and cumulative impacts of the proposed hunting and sport fishing activities on hunted populations of migratory birds and resident wildlife, non-hunted migratory and resident wildlife, T&E species, plant and habitat resources, other wildlife-dependent recreational uses, physical resources including air, water, and soils, cultural resources, station facilities, solitude, and socioeconomics.

Based upon our evaluation of the station-specific Environmental Assessments and Categorical Exclusions, we conclude that hunting and/or sport fishing programs on the 74 refuges and 15 hatcheries collectively will not result in significant adverse cumulative impacts to the human environment. We also conclude that hunting and/or sport fishing on these refuges and hatcheries will not result in significant adverse cumulative impacts to the human environment when added to impacts from past refuge hunting and/or sport fishing and hunting and/or sport fishing that we reasonably expect will occur in the future. Finally, we anticipate that the impacts of hunting and/or sport fishing on any one or combination of these refuges and hatcheries will have negligible effects on the human environment on any or all refuges and hatcheries open to hunting and/or sport fishing.

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directs federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities' access to public information and participation in matters relating to human health or the environment.

None of the EAs or CatExs will disproportionately place any adverse environmental, economic, social or health impacts on minority and low income populations. Implementation of the proposed actions is anticipated to be beneficial for the environment over the long-term and people in the surrounding communities.

None of the hunting or sport fishing programs would result in a large commitment of nonrenewable resources.
Implementation would require a moderate commitment of fossil fuels (diesel and gasoline), oils, and lubricants used by heavy equipment and vehicles for road maintenance and general maintenance of the areas to be hunted. Trails will be of little impact or temporary and increased law enforcement activities may become necessary.

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DEFINITION OF TERMS

Sustainable harvest levels means a harvest level which does not exceed net annual recruitment to the population and accounts for all forms of removal from the population, and which considers the status of the population, based on the best available scientific information.

Effects
Direct effects are the impacts that would be caused by the alternative at the same time and place as the action.

Indirect effects are impacts that occur later in time or distance from the triggering action.

Negligible effects result from a specified management action that can be reasonably expected to have no detectable effect on identified refuge resources or recreation opportunities at the identified scale.

Cumulative effects are incremental impacts resulting from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal agencies, as well as undertaken by private individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

Impact Type
Beneficial/positive impacts are those resulting from management actions that maintain or enhance the quality and/or quality of identified Refuge resources or recreational opportunities.

Adverse/negative impacts are those resulting from management actions that degrade the quality and/or quantity of identified refuge resources or recreational opportunities.

Significant Adverse impacts take into consideration both the context and intensity of an action. Both short-and long-term effects must be analyzed. The severity of the effect must also be analyzed.

Duration of Impacts
Short-term impacts affect identified refuge resources or recreational opportunities; they occur during implementation of the management action but last no longer.

Medium-term impacts affect identified refuge resources or recreational opportunities that occur

during implementation of the management action; they are expected to persist for some time into the future though not throughout the life of the CCP.

Long-term impacts affect identified refuge resources or recreation opportunities; they occur during implementation of the management action and are expected to persist throughout the life of the Plan and possible longer.

Intensity of Impact
Insignificant/negligible impacts result from management actions that cannot be reasonably expected to affect identified refuge resources or recreational opportunities at the identified scale.

Minor impacts result from a specified management action that can be reasonably expected to have detectable through limited effect on identified refuge resources or recreation opportunities at the identified scale.

Moderate impacts result from a specified management action that can be reasonably expected to have apparent and detectable effects on identified refuge resources or recreation opportunities at the identified scale.

Major impacts result from a specified management action that can be reasonably expected to have readily apparent and substantial effects on identified refuge resources and recreation opportunities at the identified scale.