Compatibility Determination

Title

Compatibility Determination for Proposed Implementation of Big Notch Project Flowage Easements, Steve Thompson North Central Valley Wildlife Management Area, Central Area Properties

Refuge Use Category

Rights-of-way and Rights to Access

Refuge Use Type(s)

Flowage easements: The right to store, convey, or drain water (e.g., aqueducts, private drainage on co-owned wetland easements, third-party drainage rights, flood water control and storage, regulating reservoirs, siltation basins, and storm water outfalls).

Refuge

Steve Thompson North Central Valley Wildlife Management Area (WMA)

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

The WMA was established in 1991:

"...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 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)

"...the conservation of wetlands in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." 16 U.S.C. 3921 (Emergency Wetland Resources Act of 1986)

"...protection, restoration, and management of wetland ecosystems..." 16 U.S.C. 4401-4412 (North American Wetlands Conservation Act of 1989)

See Appendix 1 for more details on the history of the establishment of the WMA.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as Refuge System, is 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

The Yolo Bypass is managed as a floodway, and the State of California Department of Water Resources (DWR) has existing flowage easements that were acquired prior to the Service acquiring conservation easements on the properties. The conservation easements on properties within the Yolo Bypass were acquired by USFWS with the knowledge that there will be periods of time these properties would be impacted by flood flows within the bypass. The Yolo Bypass, as part of the Sacramento River Flood Control Project authorized through the Flood Control Act of 1960, manages the historic flooding in the Sacramento Valley. The Bypass currently is designed to receive up to 343,000 cfs or approximately 85 percent of maximum Sacramento River flow and experiences at least some flooding during 7 out of 10 years, as described in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (YBHRFPP) EIS/EIR Section 2.1.5.1. However, the right to flood the Steve Thompson North Central Valley WMA (WMA) easement properties in the Yolo Bypass consistent with DWR's existing flowage easement terms is not considered an existing use since the DWR easements predated the Service's easement acquisition, and the Service has no discretion over the activity. However, the proposed use would increase the frequency and duration of flooding in the Yolo Bypass that is beyond the scope of existing DWR flowage easements.

What is the use?

The use would be flows of increased frequency and duration resulting from the operation of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Big Notch Project or Project) on properties where U.S. Fish and Wildlife Service (USFWS) possesses Conservation Easements managed as part of the WMA within the Yolo Bypass. Sixteen of the properties requiring new Flowage Easements are existing managed wetlands where the U. S. Fish and Wildlife Service (USFWS possesses Conservation Easements managed as part of the WMA. The USFWS purchased these Conservation Easements for the management of migratory birds. These lands are private, but the management of these properties as waterfowl hunting clubs meets the USFWS's objective of managing habitat for migratory birds.

50 CFR 25.44 requires permits for use of easement areas administered by the USFWS where proposed activities may affect the property interest acquired by the United States. This includes instances where the third-party applicant is a governmental entity which has acquired a partial interest in the servient estate by subsequent condemnation. Prior to issuing the special use permit, we must determine that the

proposed activities affecting our easement interest are a compatible use[1].

The USFWS would issue a special use permit for a limited period of five years to DWR to authorize flows of increased duration and frequency over the conservation easement properties resulting from operation of the Project. The increased flows would be limited to the parameters described in Yolo Bypass Salmonid Habitat Restoration and Fish Passage Final EIS/EIR (EIS/EIR) (2.4.3 Operations) and Reclamation's Record of Decision. The increased flows under the Big Notch Project of up to 6,000 cfs may occur November 1 through March 15 of each year based on the Sacramento River elevation at the Fremont Weir. The Fremont Weir gates may remain partially open after March 15 to provide adult fish passage. However, flows through the gates after March 15 could not exceed the available capacity of Tule Canal. The special use permit would only allow DWR to increase the frequency and duration of flows over USFWS easements consistent with these parameters.

Due to the inherent limitations in modeling, it is difficult to precisely analyze and assess the impacts of flooding of increased frequency and duration prior to initiation of the project. Because of this, the Service plans during the period of the initial SUP to identify and assess the specific impacts of increased flooding frequency and duration, allowing for the design and analysis of actions to minimize impacts to preserve and improve the sustainability of existing privately managed wetlands as the Service considers a longer-term permit. National Environmental Policy Act and other environmental compliance for these projects will also be completed during this period. Measures to be considered to improve the sustainability of the wetlands will include the following general categories:

- Improvement of drainage infrastructure (water control structures, ditches) to increase the speed at which water elevations in wetland units can be returned to desired management conditions after flood events. Drainage should be addressed for the Central Area Properties as a group to ensure flood water can move off properties as quickly as possible. This benefits the landowners by reducing impacts to bird use, hunting quality, and safe access, while ensuring anadromous fish will be able to safely move off these properties as flooding recedes.
- Improvements to access roads and berms to support winter access and more predictable road conditions.

During this initial permit period, the USFWS will further evaluate the effects of actual Project operations on our easement interests, which may inform the development of additional measures that may be required in our future permitting decisions to

[1] Compatible use means a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of the national wildlife refuge. (50 CFR § 25.12(a))

address impacts. Before the end of the 5 years, the compatibility determination will be reevaluated in accordance with our regulations, which provide for the re-evaluation of compatibility determinations when there is significant new information regarding the effects of the use. In addition, should the Refuge Manager determine that re-evaluation is necessary before the end of the five-year permit period, he/she may re-evaluate the compatibility of this use at any time (50 CFR 25.21(g)).

Is the use a priority public use?

No[2]

Where would the use be conducted?

This CD evaluates the effects of flooding of increased frequency and duration as described above due to operation of the Big Notch Project on the group of WMA easements referred to as the Central Area Properties. The total acreage of the Central Area Properties is 1,641 acres. Table 1 includes information on the Central Area Properties including tract numbers, parcel numbers, property names, and acreages for each parcel.

Table 1. Central Area Properties Information.

FWS Tract Number(s)	Parcel Number(s)	Property Name	FWS Tract Acres
17C	033-180-001, 033-180-008, 033-180-020	Glide In Ranch	852
19C	033-440-001	H Pond	479
23C	033-170-015	Bullsprig Underwood	119
27C	033-440-002	Channel Ranch	191

None of the Big Notch Project construction activities would occur on the Central Area Properties. However, all the properties would be affected by the increased frequency and duration of flooding in the Yolo Bypass resulting from operation of the Big Notch Project.

When would the use be conducted?

DWR proposes to begin operation of the Big Notch Project in 2025 and continue

[2] Wildlife-dependent recreational uses are the priority public uses of the National Wildlife Refuge System (16 U.S. Code § 668dd(a)(3)(C). Wildlife-dependent recreation means a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation (16 U.S. Code § 668ee(2))

annually based on hydrological conditions. Gate operations that will increase flows, up to 6,000 cubic feet per second (cfs), could begin each year on November 1 depending on river conditions. Gate operations could continue through March 15 of each year, based on hydrologic conditions. The gates may remain partially open after March 15 to provide adult fish passage. The use would be the increased frequency and duration of flows that may result from operation of the Big Notch Project as described herein.

How would the use be conducted?

The use would be conducted through flooding of increased frequency and duration that may result from the following operations of the Big Notch Project: Big Notch Project operations may begin each year on November 1, with the gates first opening based on river conditions. All gates would be opened when the river elevation reaches 15 feet, which is one foot above the lowest gate invert. At this river elevation, about 130 cfs of water would enter the gated notch. If the river continues to rise, the gates would stay open until the flow through the gates reaches 6,000 cfs.

The flow through the gates would reach 6,000 cfs when the river elevation is about 28 feet; at this point, the two smaller gates would be programmed to start closing to maintain flows of 6,000 cfs. The flow may fluctuate so that it is a little higher or a little lower than 6,000 cfs during this time. Gate closures would be controlled so that there is not a sudden reduction in flow. Gate 1, the larger gate, would remain fully open throughout operations.

Once Fremont Weir begins to overtop, the smaller gates would remain in their last position prior to the weir overtopping (generally both would be closed at this point). After the overtopping event is over, the smaller gates would open and close as needed to keep the flow through the gate as close as possible to 6,000 cfs. All gates would close when the river elevation falls below 14 feet. Gate operations to increase inundation could continue through March 15 of each year, based on hydrologic conditions. The gates may remain partially open after March 15 to provide adult fish passage. However, flows through the gates after March 15 could not exceed the available capacity of Tule Canal, which is typically about 300 cfs, so that flows do not inundate areas outside of the canal and affect adjacent lands.

Why is this use being proposed or reevaluated?

The increased flooding is proposed to allow DWR to implement the Big Notch Project, for which the goal is to maximize the number of out-migrating juvenile winter-run Chinook salmon that enter the Yolo Bypass. Downstream out-migration is triggered during the first wet season event. The purposes of the Big Notch Project are to: 1) improve juvenile salmonid access to seasonal habitat through volitional entry; 2) increase access to and acreage of seasonal floodplain fisheries rearing habitat; 3) reduce stranding and presence of migration barriers; 4) increase aquatic primary and

secondary biotic production to provide food through an ecosystem approach; 5) improve connectivity within the Yolo Bypass for passage of salmonids and green sturgeon; and 6) improve connectivity between the Sacramento River and the Yolo Bypass to provide safe and timely passage for salmonids and green sturgeon.

The Big Notch Project actions would implement Reasonable and Prudent Alternative (RPA) action I.6.1 and, in part, RPA action I.7, as described in the 2009 National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project (NMFS 2009) and the 2012 Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan (Reclamation and DWR 2012).

The two RPA actions that formed the basis for alternatives considered for analysis in the Final Yolo Bypass Salmonid Habitat Restoration and Fish Passage EIS/EIR (2019) (EIS/EIR) are summarized below:

- RPA Action I.6.1: Restore floodplain rearing habitat for juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead through increased acreage of seasonal floodplain inundation within the lower Sacramento River basin.
- RPA Action I.7: Reduce migratory delays and loss of salmon, steelhead, and sturgeon at Fremont Weir and other structures in the Yolo Bypass (NMFS 2009).

Availability of Resources

Table 2. Costs to Administer and Manage Use.

Category and Itemization	One-time Cost	Recurring Annual Expenses
Staff time (administration, and management)	$15,000	$20,000
Monitoring	$170,000	
Total expenses	$185,000	$20,000

Anticipated Impacts of the Use

Below is an analysis of the impacts of the flowage of increased frequency and duration resulting from operation of the Big Notch Project on the Central Area Properties. Impacts of the Big Notch Project operation at the larger scale of the Yolo Bypass are addressed in the Final Yolo Bypass Salmonid Habitat Restoration and Fish

Passage EIS/EIR (2019) and the Waterfowl Impacts of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project – An effects analysis tool (Ducks Unlimited 2017), which are incorporated by reference. This compatibility determination focuses on the direct and indirect impacts of the flowage of increased frequency and duration resulting from Project operations at the scale of the Central Area Properties.

The Service utilized an analysis prepared by Ducks Unlimited (DU) (2024) (Attachment D) to characterize the impacts of flowage of increased frequency and duration resulting from the Big Notch Project. DU used hydraulic model data to assess how the operation of the Big Notch could impact existing flooding on the 59 wetland managements units comprising the WMA easement areas within the Yolo Bypass. DU evaluated daily changes in water surface elevation between October 2nd and March 15th across 16 water years (1996-2011). The water years used by the model represent a range from exceptionally wet years (e.g. 1997) to drought years (e.g. 2007). Wetland unit specific water surface elevations were assessed at a fixed point within each unit under two scenarios, baseline conditions and with the operation of the Big Notch. Each water surface elevation reference point was located near the drain within each wetland unit.

To evaluate how changes in water depth within each wetland unit can impact wetland management actions, as well as landowner access and use of the units, DU worked with the Service to define three depth thresholds. These depth thresholds correspond to water depth categories and impacts to wetlands that may result, ranging from small to large increases in water depth. Table 3 describes the wetland management baseline and three different flooding depth impact categories.

DU calculated the total duration and the number of flood events at each depth category for each wetland unit. They then summarized these data at the wetland unit level into the total number of flood events and the total duration of flood days at each depth category for all water years.

As with any model, a simplified landscape had to be used to facilitate model construction and allow for reasonable processing times which ultimately limits the ability of these model results to fully represent current conditions within the study area. For example, the Cbec model used in DU's analysis utilizes a digital elevation model that was modified such that the wetland units and surrounding water control infrastructure are "plumbed to drain". These modifications likely have significantly increased the speed at which water moves across the landscape. Additionally, the Cbec model assumes initial conditions are dry, despite many wetland units and rice fields being annually flooded by October 2. These simplifications make extrapolating model results to predict future conditions at the wetland unit level with a high degree of accuracy challenging, yet within-model comparisons between different wetland units and water years provide insight as to which regions are most impacted by different scenarios.

In addition, DWR has worked to calibrate the TUFLOW model focusing on three hydrologic conditions in the Yolo Bypass to cover the range of flow conditions modeled during the 16 water years: high flow (1997 flood), low flow (flow within Tule Canal/Toe Drain channel capacity), and flood recession (recession of shallow flooding after March/April 2011 flood event). Information used to calibrate the model included gauge data (stage and flow), aerial photographs, and surveyed water surface elevations.

The results of the flood recission calibration are most relevant to the analysis of impacts on hunt clubs. In Appendix D of the YBSHRFP Final EIS/R, DWR describes the accuracy of the model at predicting the recession of shallow flooding after March/April 2011 flood event:

> *The modeled wetted extents for the entire model domain were 10 percent (or a net 2800 acres) lower than observed, with the largest deviations occurring along Conaway Ranch and south of Lisbon Weir. The decreases in stage and wetted extents could be linked to the modeled flows being 775 cfs lower than measured on April 12, 2011 and a simplified drainage network that is perhaps too efficient at draining the Yolo Bypass*

Based on this information, the USFWS concluded that the TUFLOW model, despite its limitations, provides the best available information on the impacts of the Big Notch Project operations on USFWS easement interests. Future analysis will be improved by through monitoring of actual flooding impacts on wetlands units.

Table 3. Description of Flooding Depth Impact Categories.

Flooding Depth Categories	Depth of Flooding	Rational
Wetland Management Baseline	12 inches	Seasonal wetlands that are managed to support wintering waterfowl in California's Central Valley are shallowly flooded (approximately 12 inches deep to allow waterfowl to forage) from fall to early spring.
6+ inches	6+ inches (greater than18 inches)	An additional six inches of water would likely preclude dabbling ducks from foraging and reduce the value of these areas to wintering waterfowl (Taft *et al.* 2002; Baschuk *et al.* 2012).
exceeds blind height	exceeds average blind elevation (varies by unit)	Hunters lose the ability to hunt pit blinds when water overtops blinds and fills the blind with water. Additionally, the effectiveness and access to stand-up blinds are reduced when water exceeds the floor of the blind.
exceeds berm height	exceeds average maximum berm elevation (varies by unit)	Potential impacts to berm integrity and water control infrastructure

Short-term impacts

6+ Inch Flooding impacts

In DU's analysis there was an observed increase in the number of days wetlands units were flooded at 6+ inches for all the Central Area Properties with the proposed use of increased frequency and duration of flooding due to operation of the Big Notch Project. The average annual increase in 6+ inch flood duration (i.e. days flooded) between baseline and Big Notch scenarios was 5.9 days (range 0.1 – 12.1) for the 17 units comprising the Central Area Properties (Figure 1). The average annual change in the number of 6+ inch flood events[3] affecting the Central Area Properties was 0.2 (range 0.0 – 0.6) (Figure 2). In general, wetland units along the eastern half of the Central Area Properties tended to experience more impacts than units along the western half. Model results show flooding duration was much greater in some years (1998, 2002, 2010, 2003), with wetland units experiencing an average 48 percent increase in flood duration under the Big Notch compared to the baseline (Figure 3). Similarly, flooding event counts were also much greater in some years (1998, 2008, 2004, 2006), with wetland units experiencing an average 65 percent increase in the number of flood events (Figure 4).

The increase in the duration and frequency of flooding resulting from operation of the Big Notch Project may impact the Central Area Properties for the periods of increased flooding by decreasing waterfowl and other migratory bird use due to deeper water levels that would likely temporarily reduce or eliminate the ability of dabbling ducks to access food resources (Taft et al. 2002; Baldassarre and Bolen 2006; Baschuk et al. 2012). Decreasing waterfowl abundance on the properties may also result in decreasing hunting quality.

Flooding impacts exceeding blind elevations

In DU's analysis, under operation of the Big Notch Project, there was an observed increase in the number of days where flooding exceeded the average blind elevation in 14 of the 17 wetland units within the Central Area Properties. The average annual increase in the duration of flooding exceeding the average blind elevation was 4.5 days (range 0 – 10.6) (Figure 5). The average annual change in the number of flood events that exceed average hunt blind elevations was 0.1 (range 0 – 0.4) (Figure 6). In general, wetland units along the eastern margins of the Central Area Properties tended to experience more impacts than units along the western margin. Model results show flooding duration was much greater in some years (1998, 2002, 2010, 2003), with wetland units experiencing an average 38.4 percent increase in flood

[3] i.e. the number of times annually when flooding equals or exceed 6 inches. A single flood event may stretch for multiple days/weeks.

duration under the Big Notch compared to the baseline (Figure 7). Similarly, flooding event counts were also greater in some years (1998, 2008, 2004, 2006), with wetland units experiencing an average 56.1 percent increase in the number of flood events (Figure 8).

In addition to the impacts described under the 6+ inch flooding category, the increase in the duration and frequency of flooding that exceeds blind elevations would further decrease hunter opportunity due to flooding of hunting blinds. Hunters lose the ability to hunt sunken pit blinds when water overtops blinds and fills the blind with water. Additionally, the effectiveness and access to stand-up blinds are reduced when water height exceeds the floor of the blind.

Flooding impacts exceeding berm elevations

In DU's analysis, under operation of the Big Notch Project, there was an observed increase in the number of days where flooding exceeded the average berm elevation in 13 of the 17 wetland units within the Central Area Properties. The average annual increase in the duration of flooding exceeding the average berm elevation was 1.7 days (range 0 – 8.6) (Figure 9). The average annual change in the number of flood events that exceed average berm elevations was 0.1 (range 0 – 0.3) (Figure 10). In general, wetland units along the eastern margins of the Central Area Properties tended to experience more impacts than units along the western margin. Model results show flooding duration was much greater in some years (1998, 2002, 2010, 2003), with wetland units experiencing an average 21.5 percent increase in flood duration under the Big Notch compared to the baseline (Figure 11). Similarly, flooding event counts were also greater in some years (1998, 2008, 2004, 2006), with wetland units experiencing an average 21.0 percent increase in the number of flood events (Figure 12).

In addition to the impacts described under the 6+ inch and greater-than-blind-elevation flooding categories, the increase in the duration and frequency of flooding that exceeds berm elevations could also damage wetland infrastructure (roads, levees, water control structures, lift pump stands, hunting blinds). There could be further reduction of access to the properties for management and hunting. Flooding events, specifically berm overtopping, could result in the additional loss of days due to loss of access while preparing for incoming high waters. These conditions often require landowners to move equipment and adjust water control structures to prepare for incoming floods. Moreover, once water surface elevations return to normal levels, roads and other infrastructure required for access and hunting may require additional days to dry, be inspected, and repaired before they can be safely used again. DU's interviews with landowners suggest that, in general, an additional 14-20 days of lost access is added to flood events.

Long-term impacts

The seasonal managed wetlands that support wintering waterfowl in California's Central Valley are shallowly flooded (approximately 12 inches deep to allow waterfowl to forage) from fall to early spring. In present day, these conditions rarely occur naturally in the highly modified landscape of California's Central Valley. Instead, managed wetlands are created and maintained through the efforts of private landowners and state and federal agencies. Generally, wetland management actions focus on the timing and depth of applied water, with mechanical disturbance used to create conditions that produce the annual plant seeds and invertebrates that waterfowl favor (Fredrickson and Taylor 1982; Euliss and Harris 1987; Baldassarre and Bolen 2006). These management actions are expensive and time-intensive and there are additional costs associated with maintaining the water management infrastructure required for seasonal wetlands. While not obligated to undertake these habitat management actions and related expenses, easement property owners are typically willing to pay these annual management costs due to the benefits they provide in waterfowl use and related hunt opportunities. These actions benefit other migratory waterbirds and wetland-dependent wildlife species, including special status species such as the northwestern pond turtles (*Actinemys marmorata*), tricolored blackbird (*Agelaius tricolor*), greater sandhill crane (*Antigone canadensis*), and giant garter snake (*Thamnophis gigas*) (Gilmer *et al.* 1982; USFWS 2020).

If waterfowl use and hunt opportunities decline while infrastructure and management costs rise due to increased flooding, hunt club owners may ultimately determine that costs outweigh benefits and cease operations. This could be particularly true if the flooding impacts occur multiple years in a row. If a hunt club discontinues operations, the critical migratory bird and wetlands values protected by the Service's easement interest would be lost. Without incentive for private landowners to manage and flood seasonal wetlands on USFWS Conservation Easement lands, migratory bird habitat quality and availability in the Yolo Basin would suffer. This loss of habitat value could affect the waterfowl food supply and carrying capacity within the Yolo-Delta Planning Area, as calculated within the Central Valley Joint Venture Implementation Plan (2020). Such a loss would materially detract from the purposes the WMA was established under.

The effects of flooding on hunt club operations described above may accumulate over time particularly if flooding of increased frequency and duration occurs over the long-term and in successive years. The increase in flood frequency and duration under the Big Notch Project could incrementally increase the cost of hunt club operation and decrease hunt opportunities. The likelihood that any hunt clubs would discontinue operations due to the incremental impacts of Big Notch operations during the 5-year term of the proposed special use permit is low. However, this likelihood could increase the longer the Big Notch Project is operated if flooding is of sufficient duration and frequency during successive years; the FWS proposes to work

with DWR, BOR and landowners to develop measures to avoid or minimize impacts should a longterm permit be sought.

Consistency with Comprehensive Conservation Plan Goals and Objectives

The goals and objectives in the Service's 2019 Final Comprehensive Conservation Plan (CCP) for Butte Sink, Willow Creek-Lurline, and North Central Valley Wildlife Management Areas provide important context in evaluating the short- and long-term impacts of the flooding of increased frequency and duration resulting from operation of the Big Notch Project. The CCP goals and objectives represent the desired future condition for the WMA and the strategies and management actions needed to achieve this condition. They represent the management direction needed for the WMA to fulfill the mission of the Refuge System, and the specific purposes for which the refuge was established. Appendix A includes a summary of the CCP goals, objectives, and strategies for the WMA relevant to this analysis. Ultimately, the CCP management direction for the WMA is to permanently protect 30,000 acres of managed wetlands in the 11-county acquisition boundary, including 5,835 acres within Yolo County. The long-term sustainability of existing privately managed wetlands with WMA easements is essential to meeting this objective. To that end, the USFWS plans to work with USBOR and landowners to analyze impacts of the Big Notch Project and develop measures to improve the sustainability of the privately managed wetlands, through improvements to drainage infrastructure, access roads and berms. These measures will be requirements of any longer term permit the USFWS issues for the Big Notch Project, ensuring that the privately owned waterfowl hunt clubs in the Yolo Bypass continue to operate and be sustainable as managed wetlands. This will further ensure that the proposed use is consistent with CCP goals and objectives.

Cumulative Impacts

Several proposed projects have the potential to add to the impacts from the Big Notch Project, including but not limited to Elk Horn slough restoration project, Food for Fish program, Egbert tract tidal restoration project and several additional tidal restoration projects proposed in the southern portion of the bypass. These cumulative landscape changes, in addition to climate change and sea level rise, may modify how water flows through the Yolo Bypass. The 2024 Environmental Assessment - Issuance of Special Use Permit for the Operation of The Big Notch Project at The Steve Thompson North Central Valley Wildlife Management Area includes more detail on potential cumulative impacts and is incorporated by reference.

Public Review and Comment

The draft compatibility determination was available for public review and comment from July 26 to September 1, 2024. The public was made aware of this comment opportunity through emails to landowners and other potential interested parties, and

postings on the WMA website and social media accounts. A hard copy of this document was posted at the Refuge Headquarters and Visitor Center (752 County Road 99W, Willows, CA 95988). It was also made available electronically on the refuge website: https://www.fws.gov/refuge/steve-thompson-north-central-valley-wildlife-management-area.

The USFWS received four comment letters on the draft compatibility determinations and accompanying environmental assessment. Attachment E to the Environmental Assessment provides responses to substantive comments received on the draft compatibility determination.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

The Special Use Permit for increased frequency and duration of flooding resulting from the Big Notch Project will include the following stipulations as enforceable requirements:

1. Limit the term of the use authorized by the permit to a maximum of 5 years to minimize the likelihood that short-term impacts experienced during any flood years would have substantial long-term adverse effects on the sustainability of existing privately managed wetlands with USFWS Conservation Easements.
2. Due to the uncertainty surrounding model simulations and climate change in the operations of the Project, the effects of the Big Notch Project will be monitored and reviewed on an annual basis. The focus of the monitoring will be on how increased flooding impacts wetland units and modifies habitat conditions in novel ways through changes in vegetation communities.

DWR has requested a long-term permit for operation of the Big Notch Project. Prior to issuance of such a long-term permit, the USFWS will reevaluate the use and prepare a new compatibility determination informed by the results of the monitoring. For easement properties to continue to be managed as wetlands and utilized as waterfowl hunting clubs under long-term operation of the Project, it is likely that measures may be needed to improve access, facilitate efficient drainage of flood waters, and protect existing water management and hunting infrastructure. These measures will ensure that the USFWS interest in these properties as migratory bird habitat continues. Though these measures are not a stipulation in this compatibility determination since they are not required to find the use compatible, analysis of impacts and design of measures that may improve the sustainability of these areas as wetlands will be included as a condition of the

5-year special use permit in anticipation of a request from DWR for a permit for long-term operation of the Project.

Justification

The conservation easements on properties within the Yolo Bypass were acquired by USFWS with the knowledge that there will be periods of times these properties would be impacted by flood flows within the Bypass. The Yolo Bypass, as part of the Sacramento River Flood Control Project authorized through the Flood Control Act of 1960, manages the historic flooding in the Sacramento Valley. The Bypass currently is designed to receive up to 343,000 cfs or approximately 85 percent of maximum Sacramento River flow and experiences at least some flooding during 7 out of 10 years, as described in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (YBHRFPP) EIS/EIR Section 2.1.5.1.

Accordingly, the wetlands are currently managed in an environment that periodically floods. While increased flows under the Big Notch Project could affect our easement interest, the impact is unlikely to be of a level that would detrimentally affect our interest by causing hunt clubs to discontinue operations during the 5-year permit term. The Service proposes to issue a shorter-term (5-year maximum) special use permit so that we can use this initial period of use to analyze the impacts, consider measures to address those impacts, and reevaluate the use within 5 years. By limiting the term of the permit to 5 years, the accumulation of potential flooding impacts will be limited. In addition, the payments to be received by landowners from DWR for the flowage easements will help offset increased costs associated with increased flooding. The USFWS will also have the benefit of improved information from monitoring needed to further formulate and implement effective strategies to address long-term operation of the Project.

The operation of the Big Notch Project would also contribute to the fulfillment of the National Wildlife Refuge System mission. It would directly benefit ESA-listed anadromous fish species which are a trust resource for the Fish and Wildlife Service. In addition, implementation of the project was required as part of the Endangered Species Act compliance for the Long-Term Operations of the Central Valley Project and State Water Project (NMFS 2009). The Central Valley Project is the primary water supply for Central Valley Project Improvement Act refuges consisting of 19 areas on federal National Wildlife Refuges, state Wildlife Areas, and one privately managed wetland complex (Grasslands RCD). Maintenance of this water supply is essential for the long-term sustainability of these refuges, which support a total of 212,966 acres of managed wetlands.

Based on available science and best professional judgement, the Service has determined that imposition by DWR of additional flowage easements allowing flooding of increased frequency and duration than under existing conditions, through its implementation of Big Notch Project, in accordance with the stipulations provided

here, would not materially interfere with, or detract from, the fulfillment of the National Wildlife Refuge System mission or the purposes of the Steve Thompson North Central Valley WMA.

Signature of Determination

SHARON VAUGHN

Digitally signed by SHARON VAUGHN
Date: 2025.01.08 14:07:53 -08'00'

Refuge Manager Signature and Date

Signature of Concurrence

CURTIS MCCASLAND

Digitally signed by CURTIS MCCASLAND
Date: 2025.01.14 16:45:37 -08'00'

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

2030

Literature Cited/References

Baldassarre, G.A. and Bolen, E.G. 2006. Waterfowl Ecology and Management. 2nd edition. Krieger Publishing Company, Malabar, FL, USA. 576 pp.

Baschuk, M.S., Koper, N., Wrubleski, D.A., & Goldsborough, G. (2012). Effects of Water Depth, Cover and Food Resources on Habitat use of Marsh Birds and Waterfowl in Boreal Wetlands of Manitoba, Canada. Waterbirds, 35(1), 44–55. https://doi.org/10.1675/063.035.0105

[CVJV] Central Valley Joint Venture. 2020. Central Valley Habitat Joint Venture Implementation Plan – Conserving bird habitat. U.S. Fish and Wildlife Service. Sacramento, CA.

Ducks Unlimited. 2017. Waterfowl Impacts of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project – An effects analysis tool. Ducks Unlimited Western Regional Office, Rancho Cordova, CA.

_____ 2024. Yolo Bypass USFWS Easements – Impact Analysis for the Big Notch Project. Ducks Unlimited Western Regional Office, Rancho Cordova, CA. Prepared for the United States Fish and Wildlife Service and Bureau of Reclamation.

Euliss Jr, N.H. and Harris, S.W., 1987. Feeding ecology of northern pintails and green-winged teal wintering in California. The Journal of Wildlife Management, pp.724-732.

Fredrickson, L.H. and Taylor, T.S., 1982. Management of seasonally flooded impoundments for wildlife (Vol. 148). US Department of the Interior, Fish and Wildlife Service.

Gilmer DS, Miller MR, Bauer RD, LeDonne JR. 1982. California's Central Valley wintering waterfowl: Concerns and challenges. U.S. Fish & Wildlife Publications. 41. Available from: http://digitalcommons.unl.edu/usfwspubs/41

National Marine Fisheries Service (NMFS) Southwest Region. 2009. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. June 4, 2009.

(Reclamation and DWR) U.S. Department of Interior, Bureau of Reclamation and California Department of Water Resources. 2019. Yolo Bypass Salmonid Habitat Restoration and Fish Passage: Final Environmental Impact Statement/Environmental Impact Report. May 2019.

_____. 2012. Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan, Long-Term Operation of the Central Valley Project and State Water Project Biological Opinion, Reasonable and Prudent Alternative Actions I.6.1 and I.7. September 2012.

Taft, O.W., Colwell, M.A., Isola, C.R., Safran, R.J. (2002). Waterbird responses to experimental drawdown: implications for the multispecies management of wetland mosaics. In Journal of Applied Ecology (Vol. 39).

[USFWS] U.S. Fish and Wildlife Service. 2020. Final Comprehensive Conservation Plan for the Butte Sink, Willow Creek-Lurline, and North Central Valley Wildlife Management Areas. Sacramento, CA.

Figure(s)

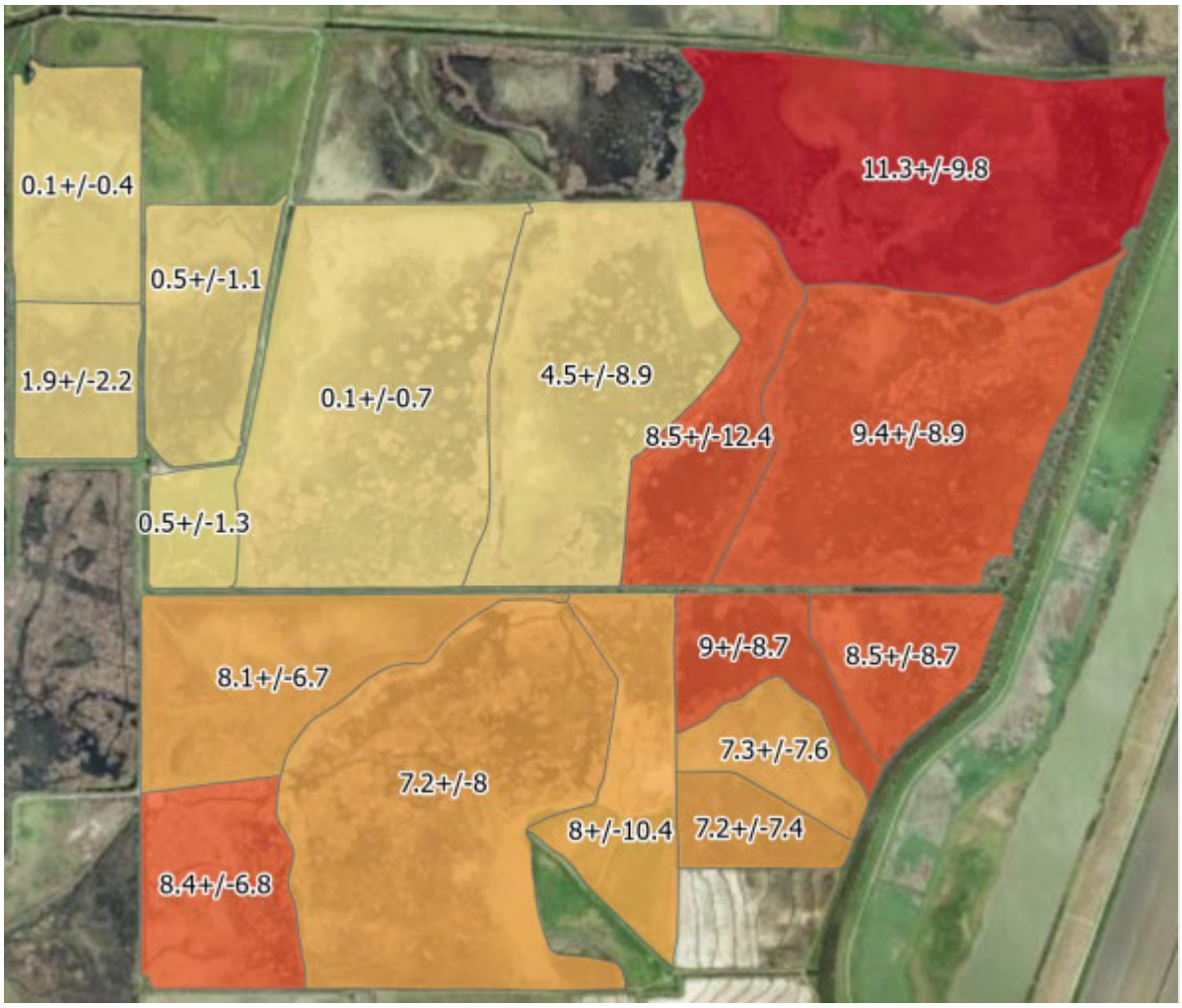

Figure 1. *Averaged annual difference of 6+ inch flood duration between baseline and Big Notch scenarios, for wetland units in the Central Area. Unit specific days are presented, followed by standard deviation values. Shading corresponds to values.*

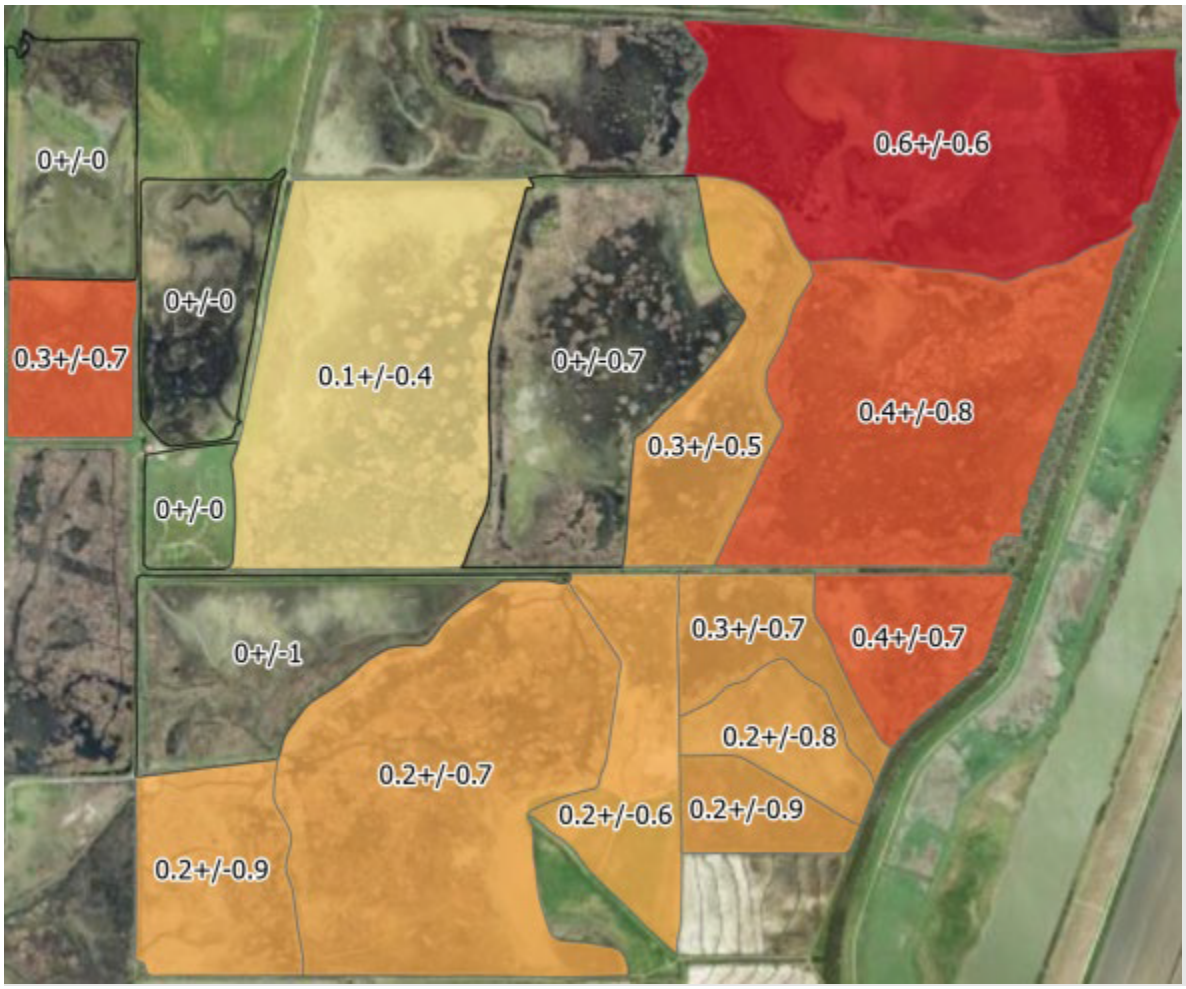

Figure 2. *Averaged annual difference of 6+ inch flood event count between baseline and Big Notch scenarios, for wetland units in the Central Area. Unit specific values are presented, followed by standard deviation values. Shading corresponds to values.*

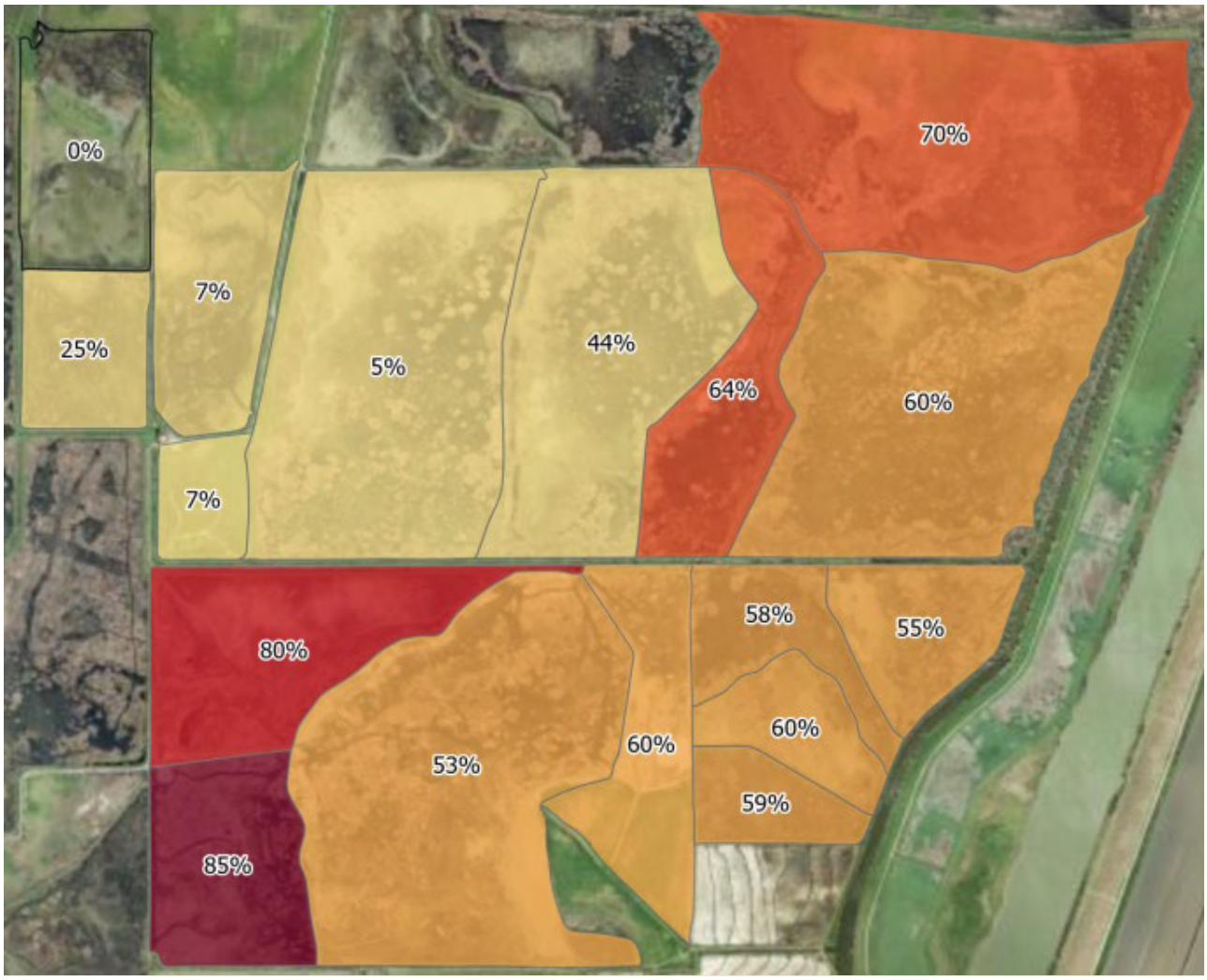

Figure 3. *Proportional increase in 6+ inch flood duration over baseline conditions attributable to the Big Notch during maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in duration between baseline and Big Notch scenarios. Values are presented for each wetland unit in the Central Area. Shading corresponds to values.*

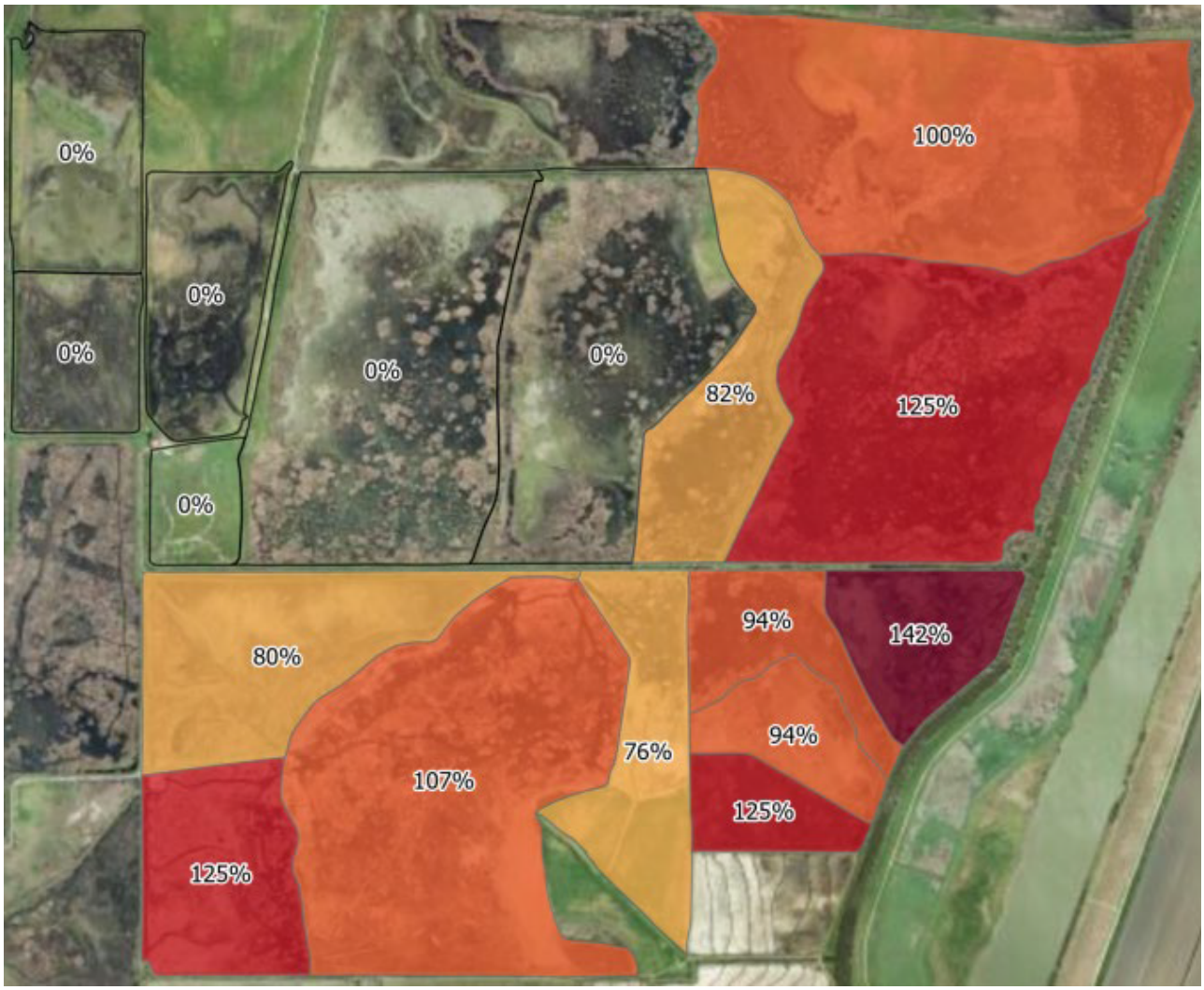

Figure 4. *Proportional increase in 6+ inch flood event count over baseline conditions attributable to the Big Notch Project during maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in flood events between baseline and Big Notch scenarios. Values are presented by wetland unit in the Central Area. Shading corresponds to values.*

***Figure* 5**. *Averaged annual difference of greater-than-blind-height flood duration between baseline and Big Notch scenarios for wetland units in the Central Area. Unit specific days are presented, followed by standard deviation values. Shading corresponds to values.*

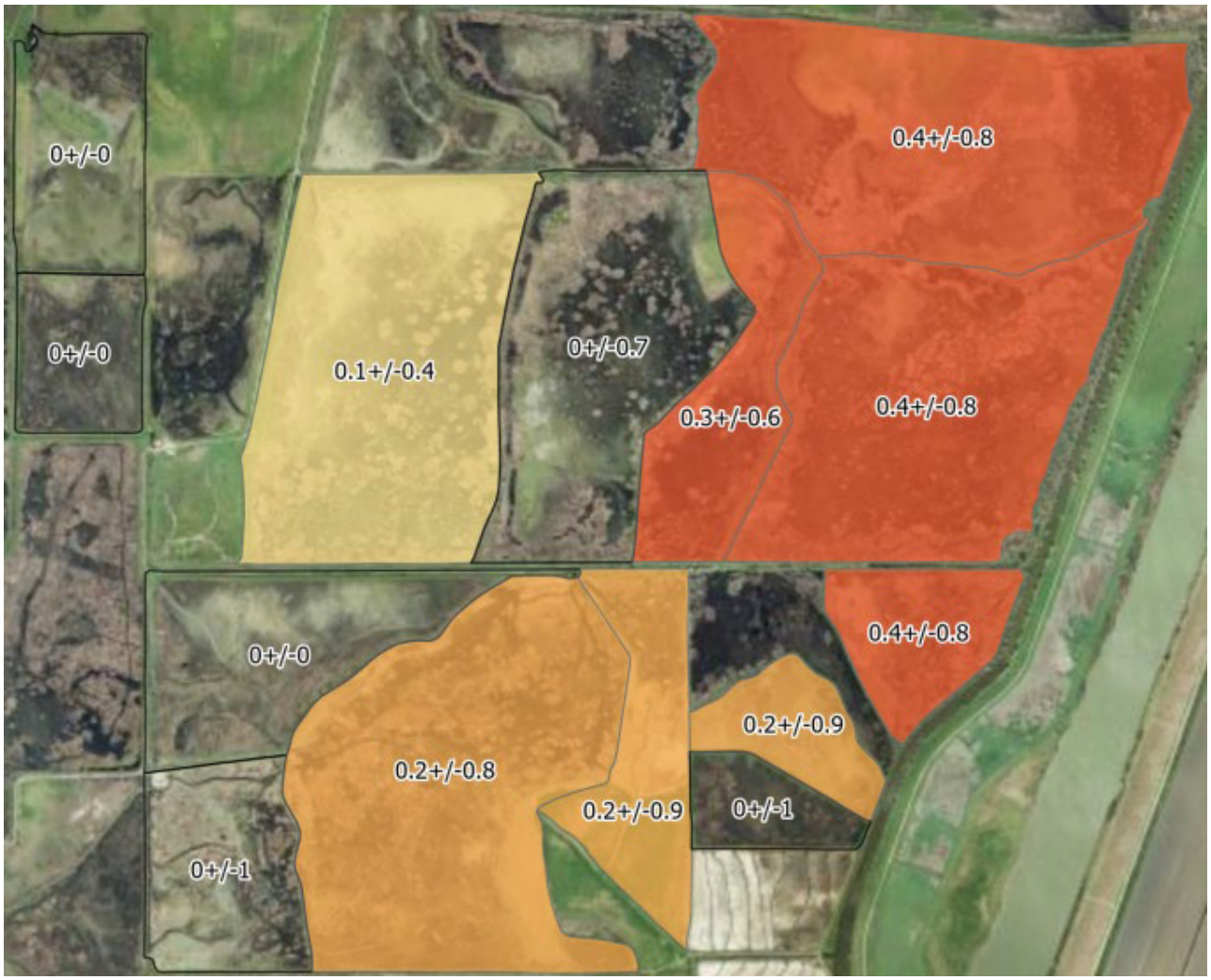

***Figure 6**. Averaged annual difference of greater-than-blind-height flood event count between baseline and Big Notch scenarios, for wetland units in the Central Area. Unit specific values are presented, followed by standard deviation values. Shading corresponds to values.*

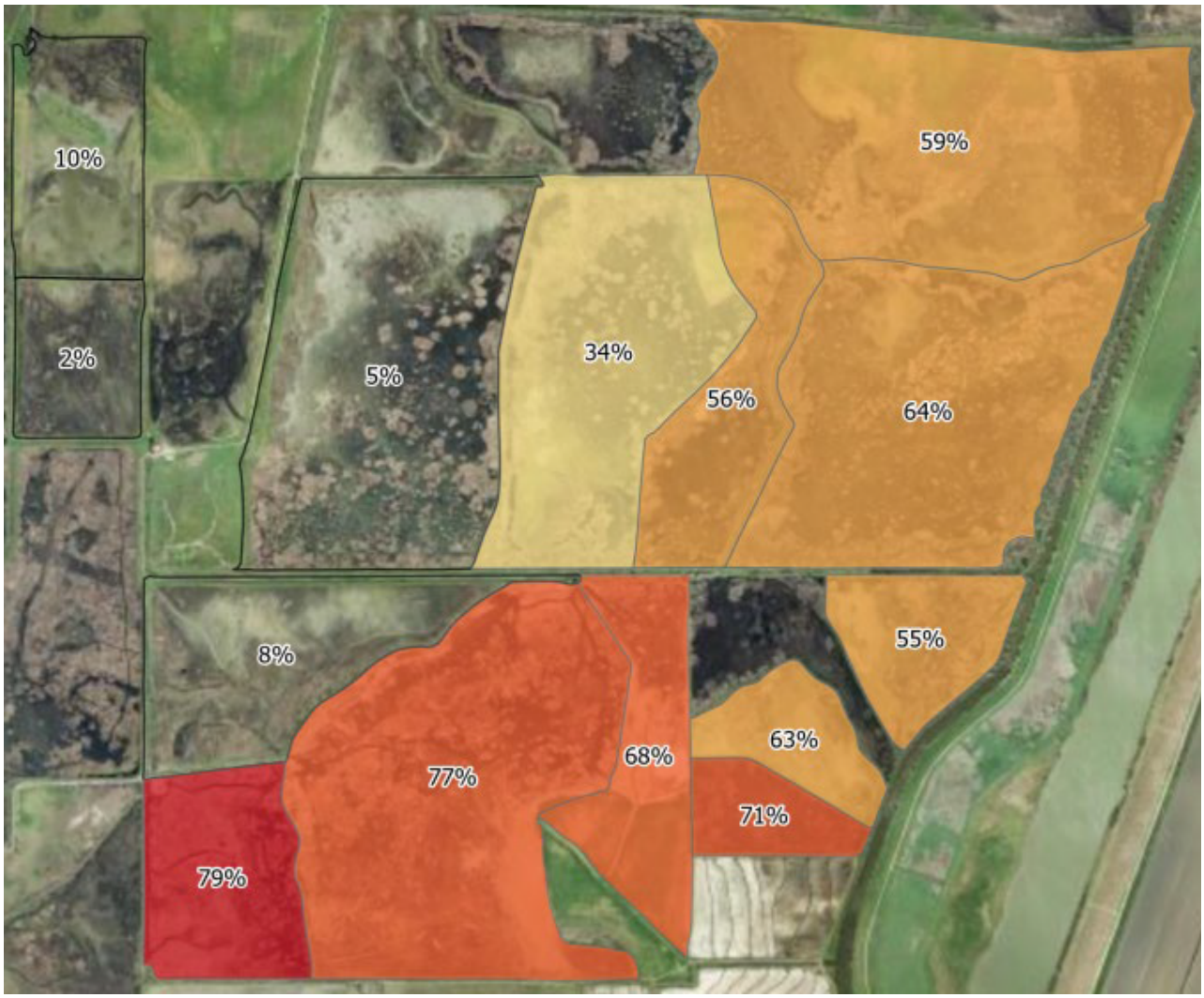

Figure 7. *Proportional increase in greater-than-blind-height flood duration over baseline conditions attributable to the Big Notch under maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in duration between baseline and big notch scenarios. Values are presented by wetland unit in the Central Area. Shading corresponds to values.*

Figure 8. *Proportional increase in greater-than-blind-height flood event count over baseline conditions attributable to the Big Notch Project under maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in flood events between baseline and big notch scenarios. Values are presented for each wetland unit in the Central Area. Shading corresponds to values.*

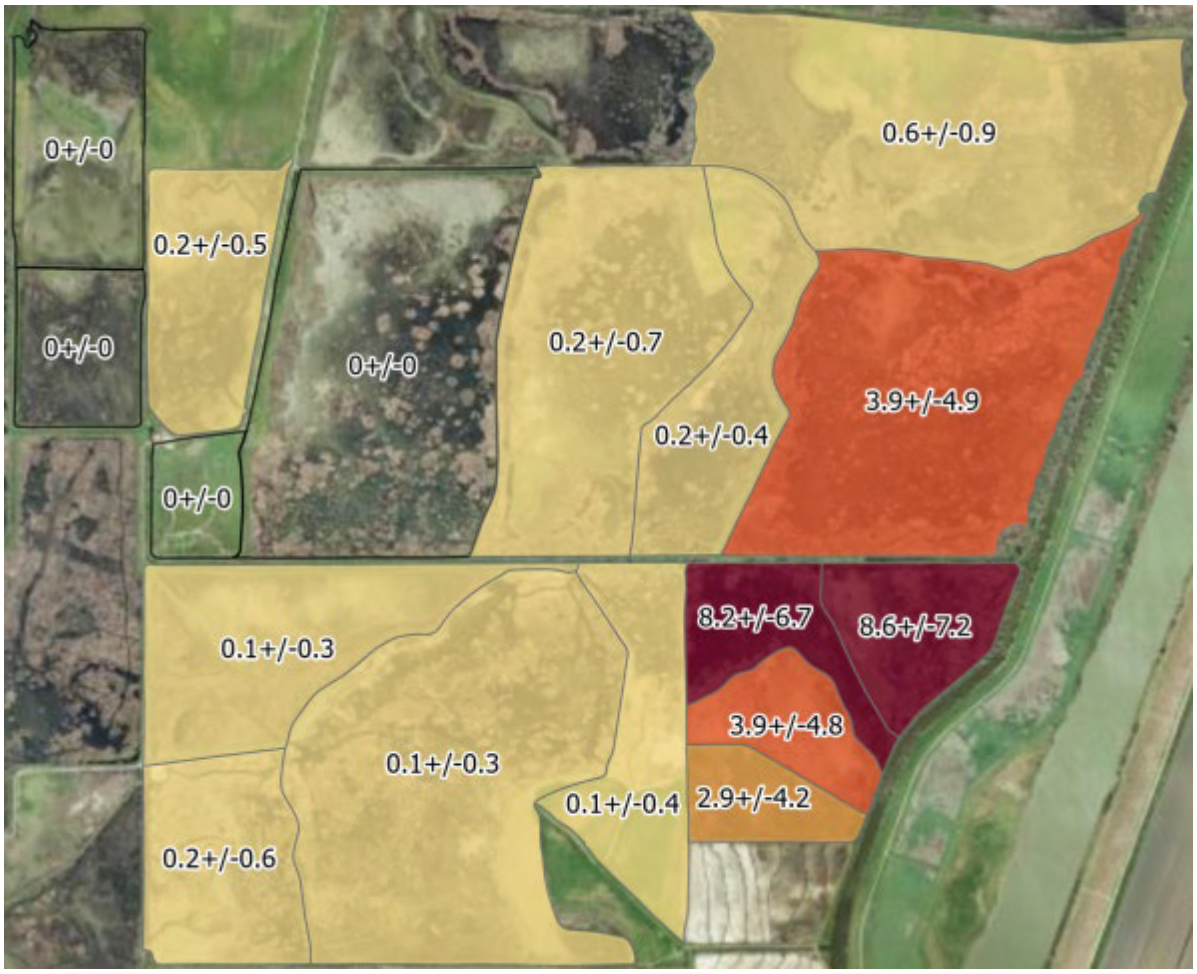

Figure 9. *Averaged annual difference of greater-than-berm-height flood duration between baseline and Big Notch scenarios for wetland units in the Central Area. Unit specific days are presented, followed by standard deviation values. Shading corresponds to values.*

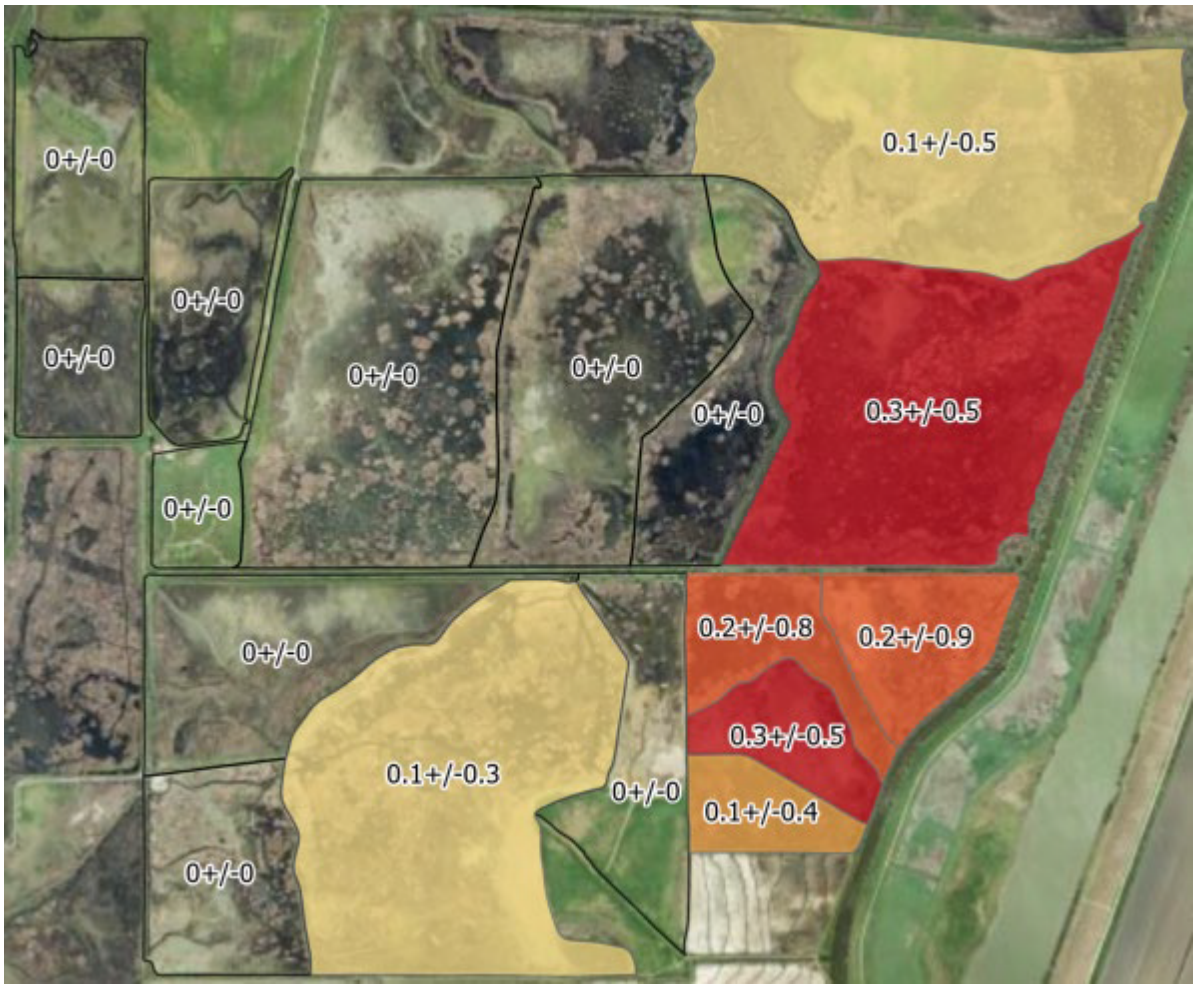

***Figure 10**. Averaged annual difference of greater-than-berm-height flood event count between baseline and Big Notch scenarios for wetland units in the Central Area. Unit specific values are presented, followed by standard deviation values. Shading corresponds to values.*

Figure 11. *Proportional increase in greater-than-berm-height flood duration over baseline conditions attributable to the Big Notch during maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in duration between baseline and Big Notch scenarios. Values are presented by wetland unit in the Central Area. Shading corresponds to values.*

Figure 12. *Proportional increase in greater-than-berm-height flood event count over baseline conditions attributable to the Big Notch during maximum impact years. Maximum impact water years defined as the four years which had the largest cumulative difference in duration between baseline and Big Notch scenarios. Values are presented by wetland unit in the Central Area. Shading corresponds to values.*

Appendix 1

History of Establishment of Steve Thompson North Central Valley Wildlife Management Area (WMA)

As of 1970, only 5 percent of historic wetlands remained in the Central Valley of California and 60 percent of these were privately owned (CVHJV 1990). Given the importance of these remaining wetlands to waterfowl, the Service developed the Concept Plan for Waterfowl Wintering Habitat Preservation in 1977 (USFWS 1978). This document recognized conservation easements as an effective tool for protecting private wetlands in perpetuity in a timely and cost-efficient manner. In addition, conservation easements were looked upon favorably as they maintained lands in private ownership and landowners retained responsibility for State and local property taxes. The Concept Plan ultimately led to the establishment of the Wildlife Management Areas, which focused on protecting private wetlands with perpetual conservation easements.

The Steve Thompson North Central Valley Wildlife Management Area (WMA) was established to help meet the habitat protection and restoration goals of the 1990 Central Valley Habitat Joint Venture Implementation Plan and ultimately the waterfowl population goals of the North American Waterfowl Management Plan. In the establishment of the North Central Valley WMA, conservation easements were recognized as an effective tool for protecting private wetlands in perpetuity, maintaining land in private ownership, and meeting Service habitat objectives in a timely and cost-efficient manner. In 1991, the authorized easement acquisition objective for the North Central Valley WMA was 48,750 acres, of which approximately 14,707 acres have been acquired, leaving a remaining balance of 34,043 acres to be acquired.

The 1990 Central Valley Habitat Joint Venture (Joint Venture) Implementation Plan set an overall objective of protecting 80,000 acres of privately owned wetlands through acquisition of fee-title or perpetual conservation easements (CVHJV 1990). This represented 67 percent of the remaining unprotected wetlands in the Central Valley at the time. Within the Yolo Basin, the Joint Venture protection objective was 5,000 acres. The 2006 Joint Venture Implementation plan set a revised objective to protect all unprotected seasonal wetlands in the Central Valley (CVJV 2006). In 2020, the Joint Venture released an updated Implementation Plan which set an objective to increase the managed seasonal wetlands in the combined Yolo-Delta region from 22,000 acres to 40,000 acres (CVJV 2020).

Acquisition and Administration of WMA Easement Programs

The Service's policy is to work only with willing sellers. When purchasing conservation easements, the Service acquires the development rights and necessary water resources to protect waterfowl and migratory bird habitat in perpetuity. In all

cases, the terms of a conservation easement must be mutually agreed upon by the landowner and the Service.

Once the conservation easement is purchased, the landowners maintain a number of rights, including trespass, grazing, wetland management, hunting, and other undeveloped recreation. Landowners are not required to flood or manage their easement wetlands; however, the Service reserves the right, but not the obligation, to flood them at government cost. Accordingly, an appropriate amount of water (e.g., "easement waters") to flood the easement wetlands to historic fall and winter levels must be maintained with the land. Service conservation easements are binding in perpetuity; the landowner reserves the right to sell or bequeath the property, but the easement and its associated restrictions remain with the property in perpetuity.

Comprehensive Conservation Plan Goals and Objectives

The Service completed the Final Comprehensive Conservation Plan (CCP) for Butte Sink, Willow Creek-Lurline, and North Central Valley Wildlife Management Areas (WMA) in 2019. The CCP goals and objectives represent the desired future condition for the WMA and the management actions needed to achieve this condition. They represent the Service's management direction for the WMA to fulfill the mission of the Refuge System, as well as the specific purposes for which the refuge was established. Below are the goals, objectives, and strategies that are relevant to the WMA easements that are the subject of this compatibility determination.

GOAL 1: Land Protection: Protect wetlands, wetland-associated uplands and riparian habitats, and productive agricultural lands to support an abundance and natural diversity of wintering and migrating waterfowl, shorebirds, birds of prey, songbirds, and other wetland-dependent species in the Central Valley.

> Objective 1.2: Easement – North Central Valley WMA Wetland Easement Acquisition. Acquire 15,000 acres of conservation easements from willing sellers in North Central Valley WMA to protect existing wetlands and restored future wetlands to help meet the habitat restoration and protection objectives of the CVJV Implementation Plan (CVJV 2006) and support the waterfowl population goals of the North American Waterfowl Management Plan (NAWMP 2012).
>
> Objective 1.4: Easement – Land Protection Partnership. Work cooperatively to help partners restore and protect wetlands and protect important agricultural lands within the North Central Valley WMA to help meet the habitat restoration and protection objectives of the CVJV Implementation Plan (CVJV 2006) and support the waterfowl population goals of the North American Waterfowl Management Plan (USFWS et al., 1986, 2012).
>
> > Strategy 1.4.4. Coordinate with CVJV partners and others to protect important wetlands and agricultural lands.

Table 4. Wetland easement acreage objectives for counties within Steve Thompson North Central Valley Wildlife Management Area (USFWS 2019)

County	Existing WMA Easements (acres)	Remaining Wetland Easement Acquisition Objective (acres)
Butte	6,028	4,509
Colusa	1,255	863
Glenn	1,174	428
Placer	0	1,917
Sutter	1,993	3,687
Yuba	0	2,392
Yolo	4,631	1,204
TOTAL	15,081	15,000

Importance of Yolo Basin to Waterfowl

Approximately 90 percent of California's Central Valley seasonal and floodplain wetlands have been destroyed or modified by agricultural conversion, development, and flood control efforts (Mitsch and Gosselink 2007; Frayer et al. 1989; Hanak et al. 2011). As a result, many wetlands-dependent species have suffered population declines, including waterfowl – which have declined from 50 million historically to 6 million currently – and native freshwater and pelagic fish species (Mount 1995; Reid and Heitmeyer 1995; Sommer et al. 2007). Waterfowl populations are most abundant within the Central Valley in winter and primarily rely on seasonal wetlands and flooded rice agriculture to access the food resources required to survive winter (CVJV 2020). The Yolo Basin contains 11,554 acres of seasonal wetlands and up to 13,500 acres of winter flooded rice, which combined provide enough food resource to support approximately 3 million duck-energy days between fall and spring. The 15,081 acres of managed seasonal wetlands protected with WMA easements comprise approximately 35 percent of all the seasonal wetlands present in the Yolo Basin and are expected to support over 350,000 duck-energy days over winter.

References Cited

Baschuk, M.S., Koper, N., Wrubleski, D.A., & Goldsborough, G. (2012). Effects of Water Depth, Cover and Food Resources on Habitat use of Marsh Birds and Waterfowl in Boreal Wetlands of Manitoba, Canada. Waterbirds, 35(1), 44–55. https://doi.org/10.1675/063.035.0105

[CVHJV] Central Valley Habitat Joint Venture. 1990. Central Valley Habitat Joint

Venture Implementation Plan. U.S. Fish and Wildlife Service. Sacramento, CA.

[CVJV] Central Valley Joint Venture. 2006. Central Valley Habitat Joint Venture Implementation Plan – Conserving bird habitat. U.S. Fish and Wildlife Service. Sacramento, CA.

[CVJV] Central Valley Joint Venture. 2020. Central Valley Joint Venture 2020 implementation plan: Sacramento, California: U.S. Fish and Wildlife Service.

Frayer, W. E., Peters, D. D., & Pywell, R. H. 1989. Wetlands of the California Central Valley: Status and Trends 1939 to mid-1980's. U.S. Fish and Wildlife Service.

Hanak, E., Lund, J., Dinar, A., Gray, B., Howitt, R., Mount, J., Moyle, P., and Thompson, B. (2011). Managing California's water: from conflict to reconciliation. Public Policy Institute of California.

Mitsch, W.J. and Gosselink, J.G. 2007. Wetlands. Fourth Edition. John Wiley & Sons, Inc., Hoboken, New Jersey. 582 pgs.

Mount, J.F. 1995. California Rivers and Streams: The Conflict Between Fluvial Process and Land Use. Berkeley: University of California Press.

[NAWMP] North American Waterfowl Management Plan, Plan Committee. 2012. North American Waterfowl Management Plan 2012: People Conserving Waterfowl and Wetlands. 47 p. Available from: https://nawmp.org/document/2012-nawmp-plan-people-conserving-waterfowl-and-wetlands

Reid, F.A., and Heitmeyer, M.E. 1995. Waterfowl and rice in California's Central Valley. California Agriculture, 49, pgs. 62.

Sommer, T., Armor, C., Baxter, R., Breuer, R., Brown, L., Chotkowski, M., Culberson, S., Feyrer, F., Gingras, G., Herbold, B., Kimmerer, W., Mueller-Solger, A., Nobriga, M., Souza, K. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary Fisheries. 32: 270–277.