CERTIFICATION OF CONSISTENCY: DETAILED FINDINGS

North Delta Project: McCormack-Williamson Tract Project and Grizzly Slough Project

Prepared for
Department of Water Resources

August 2018

ESA

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INTRODUCTION

Purpose of Project

The purpose of the North Delta Flood Control and Ecosystem Restoration Project (referred herein as the "North Delta Project") is to implement flood control improvements in a manner that benefits aquatic and terrestrial habitats, species and ecological processes. The North Delta Project is being led by the Department of Water Resources (DWR). Technical and financial support for the North Delta Project has also been provided by outside organizations and agencies including the Cosumnes River Preserve, the Delta Conservancy, and The Nature Conservancy (TNC). DWR released the Draft Environmental Impact Report (EIR) for the North Delta Project in 2007 (DWR 2007) and the Final EIR was completed in 2010 (DWR 2010). The North Delta Project encompasses two separate seasonal floodplain restoration projects, the McCormack-Williamson Tract Project and the Grizzly Slough Project. Both Projects are part of EcoRestore, an effort by the California Natural Resources Agency to implement high priority restoration projects within the Delta by 2020. The two Projects are needed to reduce damage to land uses, infrastructure and the Delta ecosystem resulting from overflows caused by insufficient channel capacities and catastrophic levee failures. The Projects will provide important benefits to biological resources, including native fish species such as Sacramento splittail and Chinook salmon, and terrestrial wildlife such as sandhill cranes.

Project Need

The Grizzly Slough Project and the McCormack-Williamson Tract are necessary to address major flood risk issues in the North Delta. The Mokelumne and Cosumnes Rivers and the Morrison Creek stream group do not currently have sufficient channel capacity to safely convey peak historical flows from Sierra Nevada watersheds, such as occurred during the 1986 and 1997 flood event, through the North Delta to the San Joaquin River. Current channel capacities for the North and South Forks of the Mokelumne River are approximately 40,000 cubic feet per second (cfs). By comparison, the combined channel capacity required to safely convey flows from a 100-year flood event has been estimated at 90,000 cfs. The lack of channel capacity, combined with constrictions in vulnerable areas (e.g., bridge abutments) and an increase in sedimentation levels, makes a number of areas in the North Delta vulnerable to flooding. Since 1955, several areas have been flooded after levees failed (by breaches or overtopping), including the Point Pleasant area, McCormack-Williamson Tract, Tyler Island, Dead Horse Island, New Hope Tract, Canal Ranch Tract, Glanville Tract, and Franklin Pond area. The potential for flooding also threatens important public facilities and institutions in the North Delta area, including Interstate 5 (I-5), the Union Pacific Railroad line, and the Rio Cosumnes Correctional Center.

A particular phenomenon associated with levee failure on McCormack-Williamson Tract is the "surge effect" created by the sudden rush of water over the island when the levee breaches or is overtopped. The force of the water from the surge effect rushes across the island from the northeast to the southwest, causing pressure on the downstream levee and breaching suddenly, ultimately releasing a wall of water near the Walnut Grove and Wimpy's/New Hope marinas. At this point, the surge can displace mobile homes, damage infrastructure, and break boats loose from their moorings. As evidenced in past flood events, flood damage can be considerable when this occurs, as the unmoored boats can become lodged against the New Hope Bridge, compounding the channel constriction with other debris. The channel constriction causes water surface elevation to rise and create a back-up condition upstream and unstable conditions on adjacent areas. The overall result historically has constituted substantial property damage and threat to human safety, both in the immediate area and potentially on adjacent islands. The McCormack-Williamson Project and the Grizzly Slough Project will help reducing future flooding risk in the north Delta by diverting flood flows from confined Delta channels and into reactivated portions of the historical Cosumnes and Mokelumne River floodplains.

The Grizzly Slough and McCormack-Williamson Tract Projects will also help to address the extensive loss of natural habitat types and ecological functions that has occurred in the Delta since the mid-19th century through restoration of tidal wetland, seasonal floodplain, and riparian habitats. Degradation and the loss of habitats that support various life stages of aquatic and terrestrial species are a primary concern in the North Delta. These habitat changes come from many causes, including sedimentation from hydraulic mining, habitat conversion, water diversions, and the introduction of exotic species. Many of the historical seasonally inundated lands in the Delta which provided habitat to a variety of wildlife species have been converted to agricultural, industrial, and urban uses. Levees constructed to protect lands in the Delta from inundation and to channelize flow to flush out sediment resulting from decades of hydraulic mining during the 19th century have eliminated fish access to shallow overflow areas while dredging to construct levees removed tule bed habitat along the channel margins. The McCormack-Williamson Project and the Grizzly Slough Project are designed to help re-establish some of the key historical ecological functions in the north Delta, principally through the reestablishment of natural floodplain and tidal inundation processes. The two Projects will also contribute towards achieving several habitat-related objectives established in the Delta Reform Act of 2009, including the following:

- "Restore large areas of interconnected habitats within the Delta and its watershed by 2100"

- "Establish migratory corridors for fish, birds, and other animals along selected Delta river channels," and

- "Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds"

Project Goals and Objectives

The overall goal of the Grizzly Slough Project is to restore and enhance riparian and wetland habitats to benefit native fish and wildlife. Specific project objectives are to:

1. Recreate a frequently flooded riparian woodland and tidal wetlands to provide habitat for native fish and wildlife

2. Reconnect sloughs to the floodplain to restore natural hydrologic and geomorphic processes.

3. Enhance agriculture that supports wildlife, as possible

Specific goals and objectives for the McCormack-Williamson Tract Project have not been finalized but will be similar to those described in the North Delta Project EIR. The objectives from the North Delta Project EIR are as follows:

Flood Control:

- Convey floodflows to the San Joaquin River without immitigable stage impacts.
- Reduce the risk of catastrophic levee failures based on the 1997 event for stage and the 1986 event for volume.
- Control floodwaters coming through McCormack-Williamson Tract in a way that minimizes the surge effect, i.e., avoids the historical occurrence when a large pulse of water from McCormack-Williamson Tract adversely affected adjacent island levees (e.g., Tyler and Staten Islands) and downstream flows and knocked boats loose from local marina moorings in flood events.

Ecological Restoration:

- Implement science-driven pilot programs to restore ecologic, hydrologic, geomorphic, and biologic processes and self-sustaining habitats, including freshwater tidal marsh, seasonal floodplain, riparian, and other wetland habitats.
- Support special-status species.
- Limit exotic species establishment.
- Promote foodweb productivity.
- Promote natural flooding processes and tidal action.
- Promote processes to increase land surface elevations in areas of subsidence.

Recreation

- Enhance public recreation in ways that do not compromise these values

The current objectives for the MWT Project has since evolved from those described in the 2010 Final EIR for the overall North Delta Project. The current MWT Project-specific objectives,

organized by the two overarching goals (i.e., flood management and ecosystem restoration), are as follows:

1. **Flood Management**

    1.1. Reduce flood risk upstream and downstream of the Project site

2. **Ecosystem Restoration**

    2.1. Restore self-sustaining habitats, including freshwater tidal marsh, seasonal floodplain, and riparian habitats

    2.2. Support special-status species and other native fish and wildlife

    2.3. Reconnect the Mokelumne River to its historical floodplain to restore natural hydrologic and geomorphic processes

Purpose of Document

The North Delta Project is considered a covered action under the Delta Plan. A state or local agency that proposes to undertake a covered action must submit a Certification of Consistency with the Delta Plan to the Delta Stewardship Council, with detailed findings demonstrating that the covered action is consistent with the Delta Plan (Water Code Section 85225).

A Certification of Consistency has been submitted electronically for this Project, via the Delta Stewardship Council's website on-line form. The purpose of this document is to provide detailed findings in support of this Certification of Consistency, specifically to provide additional details and explanation regarding the consistency of the North Delta Project with the following regulatory policies:

- GP 1 / 23 CCR Section 5002
    - (b)(2) Mitigation Measures
    - (b)(3) Best Available Science
- ER P2 / 23 CCR Section 5006
- ER P5 / 23 CCR Section 5009
- DP P2 / 23 CCR Section 5011
- RR P1 / 23 CCR Section 5012
- RR P4 / 23 CCR Section 5015

CEQA Compliance

DWR has independently prepared an Environmental Impact Report (EIR) for the North Delta Project that describes, analyzes, and discusses all the proposed Project's potential environmental impacts raised in the conceptual plan, scoping meetings, and public comments. The final EIR for the North Delta was completed in 2010, which includes the Draft EIR (DEIR), released in 2007, the Final EIR (FEIR), and any appendices, including the comments received on the DEIR during the review period and DWR's responses to those comments.

The current efforts being pursued by DWR under the North Delta Project were analyzed in the DEIR under Alternative 1-A of Group I of the North Delta Project, specifically with regards to seasonal floodplain restoration at the McCormack-Williamson Tract and Grizzly Slough properties. There are other elements described under that Alternative besides actions at McCormack-Williamson Tract and Grizzly Slough. These actions are being evaluated as potential elements of future North Delta Program actions.

Design refinements have been made for the restoration work at Grizzly Slough since the release of the FEIR in 2010, although none of these changes are expected to result in any additional "significant" impacts not disclosed in the EIR nor increase the level of severity of impacts deemed "significant" in the EIR. Nonetheless, in order to facilitate full public disclosure, DWR has prepared a CEQA Addendum for the Grizzly Slough Project. Possible design refinements are being evaluated for the restoration work at McCormack-Williamson Tract and DWR expects to prepare a supplemental CEQA document for the project once the investigations have been completed.

COVERED ACTION SUMMARY

Regional Setting

The McCormack-Williamson Tract Project and Grizzly Slough Projects are located in the northeast Delta within Sacramento County, California. Both the McCormack-Williamson Tract Project and Grizzly Slough Project are located within the Cosumnes River Preserve. DWR acquired the Grizzly Slough property in 1992 for habitat mitigation, ecosystem enhancement, and flood risk reduction. The McCormack-Williamson Tract site was acquired in 1999 by The Nature Conservancy (TNC) using CALFED funds for the purpose of ecosystem restoration and flood control.

The northeast Delta receives the drainage of four local watersheds: Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek basins. Winter flows on the Mokelumne River are almost entirely attenuated by large dams. The Cosumnes River has no significant flood control reservoir so the annual hydrograph closely follows the precipitation pattern. The Cosumnes River flows into the Mokelumne River immediately east of the McCormack-Williamson Tract. The Dry Creek watershed and Morrison Creek basin are much smaller watersheds and have no significant flood control reservoirs.

Grizzly Slough

The Grizzly Slough site is bordered by Grizzly Slough to the west, the Cosumnes River to the north, Bear Slough to the east, and New Hope Road to the South. The Cosumnes Floodplain Mitigation Bank, owned by Westervelt Ecological Services, is located to the west across Grizzly Slough. The Cosumnes Floodplain Mitigation Bank restored former vineyards and farmland to riparian and seasonal wetland habitat. Sacramento County owns lands to the east along Bear Slough. These lands, a grove of valley oak riparian forest, are under preservation easement and are part of the Cosumnes River Preserve. Private landowners to the south and east maintain their lands in agriculture, principally vineyards, orchards, and grassland for grazing. Recently, the land at the Grizzly Slough property have been fallow, however the land was recently managed in dryland agriculture. Two prior mitigation projects exist onsite at the Grizzly Slough Property to mitigate riparian forest and shrub scrub losses on New Hope Levees. Phase I (35 ac) was restored in 1992 and Phase 2 (35 ac) was planted in 2010 and 2012.

McCormack-Williamson Tract

The McCormack-Williamson Tract is located at the intersection between the historical north and central Delta, at the downstream end of the Mokelumne River delta, and at the upper range of tidal influence. Waterways in the vicinity of the McCormack-Williamson Tract include the Delta Cross Channel, Snodgrass Slough, and the Mokelumne River, which enters the Delta along the southern boundary of McCormack-Williamson Tract. Snodgrass Slough borders the western edge of McCormack-Williamson Tract and Dead Horse Island and is connected to the Sacramento River via the Delta Cross Channel. This connection to the Sacramento River is an important

contributor of fresh water and sediment to the central Delta, diverting flow from the Sacramento River to Snodgrass Slough and eventually into the Mokelumne River downstream of McCormack-Williamson Tract.

McCormack-Williamson Tract contains approximately 1,473 farmable acres, which were farmed by a tenant farmer under the oversight of TNC. This farmland is currently fallow. McCormack-Williamson Tract contains water management infrastructure for agriculture, including irrigation pumps and siphons that draw water out of adjacent waterways, and two drainage pumps (only one is functional) to return excess water to the surrounding waterways.

Topographic Setting

Grizzly Slough

The Grizzly Slough Project site is generally flat and gradually slopes from the southeast corner (about 16 feet elevation) to the northwest corner (about 9 feet elevation). The topography data was derived from LIDAR results produced by DWR; the LIDAR DEM was ground-truthed with a land survey. The elevation information presented in this document are referenced to the North American Vertical Datum of 1988 (NAVD88).

McCormack-Williamson Tract

The McCormack-Williamson Tract grades from subtidal to supratidal elevations. In contrast to the central Delta tidal islands, the surface of the Tract appears to have been more varied topographically under a layer of peat due to the differing fluvial and tidal influences and floodplain processes. The lower part of the Tract is a low shallow basin (-1 feet NAVD) grading up slowly to the north (8 feet NAVD). The highest part of the Tract depicts the extent and elevation of the natural riparian levees of the Mokelumne River. In the northeast corner of the Tract, a low point exists as a wetland or lake feature. This feature is the result of a scour pond that was created during the 2007 flood over the eastern levee. The 2017 flood event created another very small scour pond along the Mokelumne River.

Project Description

Grizzly Slough

The Grizzly Slough Floodplain Restoration Project (Grizzly Slough Project) will restore wetland and riparian habitat by reintroducing tidal and seasonal flooding and establishing native vegetation. The site is a rare place where elevation, unregulated flows, and intact sediment supply provide opportunities to restore floodplain processes.

The Grizzly Slough Project will restore natural flooding to the site by breaching the levee on Grizzly Slough. A channel network will be excavated from the breach. A new setback levee will be constructed along the south property boundary to provide equivalent flood protection pre- and post-project. The levee will include flap-gated drainage culverts to allow one-way drainage from

south to north (in the downstream direction). Hydrologic modeling indicates the restored areas will experience winter flooding every 2-5 years, suitable for riparian recruitment. The channels will be graded to maintain tidal flows year-round, with no floodplain ponding that could strand salmonids. Native vegetation will be established by natural recruitment (emergents in channel, cottonwood on floodplain) and planting. Floodplain areas above mean higher high water (MHHW) will be drill seeded with native grasses to forestall weeds, with patches of herbaceous and woody plants planted to jumpstart riparian establishment. The floodplain's long-term trajectory will be riparian forest.

An agricultural zone (~157 ac) will be established on higher elevation southern part of the site, and enhanced with new water supply infrastructure to allow cultivation of irrigated crops (e.g., corn) that provide wildlife benefits. Revenue from the agricultural lease that will be used to fund long term management (weed control, monitoring) by Cosumnes River Preserve staff.

Excluding the prior mitigation areas, the project will restore 3 acres freshwater emergent tidal wetlands in the tidal zone below MHHW (including approximately 3000 linear feet of tidal channels), 12 acres of seasonal wetland, and 91 acres of valley foothill riparian on the floodplain above MHHW. Returning natural hydrologic processes will enhance the existing natural recruitment forest (71 acres comprised of cottonwoods (37 ac) interspersed with ruderal vegetation) and provide incidental enhancements to the Phase 1 and Phase 2 mitigation areas (70 ac). Low-intensity agriculture will provide wildlife benefits (~157 ac). The exact breakdown by habitat type may vary from the numbers provided above based on final design refinements and differences between projected and actual habitat development. Total restored and enhanced acreage is 334 acres excluding the prior mitigation areas, and 404 acres including these areas.

The project will benefit species such as fish that spawn or rear on the floodplain (juvenile Chinook salmon, Sacramento splittail), migratory birds that nest in riparian habitat (Swainson's hawk), and foraging sandhill cranes and waterfowl.

McCormack-Williamson Tract

The east levee of McCormack-Williamson Tract would be lowered to allow flood flows onto the Tract to function as a weir. The exact extent and dimensions of the east levee to be lowered have yet to be finalized, but will be based on refined hydrologic modelling. Rock slope protection (RSP) would be placed on the riverside levee slope around the area of the levee to be lowered in order to protect against erosion caused by turbulence from the approaching flow. On the landside toe of the levee, a sill would be excavated to dissipate the energy of overtopping water cascading down the landside levee face. RSP would be placed down the landside face in the toe sill and for several feet beyond the toe sill. Grading and excavation of exit channels would ensure that fish and not entrapped in the toe sill as floodwaters recede from the island.

The southwest levee of McCormack-Williamson Tract located along Dead Horse Cut would be lowered to allow flood flows to pass out of the tract without causing a surge effect. To convey high river stages out of McCormack-Williamson Tract, the degraded southwest levee would be reinforced as a hardened weir to minimize erosion. During the low-flow season the lowered

southwest levee would allow tidal exchange on the island from the south. The initial design called for the entire southwest levee to be degraded along the entire length of Dead Horse Cut to match the elevation of the island floor. However, as with the east levee, the exact extent and dimensions of the southwest levee have not been finalized, as hydrologic modelling to inform design is still underway. The potential for scour along the embankment between the untouched levee and the breach will require the placement of RSP; the area of protection required will vary dependent on final levee geometry and landform elevations within the Tract.

Restored tidal and fluvial hydrology to the tract is expected to result in increased topographic variability (scour and deposition) within interior of MWT and facilitate conditions for natural revegetation. To assist these processes and facilitate habitat benefit, minor grading would occur before breaching the tract to encourage dendritic tidal channel formation, ensure positive drainage, and provide more diverse topography.

To facilitate conversion to native vegetative cover types, a combination of passive and active restoration approaches would be used. To reduce risk and minimize the potential for colonization by exotic vegetation, some starter vegetation would likely be planted. Over time, flooding events would import propagules such as willows, cottonwoods and perennial herbs that would naturally colonize on higher areas and aquatic plants at intertidal and subtidal elevations.

Mitigation Measures (23 CCR Section 5002)

This section provides detailed findings of consistency with regulatory policy *GP 1 / 23 CCR Section 5002: (b)(2) Mitigation Measures.*

The North Delta Project was subject to CEQA review and the Programmatic Environmental Impact Report (PEIR) for the North Delta Project was completed in 2010 and certified in November 2010. A CEQA Addendum has been prepared for the Grizzly Slough Project as the current restoration design is a refinement of the alternative selected through the North Delta Project planning process. DWR anticipates that a supplemental CEQA document will be prepared for the McCormack-Williamson Tract Project. The CEQA Addendum includes feasible mitigation measures that will avoid any potentially significant impacts; these mitigation measures are a subset of those mitigation measures in the North Delta Project Mitigation and Monitoring Reporting Program (MMRP), as the current Grizzly Slough Project is expected to have similar or diminished impacts relative to those described in the North Delta EIR. Similarly, although the McCormack-Williamson Tract Project is still being refined, based on the changes that have been made to that project since the release of the North Delta FEIR in 2010, the latest project design is expected to have the same or slightly reduced impacts compared to those described in the FEIR (e.g., no new significant impacts).

For the Delta Plan Certification of Consistency, a comprehensive table was uploaded which crosswalks all mitigation measures included in the Delta Plan EIR MMRP with Project specific environmental commitments and/or mitigation measures specific for the Grizzly Slough Project and the McCormack-Williamson Tract Project.

Best Available Science (23 CCR Section 5002)

This section provides detailed findings of consistency with regulatory policy *GP 1 / 23 CCR Section 5002: (b)(3) Best Available Science.*

The Project design and adaptive management plan are based on best available science, as demonstrated by the following elements:

- Well-stated objectives and hypotheses.
- Conceptual models of habitat requirements of sensitive fish and wildlife species,
- Best professional judgment of experts.

Scientific literature cited in support of the design approach for the Grizzly Slough and McCormack-Williamson Tract Projects are provided at the end of this detailed findings document.

Scientific Support

Grizzly Slough

The Grizzly Slough Project has a strong foundation in floodplain science, species life history, hydrodynamics, and lessons learned from nearby restoration projects. Levee breaching to reestablish flooding processes is a well-supported restoration approach (SFEI-ASC 2016, Opperman et al., 2017). Several riparian areas at the Cosumnes River Preserve established when levee breaching reconnected floodplains with flows and sediment (Florsheim & Mount 2002, Swenson et al., 2003, Nichols & Viers 2017). Re-establishing wide, continuous riparian forests and scrub with connections to off-channel habitats benefits riparian wildlife (SFEI-ASC 2016). The Grizzly Slough Project expands the riparian corridor that connects the Delta and the Cosumnes-Mokelumne watersheds.

Floodplain inundation activates aquatic food webs (Ahearn et al., 2006) as flows slow and residence time increases (Whipple et al. 2012). Hydrodynamic modeling calibrated to high flow events indicates projected inundation frequencies ranging from intertidal in the lowest areas of the site, to 1 in 10 years in the highest areas (ESA 2017). Long-duration flooding during late winter and early spring support native fish spawning (Sacramento splittail) and rearing (Chinook salmon) (Sommer et al. 1997, Moyle et al., 2007, Jeffres et al., 2008). A floodplain that drains by May favors native fish over nonnative species (Moyle et al., 2007). At Cosumnes, native fish (salmon, splittail) respond to hydrologic cues during flood recession to leave and avoid stranding, unlike warmwater fish (carp) that spawn later (Jeffres 2017).

Sandhill cranes and waterfowl wintering in the Delta use harvested corn fields as foraging habitat, along with winter wheat, alfalfa, pasture, and fallow fields (Pogson & Lindstedt 1988; Ivey et al., 2011). This project provides much-needed redundancy for crane roost habitat on nearby Staten Island, and offsets habitat losses due to conversion to intensive agriculture.

Plant communities follow zones of hydroperiod, soils, and flood disturbance (Stella et al. 2013). The expected hydrologic regime is appropriate for tidal freshwater wetlands (MLLW 2.9 ft to MHHW 5.8 ft at Grizzly Slough breach), transitioning to seasonal wetlands and then riparian forest above MHHW. The recruitment box model (Mahoney & Rood 1998) suggests cottonwoods will establish on sediments inundated in April, but exposed and moist during May-June seed dispersal. Monitoring of the 1995 Cosumnes breach found a diverse mosaic, with trees on higher elevation (Trowbridge 2007). Over the years, this floodplain has trended toward dominance of mostly native perennial species (Sweet, unpub. 2017). The Project team applied lessons learned from recent projects (TNC Oneto-Denier, CFMB) for the revegetation approach.

McCormack-Williamson Tract

Most of the elements described above for the Grizzly Slough Project regarding the scientific basis for the Project design are applicable for the McCormack-Williamson Tract Project, since their main objectives both include seasonal floodplain restoration. The main differences between the two projects are that McCormack-Williamson Tract Project will restore a substantially greater number of acres to freshwater tidal wetlands, and that the McCormack-Williamson Tract Project will not retain acreage on-site in agricultural production. As such this section focuses more specifically regarding best available science regarding principles of tidal wetland restoration in the Delta.

Tidal wetlands make significant contributions to estuarine food webs. The vegetation, plankton, microbes, and macroinvertebrates produced within tidal marshes become important subsidies for the food web of adjacent water bodies when transported to these water bodies on ebb tides (Teal 1962; Kneib et al. 2008). Shallow habitats sustain fast phytoplankton growth and net autotrophy (Cloern 2007), whereas deep, light-limited habitats within the Delta channels sustain low phytoplankton growth (Jassby et al. 2002) and net heterotrophy.

In the San Francisco Estuary, seston (suspended phytoplankton/detrital matter in the water column) exported from tidal wetlands is of extremely high quality for zooplankton consumers, and produced higher zooplankton growth rates than seston found in Delta river channel, flooded island, or floodplain habitats (Mueller-Solger et al. 2002). High productivity originating from tidal wetlands can be exported to surrounding areas, but the magnitude, extent and direction of net transport is variable (Howe and Simenstad 2007, Lehman et al. 2010, Lehman 2013). Liberty Island illustrates the potential for increased productivity and material flux from tidal wetlands (Lehman et al. 2010, Lehman 2013). Transport of materials varied daily and even hourly because of the strong influence of tidal dispersion forces, which can vary hourly in the Delta (Lehman et al. 2010). Additionally, carbon flux appears to be dependent on subtle variations on the timing of daylight with tidal cycles, which may explain the wide variability in concentrations of primary productivity over small spatial scales at Liberty Island (Lehman et al. 2010).

An expert consultant in hydrologic modelling is responsible for ensuring existing models and data elements are completed in sufficient detail to guide design features and verify possible hydrological impacts of the McCormack-Williamson Tract Project. Existing hydrologic and hydraulic (H&H) studies, modeling and related investigations were completed for the North Delta

Flood Control and Ecosystem Restoration Project Draft and Final EIRs. Recently, Sacramento County supported the development of a regional HEC RAS model based on earlier models that supported the NDEIR. CBEC is developing a 2D McCormack Williamson Tract model appropriate to evaluate the impacts of various flood flows on the stage height of surrounding areas given various restoration scenarios. Existing LiDAR and bathymetric data will be used to generate existing ground surface models for final designs and turbidity or sedimentation data will be reviewed by the hydrological model to predict how sedimentation will proceed given designed breaches.

Technical Advisory Groups

Grizzly Slough

The proposed project design for the Grizzly Slough Project has been refined through repeated collaboration with multiple agencies, entities, and scientists. DWR convened a Grizzly Slough Technical Advisory Committee (TAC) to provide guidance from a variety of disciplines, including geomorphology and hydrology, botany, fisheries and wildlife, land management, and water quality. The TAC members included:

- Bill Fleenor, UC Davis
- Lily Tomkavic, UC Davis
- Sarah Sweet, TNC
- Carson Jeffres, UC Davis
- Esther Burkett, California Department of Fish and Wildlife (CDFW)
- Harry McQuillen, Bureau of Land Management (BLM)
- Dave Bosworth, DWR
- Judah Grossman, TNC
- Erik Loboschevsky, EcoRestore

McCormack-Williamson Tract

During the preparation of the North Delta Project DEIR, two North Delta Science Panel meetings were held to guide early development of the McCormack-Williamson Tract design. The North Delta Science Panel was comprised of scientific experts in a diversity of fields including hydrology, water quality, and terrestrial and aquatic ecology. During the second of these Science Panel meetings for McCormack-Williamson Tract, subgroups were organized to focus on three specific topics: 1) hydraulic/hydrology and geomorphology, 2) mercury, carbon, water quality and 3) terrestrial and aquatic ecology, exotic vegetation, and mosquitoes.

The findings from the hydraulic/hydrology and geomorphology subgroup was that sediment is a limiting resources at the McCormack-Williamson Tract and restoration efforts should focus on maximizing flood flows that capture sediment. In addition, the restoration design should recognize the dynamic nature of fluvial and tidal contributions to sedimentation processes.

The findings of the mercury, carbon, water quality subgroup was that there was insufficient information regarding mercury, dissolved organic carbon, pesticides, and other water quality concerns to adequately predict how the project would affect these water quality constituents. The subgroup recommended that the monitoring plan for the Project should include tracking the response of at least some of these water quality contaminants.

The terrestrial and aquatic ecology subgroup concluded that an overarching goal for the McCormack-Williamson Tract restoration should be to maximize development of habitat that favors native fish and bird species and which discourages exotic species and mosquitoes. The subgroup also identified the need for adaptive monitoring and management to address the uncertainties associated with the project, such as response of exotic species to restoration of freshwater tidal marsh habitat.

Ecological Potential of Site (23 CCR Section 5006)

This section provides detailed findings of consistency with regulatory policy *ER P2 / 23 CCR Section 5006: Restore Habitats at Appropriate Elevations.*

Delta Plan Appendix 3 describes three target actions for floodplains in the Delta, with one of the actions to continue implementation of projects at Cosumnes River Preserve, such as restoring active and regular flooding regimes and flood response to restoration, and monitoring surface and groundwater hydrology and geomorphic changes in restored areas. Floodplains can support a highly productive mosaic of different habitat types including riparian, tidal wetlands, and perennial and seasonal wetlands. Seasonal floodplains provide benefits for native resident and migratory fish. As such the Grizzly Slough and McCormack-Williamson Tract projects help make progress towards one of the target actions identified in the Delta Plan.

Appendix 3 of the Delta Plan also states that all lands within the intertidal elevation range are assumed to have the ability to support tidal marsh habitats. Tidal marsh habitats in the Delta are highly desirable because they are hypothesized to play a critical role for native fish, including providing improved foraging opportunities and refuge from predators. Collectively, the proposed projects will restore at least 500 acres of tidal wetlands at appropriate elevations.

Grizzly Slough

The Grizzly Slough Project site has some areas located at intertidal elevations (existing northern area, and constructed breach and channels). A significant portion of the project site is at elevations suitable for seasonal floodplain habitat, based on review of Figure 4 in Appendix 3 and the Delta Stewardship Council's *Delta Plan Atlas* (http://websites.greeninfo.org/deltacouncil/atlas2/live/).

The Grizzly Slough Project site also has areas at elevations suitable for sea level rise accommodation and uplands. As sea level rises, a larger portion of the Project site is anticipated to be at intertidal elevation. Given the site's gradually sloping topography under current conditions spanning intertidal to upland elevation, the Grizzly Slough Project site has an unusually broad accommodation space with the capacity to allow tidal marsh vegetation to migrate higher in elevation in response to rising sea levels.

Delta Plan Appendix 4 also recognizes the value that agricultural lands provide in benefitting certain special-status wildlife and states that "protecting and enhancing agricultural lands for wildlife would focus on encouraging production of crop types that provide high wildlife habitat value, agricultural land and water management practices that increase wildlife habitat value, and discouraging development of ecologically important agricultural lands for urban or industrial uses." A 157-acre agricultural zone will be set aside in the southern portion of the project site and the land leased to allow farming of irrigated crops that are compatible with winter flooding and supports wildlife (e.g., corn for sandhill crane).

Delta Plan Appendix 3 identifies some concerns regarding restoration including (1) the potential stranding of native fish; (2) the potential for habitat to be colonized by non-native species; and (3) the potential that reintroduction of daily tidal flows or seasonal flooding to terrestrial habitat may increase the rate of methylation of mercury. The manner in which these concerns were considered during planning and design of the Grizzly Slough Project are described below:

1. Fish Stranding - Managing the frequency and duration of floodplain inundation during the winter and spring, followed by complete drainage by the end of the flooding season, could favor native fish over nonnative fish. The Grizzly Slough Project is designed to drain and be completely dry by summer. The site will be graded as necessary to avoid ponding and facilitate complete draining of the site by summer; the channel and breach are designed such to allow tidal flows year-around thereby further minimizing potential stranding risk for salmonids. Furthermore, native fish such as Chinook salmon and Sacramento splittail respond to hydrologic cues during flood recession to leave and avoid stranding, unlike warmwater fish (e.g., carp) that spawn later (Jeffres 2017). The adaptive management plan outlines monitoring and management responses to avoid and minimize this risk, including identification of low areas (informed by topographic surveys) and regular site visits during spring flood recession and salmonid outmigration period to determine if there are areas that may be potential stranding locations for native fish (e.g., scour holes). If fish stranding is indeed determined to be an issue for native fish, a potential management response would be to conduct periodic fish rescues.

2. Non-native species colonization - The approach for dealing with non-native species through restoration design and long-term management practices is discussed in detail below the heading **Nonnative Species** which provides details about how the Grizzly Slough Project is consistent with Delta Plan Policy ER P5 (i.e., how the Grizzly Slough Project will avoid potential for new introductions of, or improved habitat conditions for, nonnative invasive species).

3. Mercury methylation - DWR will consult with the Central Valley Regional Water Quality Control Board (CVRWQCB) regarding what monitoring, if any, will be expected to evaluate the response of mercury and methylmercury concentrations in response to the restoration project. Lessons learned pertaining to mercury will be summarized in the Annual Reports prepared by the New Hope Reclamation District (RD 348) and submitted to CDFW and DWR. These agencies can disseminate information via publications or presentations at venues such as the Bay-Delta Science Conference.

McCormack-Williamson Tract

During early planning for the McCormack-Williamson Tract Project, DWR modelled the expected acreage of potential habitat on the Tract based on tidal range, topography, and elevation range for habitat types. Local tidal datums were obtained for New Hope Gage. Topographic data used for modeling inundation levels and habitat types were obtained by LIDAR mapping. Habitat types were estimated relative to tidal range. For the purposes of DWR's analysis, it was assumed MHHW represented the upper extent of tidal marsh, while it was assumed that the lower extent of tidal marsh was defined as the area inundated no more than six feet at MHHW and no more than two feet deep at mean lower low water (MLLW) (note: some of the areas estimated to be potential intertidal marsh could become seasonal floodplain, especially towards the higher elevations). Based principally on elevation, along with very preliminary hydrologic modelling and the aforementioned assumptions, it was estimated that on McCormack-Williamson Tract about nearly 500 acres could be theoretically restored to freshwater tidal perennial aquatic habitat, about nearly 900 acres could be theoretically restored to freshwater tidal emergent marsh; about nearly 100 acres could be sea level rise transitional habitat (a combination of seasonal floodplain and riparian habitat), and about 70 acres could be uplands.

As described above for the Grizzly Slough Project, Delta Plan Appendix 3 identifies cautions related to restoring seasonal floodplains including fish stranding and potential to increase the rate of mercury methylation. The project design for McCormack-Williamson Tract will degrade the southern levee along Dead Horse Cut, so the floodplains will have year-around connectivity to Delta channels minimizing the potential for fish stranding. As stated above, the potential effects of floodplain restoration projects to contribute to mercury methylation is uncertain; DWR commits to complying with any CVRWQCB monitoring requirements regarding mercury.

Nonnative Species (23 CCR Section 5009)

This section provides detailed findings of consistency with regulatory policy *ER P5 / 23 CCR Section 5009: Avoid Introductions of and Habitat for Invasive Nonnative Species*

Grizzly Slough

Invasive plants:

Restoration projects can potentially result in introduction or spread of noxious weeds or invasive plant species due to soil-disturbing activities associated with grading and construction, and colonization of the site by natural recruitment from plant fragments or seeds originating from

nearby off-site locations. The Grizzly Slough Project includes design principles and construction measures to avoid introductions of habitat improvements for invasive nonnative species (i.e. full drainage to avoid habitat conditions for bass). The Adaptive Management Plan also includes weed control as part of its management strategies, consistent with established weed control plans of the Cosumnes River Preserve Management Plan (Kleinschmidt 2008).

Although the design and operations are planned to minimize the potential for non-native species establishment, non-native plant species will likely be present within the Project site. Based on assessments of areas with habitat conditions similar to those expected to develop at the site, invasive non-native plant species with the highest likelihood to colonize the Project site's various habitats include:

- Subtidal channels:
    - Water hyacinth (*Eichhornia crassipes*)
- Tidal channels:
    - water primrose (*Ludwigia peploides*, L. hexapetala)
    - parrot's feather (*Myriophyllum aquaticum*)
    - water hyacinth (*Eichhornia crassipes*)
- Seasonal wetlands
    - common lippia (*Phyla nodiflora*)
    - velvetleaf (*Abutilon theophrasti*).
- Riparian
    - Himalayan blackberry (*Rubus armeniacus*)
    - poison hemlock (*Conium maculatum*)
    - obull thistle (*Cirsium vulgare*)
- Grassland/Valley Oak woodland
    - thistles (*Carduus pycnocephalus* and *Silybum marianum*)
    - prickly lettuce (*Lactuca serriola*)
    - poison hemlock (*Conium maculatum*)

The Grizzly Slough Adaptive Management Plan measures will include surveys (aquatic and terrestrial) to assess the need for invasive weed control. Weed control will be consistent with

practices in the Cosumnes River Preserve Management Plan. Areas requiring weed control will be mapped and flagged for follow-up, and described in an annual report prepared by RD 348 for CDFW and DWR. These two agencies and the Preserve manager will work collaboratively to identify the most appropriate management approach for the particular situation. Weeds will be managed via mechanical removal, or through application of herbicides (i.e., coordination with California Boating and Waterways). The plants will be sprayed with appropriate herbicides at the appropriate time of year to maximize effectiveness based on the invasive species being targeted, and shall be applied according to its label. Spraying efforts, including weeds targeted, chemicals used and mechanical methods employed will be described in the annual report.

Terrestrial areas where invasive weeds have been removed and/or treated will be re-planted with native vegetation to minimize recolonization by invasive weeds. Once established, it is expected that native vegetation will be able to withstand invasion by nonnative weeds such that the need for weed management control will decrease as native vegetation matures. In the early years of the Project, more intervention is anticipated to be needed to control invasive weeds populations before they become established and problematic for the success of native vegetation.

Invasive wildlife:

The Grizzly Slough Project is designed to benefit native fish species that utilize seasonal wetlands for spawning and/or rearing. A five-year study by Moyle and others (2007) determined that the Cosumnes River floodplain is an important habitat for a number of fish species, particularly native Chinook salmon and Sacramento splittail. These two native species are well-adapted to the seasonal hydrodynamics, moving onto the inundated floodplain shortly after it became accessible, and leaving before potential stranding. Nonnative species arrived onto the floodplain later in the season than these two native species, and exited the floodplain at a later time as well, resulting in higher frequency of stranding. Thus, it is hypothesized that the seasonal floodplain habitat to be restored on the Grizzly Slough property will provide a competitive advantage for native fish over introduced fish counterparts. The main tidal channel will be designed to remain perennially wet to minimize the risk of stranding of juvenile salmonids, but could also potentially provide habitat for non-native introduced fish.

McCormack-Williamson Tract

Invasive plants:

The potential invasive plants which could potentially colonize the McCormack-Williamson Tract Project site are expected to be the same as described above regarding the Grizzly Slough Project site. Weed management will be conducted in a manner consistent with the Cosumnes River Preserve Management Plan. The precise nature of those surveys will be defined when the restoration project design is further along and a project-specific Adaptive Management Plan can be developed. If surveys for invasive weeds are to be included in the Adaptive Management Plan, it will include management triggers and potential management response options, in a similar manner as presented within the Grizzly Slough Project Adaptive Management Plan.

Invasive wildlife:

Similar to the Grizzly Slough Project, the McCormack-Williamson Tract Project is expected to provide benefits to native fish species. The northern portion of the Tract which will function as seasonal floodplain habitat is expected to drain seasonally. As such, this portion of the McCormack-Williamson Tract is expected to preferentially benefit native fish species which are more acclimated to the Delta's episodic seasonal flooding regime in the winter and spring than non-native fish species which are predominantly warmwater species. The central and southern end of McCormack-Williamson Tract will be restored to tidal wetlands. Portions of this tidal wetland area will consist of subtidal habitats and as such will be perennially wet. Such subtidal habitat can represent beneficial habitat for native pelagic species such as delta smelt, but the presence of accessible tidal perennial aquatic habitat of McCormack-Williamson Tract make it susceptible to potentially harboring habitat for resident non-native species such as largemouth bass. As the project design for McCormack-Williamson Tract is refined, input from Delta fisheries experts will be utilized to minimize these potential adverse outcomes, however given the widespread abundance of non-native fish in the Delta, occupancy of the site by non-native fish species is to be expected regardless of the restoration design. One possible strategy to lessen the likelihood of colonization by nonnative species in the southern open-water area of McCormack-Williamson Tract is to establish tules in this area before degradation of the southwest levee with the idea that dense tule growth could prevent establishment of submerged aquatic vegetation. However, it is uncertain whether tules could survive 3 feet of inundation and also dense tule growth may lesson tidal energy to such an extent that dendritic intertidal channels do not form at high elevations within McCormack-Williamson Tract.

Land Use Considerations (23 CCR Section 5011)

This section provides detailed findings of consistency with regulatory policy *DP P2 / 23 CCR Section 5011: Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats.*

Grizzly Slough

A new setback levee will be constructed along the south property boundary to provide equivalent flood protection pre- and post-project. The levee will include flap-gated drainage culverts to allow one-way drainage from south to north (in the downstream direction).

The Grizzly Slough Project site is zoned by the 2030 Sacramento County General Plan as agricultural cropland. The General Plan describes this designation as agricultural lands most suitable for intensive agriculture, since they include at least some of the following attributes: deep to moderately deep soils, abundant to ample water supply, distinguishable geographic boundaries, absence of incompatible residential use, absences of topographical constraints, good to excellent crop yields, and large to moderate sized farm units. Based on the Zoning Consistency Matrix in the Land Use Element of the 2030 Sacramento County General Plan, a "natural preserve" is a fully acceptable use within all categories of permanent agricultural zones.

The Conservation Element of the Sacramento County General Plan has several policies which support establishment of large habitat preserves, and increasing natural habitat types. Policy CO-64 states that "consistent with overall land use policies, the County shall support and facilitate the creation and biological enhancement of large natural preserves or wildlife refuges by other government entities or by private individuals or organizations." Sacramento County Regional Parks is a landowning Partnership for the Consumes River Preserve and works with Preserve partners to help achieve goals of the Cosumnes River Preserve Management plan and state and federal recovery plans. Policy CO-75 calls to "maintain viable populations of special status species through the protection of habitat in preserves and linked with natural wildlife corridors." The project is consistent with this policy as it will restore seasonal wetland functions for migratory waterfowl and waterbirds such as sandhill cranes. Policy CO-79 calls for management of vegetation on public lands with special status species to encourage locally native species and discourage nonnative invasive species." The Project is consistent with this general plan policy as it will restore natural seasonal flooding that will encourage recruitment of native vegetation, in concert with weed control to discourage invasive weeds as per the Preserve's Management Plan. Policy CO-90 calls to "increase riparian woodland, valley oak riparian woodland and riparian scrub habitat along select waterways within Sacramento County." The Project will help support this policy by restoring riparian habitat.

DWR has already engaged with neighboring landowners to inform them about the Grizzly Slough Project and address their concerns to the extent possible. This engagement has included the landowner to the south and east of the Project site, which are currently maintained in agriculture, principally vineyards, orchard, and grassland for grazing. The property to the west of the Project site is the Cosumnes Floodplain Mitigation Bank owned by Westervelt Ecology Services; Westervelt Ecological Services has been a key partner in the development of the Grizzly Slough Project, including providing guidance on real estate issues and sharing lessons learned from their experience in development the Cosumnes Floodplain Mitigation Bank.

The restoration effort occurs on public land currently owned by DWR. The Project site was acquired by DWR in 1992 with funds supplied by the State Water Contractors. The Project has widespread support, including from the Cosumnes River Preserve, due to the project's role in restoring functional ecosystem processes, and from the County of Sacramento, because of the project's role in reducing flood risk in the North Delta (see attached Letters of Support). Harry McQuillen, the BLM Preserve Manager for the Cosumnes River Preserve, has been actively involved in the planning for the Grizzly Slough Restoration Project, and is in full support of the Project. It was determined that the Grizzly Slough Restoration Project will further the Cosumnes River Preserve's mission to protect, restore and manage habitat for native species within the Delta and lower Cosumnes River watershed because not only would it reconnect the Cosumnes River to a part of its historic floodplain, it would also restore more of the areas of historic valley oak riparian forest. As such the BLM has expressed its commitment to help the Grizzly Slough succeed, including assisting with monitoring and maintenance of the proposed project site over the long-term once it is restored.

McCormack-Williamson Tract

The McCormack-Williamson Tract project will be constructed over two phases, with the first phase mainly involving site preparation work necessary for implementation of the second phase which includes all the tidal wetland and seasonal floodplain restoration elements. The first phase involved constructing a levee around the large communications transmission tower located in the northwestern corner of the Tract and re-sloping internal levees so they can withstand the hydraulic forces that will occur when the Tract is restored to tidal wetlands and seasonal floodplain. The construction of the internal levee to protect the large communications transmission tower is one example of how the project design needed to ensure the accommodation of existing uses on the Tract.

The McCormack-Williamson Tract site is zoned by the Sacramento County General Plan as agricultural cropland, specifically AG-80 (i.e., agricultural parcels with a minimum size of 80 acres). Based on the Zoning Consistency Matrix in the Land Use Element of the 2030 Sacramento County General Plan, a "natural preserve" is a fully acceptable use within all categories of permanent agricultural zones. The McCormack-Williamson Tract is also designated by the General Plan as a Recreation Zoning District, which are established by the County to promote and protect the public's health, safety and general welfare. The specific Recreation Zoning District designation assigned to McCormack-Williamson Tract T is "O". This designation is for areas that provide public park facilities or wildlife preserves, and as allowed by a conditional uses permit, can include agricultural, single-family residential, some agricultural-related commercial, and some institution uses are permitted. Since the Project will improve wildlife habitat conditions within the Cosumnes River Preserve, the Project is also considered consistent with the County's recreational zoning designation for the site. The same Conservation Element policies identified as applicable to the Grizzly Slough Project are also pertinent for the McCormack-Williamson Tract; the McCormack-Williamson Tract is consistent with these policies for the same reasons as described for the Grizzly Slough Project.

The Project has support from the local Delta community, mainly because the Project will substantively provide flood risk reduction benefits to properties along the Mokelumne and Cosumnes Rivers. During the past few years of planning for the McCormack-Williamson Tract project, DWR has modified the design of the levee breach/weir to be constructed on the northeastern section of the Tract along the Mokelumne River, in part to balance the interests of stakeholders located upstream of the Project and those located downstream of the Project. For example, those landowners located upstream of the Project desire shunting as much flood flows as possible into the McCormack-Williamson Tract property since that approach would result in the greatest reduction in flood stage upstream. Stakeholders downstream of the Project as a whole are also are supportive of the Project, however, some are concerned that directing too much flood flows into McCormack-Williamson Tract could potentially produce flood surges which will place more strain on the adjacent Dead Horse Island levee and other downstream levees. DWR will continue to actively engage with local stakeholders to ensure the project is compatible with their interests to the extent possible.

Delta Levee Investments (23 CCR Section 5012)

This section provides detailed findings of consistency with regulatory policy *RR P1 / 23 CCR Section 5012: Prioritization of State Investments in Delta Levees and Risk Reduction*

Delta Plan Policy RR P1 provides a table of priorities for state investment in Delta Integrated Regional Flood Management, which contains three general themes: 1) localized flood protection, 2) levee network and 3) ecosystem conservation. Additionally, three separate goals are identified for each of those themes. As such, state funding for Delta flood management should fall into one of nine different priorities. Policy RR P1 specifically states that the nine priorities are meant to guide budget and funding allocation strategies for levee improvements.

The Grizzly Slough Project will involve creation of a new setback levee to protect the agricultural lands located to the south of the Project boundary. This setback levee is consistent with the Goal 3 priority for Localized Flood Protection of "Protect agricultural and local working landscapes."

At McCormack-Williamson Tract, levee improvements were necessary to ensure that interior levees on the Tract could withstand the hydrologic forces that will result as more frequent seasonal flood flows are reintroduced to the site. Given its larger size, the McCormack-Williamson Tract Project is expected to provide more prominent benefits to regional flood risk reduction compared to the Grizzly Slough Project, and thereby will also more greatly help achieve the priority "protect agricultural and local working landscape" by diverting flood flows and thereby reducing the strain on levees protecting neighboring agricultural land uses. Additionally, the McCormack-Williamson Tract Project will help to achieve at least two of the goals related to ecosystem conservation identified under RR P1, including one priority to "protect existing and provide net enhancement of floodplain habitat" and another priority to "protect existing and provide for net enhancement of wetlands."

Floodplain Encroachment (23 CCR Section 5012)

This section provides detailed findings of consistency with regulatory policy *RR P4 / 23 CCR Section 5015: Floodplain Protection*

Delta Plan Policy RR P4 requires that no encroachments be placed in certain Delta floodplains unless there is sufficient analysis that such an encroachment would not have a significant impact on floodplain values and functions. The North Delta Project is located within what the Delta Plan designates as the Cosumnes River-Mokelumne River Confluence floodplain. Both the Grizzly Slough and the McCormack-Williamson Tract Projects are floodplain restoration efforts which will reestablish seasonal floodplains to areas disconnected from adjoining rivers by constructed levees. These Projects will not include any infrastructure-related encroachments into this floodplain (e.g., bridge pilings) – rather the Projects will improve floodplain function by reconnecting the Grizzly Slough property and McCormack-Williamson Tract back to flood flows. However, these Projects will modify vegetation within these two sites – primarily through intentional plantings and natural vegetation recruitment – which will thereby change the roughness coefficients within the Project sites (i.e., Mannings 'n'). As such, DWR will also prepare encroachment permit applications to the Central Valley Flood Protection Board with

analysis regarding the Projects' anticipated effects on flow patterns and flood stage in the north Delta. Although the Projects may result in recruitment of riparian vegetation and other herbaceous plants, hydrologic modelling results indicate both Projects as currently designed will not increase flood stages either upstream or downstream relative to existing conditions, and the Projects – in particular the McCormack-Williamson Tract Project – is expected to provide a net gain to regional flood benefits by diverting flood flows from channels with limited conveyance capacity to floodplains. As such, the Grizzly Slough and McCormack-Williamson Tract Projects are considered to be fully consistent with Delta Plan Policy RR P4.

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