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Summary of Collaborative Wildlife Protection and Recovery Initiative (CWPRI) Conservation Workshop: Least Bell's Vireo

Jacob F. Jung, Stephanie Hertz, and Richard A. Fischer

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Abstract

This special report summarizes the regional workshop held 24–26 April 2018 at the US Fish and Wildlife Service (USFWS) Ecological Services Office in Carlsbad, California on the importance of collaboration among federal, state, and nongovernmental agencies to facilitate the recovery of threatened and endangered species (TES). This workshop focused primarily on one species, the least Bell’s vireo (LBVI), and how to achieve full recovery and eventual delisting through agency partnerships. A major theme of the workshop was applying the Endangered Species Act (ESA) Section 7(a)(1) conservation planning process as a building block towards recovery of LBVI—as well as other threatened, endangered, and at-risk riparian species within the Southwest. The main objective of this workshop was to assemble an interagency and interdisciplinary group of wildlife biologists and managers to detail how the Section 7(a)(1) conservation planning approach, in consultation with the USFWS, can assist in the recovery of LBVI primarily on federal lands but also other public and private lands. Goals of this workshop were to (1) review Section 7(a)(1); (2) outline LBVI ecosystem processes, life history, threats, and conservation solutions; and (3) develop and organize agency commitments to collaborative conservation practices.

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Preface

This study was conducted for the Dredging Operations and Environmental Research (DOER) program under Funding Account Code U4368836 and AMSCO Code 089500. The Technical Monitor was Ryan Orndorff, Director, DoD Natural Resources Program (OASD [Sustainment]/ODASD [Environment]). The work was performed by the Ecological Resources Branch of the Ecosystem Evaluation and Engineering Division, US Army Engineer Research and Development Center, Environmental Laboratory (ERDC-EL). At the time of publication, Jennifer Seiter-Moser was Chief, Mark Farr was Division Chief, and Dr. Elizabeth Ferguson was the Technical Director for Installations and Operational Environments. The Deputy Director of ERDC-EL was Dr. Brandon Lafferty, and the Director was Dr. Edmund Russo.

Information presented in this special report was derived from input by numerous attendees from the US Fish and Wildlife Service (USFWS); US Geological Survey (USGS); US Forest Service (USFS); US Department of Agriculture–National Resources Conservation Service (USDA–NRCS); US Bureau of Reclamation (USBR); US Bureau of Land Management (BLM); the US Army Corps of Engineers (USACE), Los Angeles District and ERDC; and the Department of Defense (DoD), including Marine Corps Base Camp Pendleton (MCBCP). Additional contributions were provided by nongovernmental organizations (NGOs) including American Bird Conservancy (ABC); Defenders of Wildlife (DOW); National Fish and Wildlife Foundation (NFWF); and researchers from the University of Central Missouri; University of California, Riverside; and Southern Sierra Research Station. We are grateful to Jon Avery, Gjon Hazzard, and Peter Beck of the USFWS, Carlsbad Ecological Services Office for hosting the workshop and to Ryan Orndorff for facilitating discussion sessions during the workshop. Numerous presenters provided external reviews and suggested edits of their summarized information.

The Commander of ERDC was COL Teresa A. Schlosser and the Director was Dr. David W. Pittman.

1 Introduction

The information provided below is derived from presentations made during the workshop by representatives of the US Army Corps of Engineers (USACE), Department of Defense (DoD), US Fish and Wildlife Service (USFWS), US Geological Survey (USGS), US Forest Service (USFS), US Department of Agriculture–Natural Resources Conservation Service (USDA–NRCS), US Bureau of Land Management (BLM), US Bureau of Reclamation (USBR), American Bird Conservancy (ABC), Defenders of Wildlife (DOW), National Fish and Wildlife Foundation (NFWF), and researchers from the University of Central Missouri; University of California, Riverside; and Southern Sierra Research Station.

1.1 Background

The Endangered Species Act (ESA) of 1973, as amended, provides a framework regulated by the Department of the Interior (DOI) to protect threatened and endangered species (TES) in the United States and its territories (United States 1982). Identification and determination of listed species on federal lands requires significant expenditures of time and funds to devise effective management approaches for the protection of critical habitat requirements and eventual recovery of listed species. In 2016 the Collaborative Wildlife Protection and Recovery Initiative (CWPRI) was formed by the Department of Defense’s Natural Resource Program as a means to bring numerous stakeholders, primarily federal agencies, together to help listed species within a particular region. A driving force behind this initiative was to encourage collaboration among the federal agencies, and their nonfederal partners, to better utilize ESA Section 7(a)(1) which calls for, and indeed mandates, proactive conservation planning for TES by federal agencies in consultation with the USFWS and National Marine Fisheries Service (NMFS). This proactive planning effort, when flexible and collaborative, is the best means to promote the conservation and recovery of listed species. This workshop resulted in a better understanding of the ecological and other needs of the least Bell’s vireo (LBVI) under current conditions and with new threats (for example, climate change, invasive pests such as shot-hole borer [SHBO; *Euwallacea* sp.]). The partners (appendix A) developed both short- and long-term plans for LBVI recovery.

1.2 Objective and Meeting Structure (Jon Avery, US Fish and Wildlife Service [USFWS] Ecological Services Office, Carlsbad, California)

The goal of the first local meeting was not only education but collaboration. The objectives of the meeting were to

- educate about LBVI threats and conservation needs;
- discuss the ESA Section 7(a)(1) process;
- share local examples of how the Section 7(a)(1) process can propel us down the road to recovery;
- develop a roadmap using shared expertise to eventually achieve recovery, with some stepping stones that will help agencies streamline their ESA 7(a)(2) formal consultations; and
- create two products: a summary of the workshop to distribute to the group for review/acceptance and a draft interagency range-wide conservation plan.

Note: Presentations from the workshop are uploaded and available for viewing from the USACE Threatened and Endangered Species Team (TEST) website: <https://test.el.erdcdren.mil/index.html>. For copies of presentations that are unavailable for download, please contact Jacob Jung (Jacob.F.Jung@erdcdren.mil).

1.3 Approach

The CWPRI conducts biannual meetings, typically in Washington DC, to discuss collaborative efforts towards recovery of TES. The CWPRI determined that a regional meeting that focused on a species of importance to several federal agencies and that is likely to achieve recovery in the foreseeable future should be selected as an example for developing an interagency 7(a)(1) conservation plan. The LBVI was selected under this criterium because it occurs primarily on federal lands, has an increasing population that has expanded from 300 breeding males in 1986 to 3,000–3,500 breeding males in 2010, and uses habitats that can potentially be rehabilitated on federal lands. The following workshop presentations by wildlife biologists, managers, and researchers from both federal and nonfederal entities served to improve communication among federal agencies that manage and conserve lands occupied by LBVI as well as other TES. Open discussion periods involving participants from the audience and a selected panel of experts were held and are summarized to identify ongoing problems and conflicts with LBVI management and conservation.

2 Day 1: Tuesday, 24 April 2018—Summaries of Presentations on the Conservation of LBVI in Southern California

2.1 The role of Section 7(a)(1) of the Endangered Species Act in the Conservation of the Endangered LBVI at Marine Corps Base Camp Pendleton San Diego, California (Larry Salata, USFWS, Portland Regional Office)

Federal participation in 7(a)(1) and 7(a)(2) is critical in recovery. 7(a)(1) allows federal agencies the discretion to give TES priority over central missions. It is important to consult with USFWS through programmatic review and identification of 7(a)(1) conservation activities that help streamline 7(a)(2) consultation process. Section 7(a)(1) is an affirmative mandate requiring federal agencies to collaborate with USFWS and NMFS when appropriate to identify and carry out recovery actions for listed species within the sideboards of their authorities. USFWS can recommend certain actions, but federal action agencies can choose whether or not to implement. As a policy matter, USFWS recommends that implementation of 7(a)(1) activities be closely coordinated with 7(a)(2) programs in the form of a programmatic review. Notion of collaboration and integration of 7(a)(1) and 7(a)(2) is the basis for efficiency and effectiveness. In 1986, the US Marine Corps (USMC) formalized their commitment through a Memorandum of Understanding with USFWS (Pendleton 2017), through a LBVI conservation program at Marine Corps Base Camp Pendleton, thus setting the tone and example for LBVI conservation in southern California. MCBCP manages about one-third of the range-wide LBVI population, and proactive conservation and management on the base have benefited many other riparian-dependent species. MCBCP is an exemplary case study of federal agency compliance with 7(a)(1).

2.2 Collaborative Wildlife Protection and Recovery Initiative (CWPRI) Partnership (Ryan Orndorff, Department of Defense [DoD] Natural Resources Program, Office of Secretary of Defense)

DoD has considerable long-term investments and is working to promote listed species recovery on installations. DoD initiated the formation of the CWPRI as a means to develop a roadmap and a strategy to see how each

stakeholder fits into the larger picture for species recovery. Members of CWPRI want to develop a formula for successful collaborative innovations so that outcomes and tools can apply more broadly than a single situation. The CWPRI conducts, at a minimum, biannual meetings in Washington DC; however, these discussions can only go so far. We need to meet in local areas and develop ways to complete conservation. There are significant source populations of LBVI at military installations and USACE properties, with a goal of collaborative conservation to continue to expand LBVI to other suitable areas. CWPRI is a conversation among federal agencies that understands that we are working on the same species and areas but not necessarily in the same context. CWPRI landed initially in the southwestern US because we stumbled upon shared priorities among the different federal agencies. We are looking for ways we can do more with strained resources. We want to increase efficiencies, streamline processes, support flexibility to agency missions, be more effective with the outcomes of our investments, and, hopefully, look for areas of opportunity where we can collaborate. We would like to see a model of collaboration where we come together as federal agencies, states, and private landowners. We also want to determine steps for the next 6–12 months to develop models for achieving more effective outcomes. The opportunity between what we could do and what needs to be done to achieve recovery is the basis of CWPRI. Where can we develop partnerships and leverage efforts/resources with other organizations and programs that are seeking similar outcomes? We have started to reach out to other federal agencies, and initiatives such as NFWF, to leverage funding. Also, we can learn from other agencies such as the BLM, as they have had success/lessons learned from the Endangered Species Recovery Fund managed through NFWF. CWPRI is also interested in partnering with other organizations such as DOW and ABC to achieve recovery goals.

2.3 Least Bell's Vireo: Life History and Status Overview (Dr. Barbara Kus, US Geological Survey [USGS], San Diego, California)

The LBVI is listed federally and in California. LBVI are migratory, wintering in the Cape Region of Baja California, Mexico and breeding mostly in southern California, with the historic range extending north into San Joaquin and Sacramento Valleys. The historic range has been significantly reduced due to 90% habitat loss, and in 1986 there were only 300 known LBVI territories in California. Threats to the LBVI population include habitat loss, particularly related to loss of water, drought, wildfire and other climate change impacts, brown-headed cowbird (BHCO;

Molothrus ater) parasitism, SHBO (an invasive insect pest), and invasive riparian plants. Recovery of the species would involve managing water resources to rehabilitate suitable habitat, BHCO control, and eliminating invasive plants. LBVI are resilient and able to locally recover with suitable conditions and threat reductions. Anyone who manages water plays a pivotal role in LBVI recovery. Southwestern willow flycatcher (SWFL; *Empidonax traillii extimus*) occupies many of the same areas and has somewhat similar habitat requirements as LBVI but has not recovered to the same extent, and populations are declining statewide. In 1995 SWFLs in California numbered 70 territories. By 2010 LBVI had increased to 3,000–3,500 males, while SWFL remain at very low population levels for reasons not yet fully understood.

2.4 Stressors and Threats to LBVI (Peter Beck, USFWS Ecological Services Office, Carlsbad, California)

LBVI must have water. Water (for example, flood flows, surface flows, and groundwater) must be present to support riparian vegetation, mainly willows, for LBVI breeding habitat. LBVI primary threats are direct floodplain activities, urban development, agricultural development, and direct loss of habitat. Other threats include water development, livestock grazing, non-native invasive plants, off-road vehicle activity, climate change effects, SHBO, disease or predation, and BHCO parasitism. Climate change and SHBO are substantial threats not addressed in the original 1998 draft recovery plan (US Fish and Wildlife Service 1998). A draft five-year review (initiated in 2013) was never completed, leaving the latest published five-year review from 2006. The five-factor analysis, which is part of the five-year review, includes present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; lack of existing regulatory mechanisms; and other natural or anthropogenic factors affecting its continued existence. For delisting to occur, key management actions must be in place; a 7(a)(1) conservation plan is likely needed to specify what is required following delisting.

2.5 Status of Recovery Plan and Five-Year Review/Sensitive Species Known to Utilize LBVI's Breeding Habitat (Gjon Hazard, USFWS Ecological Services Office, Carlsbad, California)

LBVI was listed as an endangered species in 1986 with critical habitat designated in 1994, and a formal five-year review was last completed in 2006. A new status review is planned for fiscal year 2019 and likely will be either a five-year review or species status assessment (SSA). A completed recovery plan is planned for 2020 or 2021, with the last draft plan initiated but never finalized in 1998. A formal recovery plan is not necessary for delisting, but it does aid in setting and achieving recovery goals. Single species management is important for LBVI, but multispecies management is ongoing in California riparian zones and should be contextually considered in this workshop, as more than 17 sensitive species inhabit the general riparian ecosystem utilized by breeding LBVI.

2.6 Stream/Riparian Water Hydrographs and Fluvial Sediment: Reliance and Modifications on the Coastal Slope of California (Tory Walker, TW Engineering, Vista, California).

Common factors affecting stream degradation include percentage and locations of impervious areas within watershed, soils and geology of watershed, sediment sizes within watershed, slope of waterway, and time passed since development. In southern California, infrequent episodic flood events are far more influential than frequent winter rain events in forming and maintaining streams and their riparian floodplains (fluvial geomorphology and bank/floodplain natural communities). A systematic approach is recommended to hydromodification management by (1) observing response of fluvial system to previous increase in impervious area over time, (2) studying aerial photography and topography, (3) conducting Geographic Information System (GIS) analyses, (4) developing hydraulic models, and (5) developing other fluvial geomorphic tools. A balanced approach to hydromodification includes (1) starting with a multidisciplinary team of experts; (2) using the best available data, models, and tools; (3) rigorously adhering to the scientific method; (4) further developing modeling tools based on local data; (5) applying applications to realities that characterize the region (climatic, geologic, urban, economic); and (6) calibrating parameters. Issues to identify in restoration plans are re-establishment of natural creek functions; potential of groundwater replenishment; protection of adjacent and downstream properties; preservation of downstream flood capacity; protection of

existing infrastructure, such as railroad and sewer lines; and stabilization of creek beds and banks.

2.7 The Future of Stream Water in Coastal Southern California (Chris Medak, USFWS Ecological Services Office, Carlsbad, California).

Southern California water treatment and supply agencies are planning and implementing projects to increase local water supplies, diversifying and expanding them to meet increased demand. For example, the Los Angeles region encompasses 2,040 square miles and is home to approximately 10 million people. It is in the process of diversifying and expanding its water supply portfolio to meet demand. Climate change will also change water supply and delivery into the future. How does LBVI fit in with all the water management strategies? Wherever there is water left. LBVI occur in some of the spreading basins that provide enough water through urban runoff to support LBVI breeding habitat; however, counties would like to clear and clean out some of these basins in order to increase water infiltration capacity. LBVI breeding habitat is also partially or fully supported downstream of wastewater treatment plant discharge sites in local streams. Hansen Dam currently has substantial acreage of LBVI breeding habitat above and below the dam. Other areas include drainages below developments with substantial urban runoff (from landscaping irrigation), with some developments converting ephemeral streamflows to permanent flows that create/support LBVI habitat, at least for some period of time until streambed incision occurs. Once incised, low-flow channels become too deep, such that water tables drop, confining riparian vegetation for LBVI habitat to a narrow channel width. Existing diversions and groundwater pumping are already contributing to a shortage of surface and groundwater to support riparian ecosystems in California. As we move forward, we need to think of where we can restore natural stream flows or move water to re-expand LBVI into its former range northward (such as the Lower San Joaquin and Kern River area). LBVI recovery needs series of stepping stones of functional LBVI breeding habitat within the Central Valley and Coast Range regions, so we must think strategically about restoring water flows and groundwater in key areas.

2.8 Linkages between Riparian Vegetation and the Insects of LBVI's Habitat (Dr. Daniel Marschalek, Assistant Professor, University of Central Missouri).

Meta-analysis of 114 studies suggest that trophic cascades between LBVI, insects, and vegetation are complex ecological processes that require empirical studies across systems and species combinations to reveal their governing principles (Borer et al. 2005). Arthropods are an important food source for many species of birds; breeding birds in particular can have a significant impact on arthropod populations, which in turn increases plant survival and growth. Although plant defenses against insects include poisons and digestion-reducing substances, insect herbivores have adapted. Butterflies are considered to be indicator species for plant and soil diversity. Management actions to control insects, including the invasive SHBO, in riparian vegetation might include the inoculation of trees, biological control (parasitoid wasps), and chemical control. Managers should be careful not to negatively impact other arthropod species that are important to LBVI diets. Researchers are interested in studying what SHBO infestation means to riparian vegetation communities. The primary scope of work includes the study of riparian areas with and without SHBO in relation to breeding LBVI, vegetation, and other arthropods. These studies could include wintering birds as a secondary scope and study variation among sites, within sites, and across years.

2.9 Brown-Headed Cowbirds' (BHCO) Natural History and Their Effects on LBVI and Other Sensitive Birds (Mary Whitfield, Research Director, Southern Sierra Research Station).

In most cases, BHCO control is effective and increases reproductive success of host populations such as LBVI. The next main phase of BHCO management focuses on refinement of past practices. BHCO trapping technique refinements for LBVI are ongoing. Trapping has helped reduce BHCO numbers and contributed substantially to increased LBVI populations. Research has shown that nest productivity is much higher for LBVI when BHCO are trapped in March (as compared to other months), due to BHCO's breeding cycle. The conclusion is that appropriate short-season BHCO trapping is at least as effective in reducing nest parasitism of LBVI as full-season trapping.

2.10 Breakout Exercise: Current Distribution and Issues Moving Forward

Below is a summary of major themes and ideas that resulted from the breakout exercise:

- LBVI stressors/constraints, in alphabetical order
 - BHCO parasitism
 - inconsistent survey data
 - lack of prescribed fire/increasing fuel loads
 - non-native species (plants, feral pigs)
 - pesticides
 - SHBO
 - water quantity (reductions in surface water, groundwater, episodic flooding)
- important drainages and opportunities
 - Santa Ana River
 - USACE: Prado Basin feasibility studies for sediment, incised stream channels, LBVI, Santa Ana Sucker restoration, and restoration of environmental (for example, base and flood) flows
 - USFS: prescribed fire on hillsides to improve water quality and invasive species management
 - USDA–NRCS: restoration in Orange County, could look for private landowner opportunities
 - San Luis Rey
 - DoD (Marine Corps Base Camp Pendleton [MCBCP]): could look for off-base conservation solutions
 - USDA–NRCS and other agencies: make effort to engage local Tribal governments and indigenous nations
 - USACE: flood control projects
 - Santa Clara River (Ventura/Los Angeles County)
 - land protection
 - habitat restoration
 - San Mateo–San Onofre
 - USMC (MCBCP): surveys, invasive species control, BHCO control
 - Multiple Species Habitat Conservation Plan (MSHCP): some monitoring, conservation
 - desert populations
 - BLM: tamarisk removal, habitat restoration

- California Central Coast and Central Valley populations: critical areas (Santa Ynez River, Salinas River, and stepping-stone habitats throughout the Central Valley), to meet goals of draft recovery plan
- land managers within LBVI range
 - USACE
 - USFS
 - USBR
 - USFWS
 - BLM
 - Western Riverside County MSHCP
 - DoD (for example., MCBCP, Naval Weapons Station Fallbrook, Naval Weapons Station Seal Beach)
- potential areas for collaboration
 - watershed modeling to look for best areas for LBVI restoration
 - restoration of environmental flows on key streams
 - purchasing water rights as mitigation credits
 - spatial vegetation mapping
 - LBVI inventory and monitoring
 - habitat restoration
 - funding opportunities (Section 6, DoD Legacy, DoD REPI, etc.)
 - increase prescribed fire to enhance water supply/improve water quality
 - remove dams
 - inundation of riparian areas
 - BHCO control
 - use of tertiary treated water to recharge groundwater.

3 Day 2: Wednesday, 25 April 2018

3.1 Overview: US Army Corps of engineers (USACE) Threatened and Endangered Species Team (TEST) (Richard Fischer, US Army Engineer Research and Development Center [ERDC], Vicksburg, Mississippi)

USACE spends \$230 million annually on TES that contribute to significant mission impacts. USACE has developed the TEST with the primary focus on listed species that impact navigation but which addresses impacts of TES on other missions as well. The goal is to improve operational flexibility, reduce future costs, improve budget planning capabilities, reduce adverse impacts to mission execution, and improve species conservation outcomes (including recovery). USACE used the 7(a)(1) approach that led to recovery of the interior least tern (*Sterna antillarum athalassos*) with hopes that the same process can be implemented to recover LBVI. Conservation Management Agreements (Section 7[a][1] Conservation Plans) are formal agreements that allow for long-term management with any combination of agencies and organizations (United States 1982). Partners must have legal authority for management and agreement must contain funding mechanisms. MCBCP has received operational flexibility because of its Section 7(a)(1) conservation activities. Our hope is that collaboration via a multiagency Section 7(a)(1) plan results in the recovery of LBVI.

3.2 DoD Readiness and Environmental Protection Integration (REPI) Program Outline (Ryan Orndorff, DoD Natural Resources Program, Office of Secretary of Defense)

REPI is a partnership-based program with the authority to implement projects based on two primary purposes: incompatible development (easements) or protection/restoration of habitat for species that affect the mission. REPI can work with state governments or private conservation organizations (nonprofit or profit [timber investment management organizations, conservation banks]). Implementation occurs through cooperative agreements at the installation level. Partnering agreements with cost-share requirements or in-kind contributions also occur. The program generally seeks one-to-one matching contributions, but that target is not compulsory. If a partner agrees to take on management, for example, the program considers that a match, too. Authorities allow for

DoD funds to be counted as a nonfederal match to any USDA–NRCS or DOI program. REPI has been able to provide matching funds through USDA–NRCS Healthy Forests Reserve Program (US Department of Agriculture 2020), Agricultural Conservation Easement Programs (US Department of Agriculture 2016), Pittman Robertson (US Department of Interior 1938), North American Wetlands Conservation Act, and Section 6. The Sikes Act is a driver of integrated natural resource management plans (INRMPs), the primary tool for conservation on installations. An INRMP is going to be the foundation of 7(a)(1) for installations. The Sikes Act of 1960 (16 USC 670a-670o, 74 Stat. 1052) also gives authority to work across boundaries on nonfederal lands. The DoD has authority to enter into cooperative agreements for management of natural resources off of installations. It does allow lump-sum funding up front to establish management endowments. Rather than having to fund projects year by year, we can identify long-term, potential in-perpetuity costs and provide upfront costs to eligible entities. We are trying to explore how to put authorities to work more broadly and efficiently through CWPRI.

3.3 The Working Lands for Wildlife Initiative (Thomas Moore, US Department of Agriculture–Natural Resources Conservation Service [USDA–NRCS], Davis, California)

Farm Bill¹ funding is designed to help farmers and ranchers address issues on their lands through incentive programs and easements. Participation is voluntary in all programs and includes consultation for planning. There is competitive funding for eligible producers who complete reimbursable contracts to specifications. All interactions, plans, and contracts with clients are private as stated in policy and Farm Bill statutes. Funding priorities include water quantity, erosion control and drainage control, water quality, vegetation management, and wildlife habitat improvements. USDA–NRCS California has always had multiple funding pools for targeted at-risk wildlife species. Currently, USDA–NRCS has focused on SWFL through its Working Lands for Wildlife program, but it is interested in aiding conservation of LBVI. USDA–NRCS's process for both SWFL and LBVI include (1) a targeted approach near historic or extant territories, (2) using habitat suitability models and science provided by USGS to prioritize areas, (3) enhancing riparian habitat with partners, and (4) increasing nesting habitat and connectivity through invasive species management.

1. Agriculture Improvement Act of 2018, Pub. L. 115-334, 132 Stat. 4490 (2018).

Potential opportunities exist to work on habitats for SWFL and LBVI by (1) expanding USDA–NRCS technical assistance in southern California with partner biologist positions with ABC, USFWS, DoD, and others; (2) increasing the joint funding for riparian habitats enhancement occurring with the USFWS Partners program; (3) securing matching funding for riparian restoration projects or agricultural easements through REPI; and (4) coordinating with interested federal, state, and local partners.

3.4 Endangered Species Recovery Program (Amy Fesnock, Wildlife and Listed Species Lead California State Office, Bureau of Land Management [BLM])

The BLM Recovery Fund is repurposing congressional dollars to work on a concerted effort to push species into the down- or delisting realm. BLM is interested in the genetics of LBVI in the desert and how important these individuals are to the overall range-wide population. We need to determine what these small isolated desert populations contribute toward overall recovery goals. Given the sum total of stressors, scattered populations may have a higher value. Even with ESA 7(a)(1), we are uncertain if we are moving toward a target. Therefore, we need to establish what recovery looks like and identify those targets to reach it.

3.5 Addressing LBVI within the US Army Engineer District, Los Angeles (Edward DeMesa, USACE, Los Angeles District)

The USACE missions are primarily navigation, ecosystem restoration, and flood management. USACE restores habitat but needs to justify the ecosystem restoration measures. USACE does have LBVI near several of its dams. Most dams in the region along the Santa Ana, Los Angeles, and San Gabriel Rivers are projects constructed prior to 1986 but which continue to operate and maintain in cooperation with nonfederal partners. Water supply facilities represent another opportunity for LBVI. The Los Angeles District is conducting some water conservation studies, currently for dams, as well as some studies about sediment use for ecosystem restoration. USACE is encouraging understory growth that will benefit LBVI. There is a need to convince policy makers that these are good projects. Management also wants to think about species beyond LBVI and show decision makers that we are proposing multispecies management to justify funding. Partners may be able to help USACE manage sediment. Funds are difficult to obtain if there is no legal commitment, because projects do not necessarily rise to the top. However, if ESA 7(a)(1) links

stewardship operation that is supported all the way to headquarters, it will create justification that there is a broader link (CWPRI, TEST). Letters of recommendation are always helpful for providing leverage to fund Los Angeles District projects, and active involvement from CWPRI could assist in this regard.

3.6 Location and Status of US Bureau of Reclamation (USBR) Facilities in the Historic Range of Least Bell's Vireo (LBVI) (Doug McPherson, Environmental Protection Specialist, USBR Southern California Area Office)

The USBR only has lands in the 17 western states, and these are broken into five regions that focus on water management. Currently, the Southern California Area Office does not have lands where LBVI occur. There is current interest in modifying or restoring the Los Angeles River, and USACE may perform some restoration on 11 miles of the river. The Lower Colorado River has an approximately \$30 million annual effort for restoring habitats of other species. The Southern California Area Office also has about \$45,000 each year as discretionary ESA funds that could assist in LBVI conservation. (Postworkshop note: the Mid-Pacific Region has an interest in this species under the Central Valley Project Improvement Act's² [CVPIA] Conservation Program and the CVPIA's Habitat Restoration Program.)

3.7 US Forest Service (USFS) Riparian Conservation Programs in California (Patti Krueger, Threatened and Endangered Species [TES] Coleader, USFS Pacific Southwest Division)

The USFS is initiating more programmatic efforts and is interested in how and where to push species toward recovery to achieve desired results. The National Forest Management Act of 1976 (16 USC §§ 1600–1614, August 17, 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, 1988 and 1990). provides for viability of species on USFS lands. USFS is the largest federal landowner in California, but much of the land is higher elevation, which is mostly unsuitable for LBVI. USFS conducted numerous bird surveys in the 1980s and 1990s but have not surveyed many areas since. Many surveys are biased to locations near roads or during certain times of year (for example, Christmas bird counts). Two big pieces should also be part of this

2. Reclamation Projects Authorization and Adjustment Act of 1992, Pub L. 102-575, 106 Stat. 4600 (1992).

effort: land rehabilitation to reduce catastrophic effects of wildfire on species and the Clean Water Act (3 USC §1251 et seq. [1972]). USFS is removing invasive species, but there have not been follow-up surveys to determine if LBVI have recolonized USFS lands.

3.8 Riparian Programmatic Consultation (Colin Lee, Riparian Biologist, US Marine Corps [USMC] Camp Pendleton)

MCBCP has a long history of conservation measures for TES, including the LBVI. MCBCP has a multispecies, programmatic biological opinion to increase mission flexibility and efficiency for training operations on the installation beaches and waterways. Pendleton has been involved with significant BHCO control and removing giant reed (*Arundo donax*) on approximately 1,300 acres. Pendleton's conservation actions have led to more favorable incidental take statements in biological opinions involving LBVI and have helped save money and increase mission flexibility. Pendleton has conducted postfire and *A. donax* removal effects studies for LBVI. Management strategies include conducting activities during the nonbreeding season, minimizing actions where impacts cannot be avoided, and offsetting any losses through improvements to species/habitat values and functions. The MCBCP Riparian Ecosystem Conservation Plan (a key component of the programmatic biological opinion) is based on an ecosystem management approach for training the warfighter while improving ecosystem integrity and providing conservation actions for maintaining populations of sensitive species (Pendleton 2017). The plan intends, where possible, to contribute to the conservation of TES to reach nonendangered status to restore riparian functions and values for all riparian species. This will continue to involve BHCO trapping, aquatic non-native species management, and research studies to improve understanding and management.

3.9 National Fish and Wildlife Foundation (NFWF) Work for Positive Species Outcomes and Funding Potential to Support CWPRI Effort (Jody Olson, Director Federal Relations)

NFWF's purpose is to undertake and conduct such activities to further the conservation and management of the fish, wildlife, and plant resources of the United States and its territories and possessions for present and future generations of Americans (Congressional Charter 1984). NFWF's call to action is to develop long-term, science-based conservation programs with measurable outcomes that move the needle forward for key species, places

of importance, or issues. NFWF can assist with some outside the box issues such as water transactions or endowment for BHCO trapping and also with monitoring and long-term funding. NFWF has priority landscapes in the Central and Southern California watersheds and forests. NFWF can take federal and nonfederal funding for conservation and can work across jurisdictions/agencies to do on-the-ground work.

3.10 Defenders Support for Carlsbad Recovery Efforts (Jake Li, Director, Defenders of Wildlife [DOW], Center for Conservation Innovation)

DOW has developed a draft Dynamic Online Recovery Plan Tool for the DoD Legacy Resources Management Program; <https://www.denix.osd.mil/legacy/home/>). This tool allows the user to login and make changes when recovery actions are implemented. The pilot study is being conducted on the eastern indigo snake. The goal is to achieve faster recovery and easier consultations. The tool will include dynamic maps of species occurrences and restoration actions and take authorizations as well as data integration with Section 7 consultations, habitat conservation plans, and other materials. The tool will be easily updateable, will track progress of recovery actions, and will provide for better public engagement. This will help with SSAs and recovery implementation strategies. LBVI has had about 600 consultations from 2008–2016, 281 of which were formal consultations. This tool can be a central place to provide updated LBVI population estimates, help track status of LBVI recovery actions, and assist with integrating ESA Sections 7(a)(1) and 7(a)(2).

3.11 American Bird Conservancy (ABC) and Southwest Riparian Birdscape Initiative (David Younkman, Vice President Western Region, ABC)

ABC was founded in 1994 to conserve birds and their habitats across the Americas. Its annual budget is \$12–\$15 million to work throughout the Western Hemisphere, including the continental US, Hawai‘i, Canada, Central America, and South America. ABC has a focus on science-driven, on-the-ground actions and has dedicated capacity and commitment to riparian birds and habitat. ABC was heavily involved in past 7(a)(1) plans (interior least tern with USACE) and is very interested in playing a role with a similar effort with LBVI.

3.12 Shot Hole Borer (SHBO) in California (Dr. Akif Eskalen, University of California, Riverside)

The invasive SHBO has caused massive die-offs of riparian trees in California. The pest was first discovered in California in 2003 in funnel traps near Los Angeles, but the problem was not recognized until 2012, when it was discovered in a backyard avocado tree in Los Angeles. A second invasion occurred in San Diego in 2014. Polyphagous Shot Hole Borer (PSHB) is found in Southern California and is associated with fungal symbionts (meaning it does not feed on hosts but uses the host to grow the fungi). Kuroshio Shot Hole Borer is also found in southern California, but it's not as widespread in the LBVI range as PSHB. Both species of bark beetles attack stressed, dead, and dying trees, while PSHB attacks healthy trees to have a suitable place to grow their fungus. Fungi are pathogenic to the plant. When the host plant realizes the fungus is present, the host produces preventative mechanisms, but this clogs the xylem and desiccates the host tree. Each host has a different susceptibility; box elder is preferred, but there are few to none of these trees remaining in Southern California. SHBO have a wide host range—so far 338 tree species. Among them, they could grow fungus on 138 species, 19 of which are native tree species. This invasion has devastated the Tijuana River Valley, killing 180,000 willows. Management includes early detection, determining where to allocate resources for management, and identifying endophytic organisms for biocontrol. More information on SHBO is available at www.eskalenlab.ucr.edu and www.pshb.org.

3.13 What is Needed for Conservation in the Next Two Decades? Table Discussion and Question-and-Answer Session (Barbara Kus, Peter Beck, Jon Avery)

Many things will be needed to ensure LBVI conservation in the next 20 years. Most of the population is concentrated in Southern California and is already highly managed in some areas, including MCBCP and Prado Basin/Santa Ana River. Some LBVI occurrences have been detected in the northern range, such as the Central Valley. The LBVI population has grown but only within limited borders; it has not expanded back into much of its historic range. Northern expansion is encouraged along the coast and Central Valley, but management of the current populations in Southern California, and protection against new and old threats (such as SHBO) are still necessary. To encourage northern range expansion of the current LBVI population, we need an effective road map for how agencies

can participate in the strategy within their own jurisdictions and missions. We should start by evaluating possible areas of suitable/easily restorable habitat south to north. Do these areas need restoration activity, or does BHCO management need to take place in order to re-establish effective occupation? Can we do an assessment of riparian drainages along the coast to evaluate them as potentially suitable for LBVI and for possible management actions? The Santa Clara area is a possible source population, and there is need to determine if Mexico is another option. Additionally, expansion into the eastern California desert areas may be important. A genetic link to populations that thrive in the desert climates could exist, and may provide a refuge for climate change. While evaluating expansion sites, we must enhance the ability of the Los Angeles area to support LBVI while continuing to handle new threats to the southern range core areas.

Next we need to fund a planning effort to identify how we can expand the LBVI populations on a site-by-site basis. When we find new sites, we will need to determine who the land manager is, and reach out to them to see what they can provide. Is there science to support this venture? For example, are desert birds important, and how do genetics impact conservation of the species?

3.14 Range-Wide Conservation Planning: Putting It All Together in a 7(a)(1) Framework (Jonathan Snyder, USFWS, Carlsbad Fish and Wildlife Office (CFWO); Jon Avery; Richard Fischer; and Ryan Orndorff)

Potential conservation actions or measures that could be documented in a 7(a)(1) framework

- LBVI habitat suitability model to determine best areas for restoration (based on SWFL example), then overlay with land management
- assessment of habitat suitability on wintering and breeding grounds
- SSA;
- BHCO trapping expert to coordinate range-wide activities, determine thresholds for additional trapping
- Removal of invasive plant species within riparian corridors
- online dynamic recovery tool for LBVI
- update of draft recovery plan to update stressor information and to determine recovery criteria, minimum population size, and distribution for LBVI
- California-based riparian bird coordinator (potential to assist with online recovery tool)

- identify a lead coordinating entity and financial fiduciary to drive collaborative efforts
- remove regulatory barriers (state/federal) that serve as disincentives for landowner restoration
- range-wide monitoring strategy for implementation and delisting postmonitoring strategy (need to determine standards, methodology, and desired output)
- find collaborative funding opportunities (for example, Section 6, DoD Legacy, DoD REPI, NFWF)
- find additional partners to assist in local efforts (for example, State of California, Native American Tribal governments and indigenous nations)
- look for opportunities to benefit other riparian-dependent species in our recovery efforts
- consider establishing a recovery team
- water management (flood control, water rights, inundation)
- land purchases for USFS/BLM
- determine where habitat restoration on lands managed by participating CWPRI agencies or easements is a potential (for instance, there may be opportunities for BLM in Central Valley or opportunities on USDA–NRCS easements)
- conduct educational outreach for LBVI with general public and landowners
- explore additional LBVI opportunities on DoD installations
 - Camp Roberts
 - Camp San Luis Obispo
 - Vandenberg Air Force Base
 - Naval Air Station Point Mugu
 - Naval Base Coronado
 - Fallbrook Naval Weapons Station
 - existing REPI or Army Compatible Use Buffer parcels
 - California Army National Guard sites of sufficient size with no INRMP (sites range from 150 to over 2,000 acres)
- provide assistance/guidance to encourage the expansion of LBVI populations into new areas within its range (such as Camp Roberts)
 - assure no negative impacts to mission capabilities
 - Section 7 consultation with incidental take statement might assist in providing those mission and regulatory assurances
 - explore templates or other ways to expedite the process if Section 7 consultation is the recommended process
- explore USACE flood control projects/sediment studies/restoration opportunities/mitigation potential
 - Tijuana Valley
 - San Luis Rey
 - Aliso Creek

- Santa Ana River (to include Prado Dam, Brea Dam, Carbon Canyon Dam, Fullerton Dam, Seven Oaks Dam, Whittier Narrows Dam, Santa Fe Dam)
 - Los Angeles River (to include Hansen Dam, Lopez Dam, Sepulveda Dam, and channels in between)
- evaluate the potential for LBVI gains in USACE San Francisco and Sacramento District basins
- look for local partners/sponsors to help gather support for projects
- watershed modeling (such as USBR in-stream flow team).

4 Day 3: Thursday, 26 April 2018

4.1 Hydrology and Riparian Vegetation on the Coastal Slope of California (Jon Avery, USFWS Ecological Services Office, Carlsbad, California)

Groundwater, surface water, and flooding naturally all combine to support riparian vegetation that LBVI depend upon. Groundwater provides effective moisture to mature and immature riparian vegetation when it is within one to seven feet of ground surface. Groundwater provides available moisture to riparian vegetation on floodplain areas that are away from surface water and channel margins, moisture to riparian vegetation during drought periods, and moisture to riparian vegetation along intermittent streams. Surfacing groundwater flows downstream and maintains downstream riparian areas. Groundwater pumping often lowers groundwater levels below the depth that riparian vegetation needs to function or survive. The overall effect is a loss of riparian vegetation and wildlife habitats (including reduced or eliminated LBVI populations). As groundwater levels drop, riparian ecosystems in California become degraded or are eliminated. Surface water (from upstream) supports LBVI by maintaining high groundwater levels in nearby riparian floodplains and maintaining surface soil moisture levels for riparian vegetation that occurs adjacent to channels (particularly in areas where groundwater is distant from the ground surface). Flooding events support LBVI by episodically covering or submerging floodplains with water; temporarily increasing surface soil moisture in floodplains; recharging groundwater levels; moving and depositing sediment along channels and floodplains; knocking down and denuding vegetation along floodplains by scouring (needed every 5–10 years to reset/maintain essential vegetation succession); cyclically resetting successional stages for riparian scrub/woodland/forest; and preparing essential seedbeds for important woody plant recruitment (for example, Fremont cottonwood).

4.2 Identifying a Strategy for LBVI Recovery

4.2.1 Short-Term (3 Months)

- compile and distribute meeting notes to participants (leads: Richard Fischer, Jacob Jung, Stephanie Hertz, and Jon Avery)

- convene a conference call to explore potential funding opportunities (that is, DoD Legacy, Section 6, NFWF, USDA–NRCS Regional Conservation Partnership Program [ABC], etc.) for LBVI’s needs (leads: Ryan Orndorff, Jon Avery, Peter Beck, Patti Krueger, Jenny Marek, Jody Olson, Richard Fischer, Jacob Jung, and David Younkman) Jenny Marek of Ventura Fish and Wildlife Office (VFWO) already pursuing DOI Endangered Species Conservation Fund Section 6 Grant for development of the habitat suitability model, plus on-the-ground site habitat assessment surveys and vireo discovery surveys in northern coastal range extension area (Ventura County through Salinas Valley)
 - Marek coordinated with Carlsbad Fish and Wildlife Office (CFWO) staff, California Department of Fish and Wildlife (CDFW) staff (Dan Blankenship, Christine Beck), refined previous proposal to meet objectives stated in workshop and meet CDFW expectations (proposal due date was 11 May 2018).
- determine other stakeholders for local CWPRI efforts (for example, State of California) (leads: Ryan Orndorff, Richard Fischer, and Jon Avery [note: Jody Olsen is working with state partners currently on a Section 6 proposal])
 - develop range-wide 7(a)(1) framework (leads: Richard Fischer, Stephanie Hertz, Jacob Jung, Jon Avery, and Tad McCall)
 - advisory input from Peter Beck, Barbara Kus, and Gjon Hazard
 - framework could serve as primary short-term product following workshop
 - further tasks and concepts all to be fit into this framework
 - additional elements of this framework developed over time
 - use existing information from the draft recovery plan, literature, and other available data
 - compile information from the conservation workshop
 - solicit review and input from participating organizations
 - determine if funding is needed for a long-term lead writer
 - develop long-term file sharing website outside USFWS for data, research, and information sharing (USFWS limited to only 30 days).

4.2.2 Middle-Term (6–9 Months)

- identify lead(s) and develop habitat suitability model(s) for LBVI (lead: to be determined with input from Jon Avery, Peter Beck, Barbara Kus, Jacob Jung, and other participating agency reps)
- NFWF (Jody Olsen) to propose model through Section 6 funding, mostly for unoccupied or sparsely occupied northern range (will still need similar effort for southern range)

- funding pursued, in part, through Section 6 proposal described above
 - proposal includes central coast area only, so funding needed for rest of range
 - include input of Jenny Marek (VFWO) and Gjon Hazard (CFWO).
- conduct initial quick overview for high-priority drainage areas using GIS then determine methodology and process for ground truthing
- find out status of breeding range for LBVI in Baja, Mexico (leads: ABC, appropriate joint ventures)
 - input from Jon Avery, Peter Beck, Barbara Kus, and Gjon Hazard
 - Hazard is lead of CFWO Listing and Recovery Division, so include in effort
- will attend next Sonoran Joint Venture meeting, in part to investigate funding opportunities and potential Mexican partners
 - process for Baja population investigations should be similar to northern coastal expansion area: habitat modeling (via GIS), ground-truth habitat assessment (habitat type, condition, BHCO presence, other threats), and LBVI discovery surveys (last two parts done together)
 - goal to develop and then implement a plan through ABC or some other nongovernmental organization (NGO), as NGOs may have fewer limitations operating internationally
 - include a Mexican partner
 - include San Diego Natural History Museum, as appears to have many connections in Baja
- identify coordinator to drive local efforts for LBVI and other riparian species of interest (lead: ABC, if funding can be secured)
 - keep coordinator (such as ABC) connected back to shared vision between partners
 - find potential funding contributors
 - coordinate for two to three years, then assess long-term needs.

4.2.3 Long-Term (12–24 months)

- develop range-wide monitoring strategy (lead: to be determined with input from Jon Avery, Peter Beck, Barbara Kus, and other participating agency reps)
 - clarity needed regarding monitoring and monitoring objectives
 - traditionally, *monitoring* means structured surveys/sampling over a given range and is most typically applied to areas with known populations
 - objective to track population changes over time with regard to measurable population features so that the management strategy can be adjusted to ensure population health and persistence.
 - discovery surveys above indicate some initial (and maybe repeated) effort to discover individual birds or populations in areas where they had been absent or where we did not know they occurred
 - discovery surveys are not monitoring
 - design and implementation of discovery surveys very different than traditional monitoring
 - used to detect new populations as the species expands its range (while monitoring used to track dynamics of known populations)
 - USFWS needs range-wide monitoring strategy
 - will inform decision to delist
 - must be different from current local monitoring strategies (for example, on MCBP), which are very time and cost intensive
 - occupancy approach guided by a habitat suitability model may also be viable option
 - develop range-wide monitoring based on input from the LBVI habitat suitability model
 - use strategy to monitor population changes in focal drainages
 - consider merits of conducting a range-wide inventory (one-to-two-year timeframe) to get snapshot of current distribution and population sizes by drainage (region by region or whole range?)
- SSA (lead: to be determined with input from Jon Avery, Peter Beck, Ryan Orndorff, and other participating agency reps)

- first secure funding, then begin SSA process to inform recovery criteria, targets, and range-wide status
 - compile datasets from participating agency partners (with their leadership approval) and the public
- determine feasibility of range-wide BHCO trapping expert (lead: to be determined)
 - may initially be same person as riparian birds coordinator to make sure information gathering is coordinated closely with other objectives
 - team to develop and implement range-wide BHCO management plan as part of 7(a)(1)
 - identify strategy to manage BHCO consistent with recovery goals for LBVI
 - take into consideration funding and implementation opportunities and limitations
 - address acceptable levels of BHCO parasitism that still allow for LBVI population growth
 - identify key target populations/areas for BHCO management
 - develop strategies to pool resources (for example, mitigation funds) in a way that maximizes recovery benefits for LBVI
 - needs dedicated person to manage its implementation (the “BHCO expert?”)
 - MCBCP to develop field workshop and conduct field demonstration on BHCO management
- explore opportunities to fund range-wide BHCO and invasive-plant management (lead: to be determined)
 - non-mitigation funds managed in accordance with range-wide BHCO management plan? by proposed plan manager?
 - develop range-wide invasive plant management plan (like range-wide BHCO management plan) with matching funding sources (for example, mitigation dollars, grants) to priority invasive plant control efforts
 - explore potential for endowment through NFWF
 - choose program manager
- evaluate high-potential areas of near-future LBVI recolonization in central portion of former range (lead: to be determined)
 - attain permission for monitoring on select private lands
 - evaluate

- targeted public lands directly
 - other areas remotely
 - riparian vegetation
 - BHCO occupancy
 - invasive species
 - land uses
 - direct impacts
 - needs for stream or floodplain protection and/or buffers
 - threats, opportunities, and constraints
- first address easy threats in potential near-future LBVI recolonization in central portion of former range (lead: to be determined) implement BHCO trapping where near-future LBVI expansion has highest potential
 - implement stream and floodplain protections, where appropriate, through fencing or other protection
 - remove invasive plants where appropriate
- collect/monitor data on surface water and groundwater withdrawals within LBVI historic range (lead: to be determined)
 - develop water budgets for each important watershed based on existing data
 - develop historic and current hydrographs where data is available
 - monitor/report surface flows and groundwater levels in historic and occupied range
 - calculate essential surface and groundwater needs for LBVI ecosystem
 - develop instream flows needs report for important drainages within LBVI's historic range (lead: to be determined)
 - restore and monitor instream flows on selected degraded streams on experimental basis within existing and recolonization areas of LBVI's range (for example, Rio Hondo–San Gabriel River–Whittier Narrows) (lead: to be determined)
 - update the recovery plan for LBVI (leads: Peter Beck, Jon Avery, and Gjon Hazard)
 - Hazard will be lead for upcoming recovery plan development
 - use information collected from habitat suitability model, range-wide monitoring strategy, SSA, range-wide 7(a)(1) plan, etc.
 - 1998 draft recovery plan used as starting point for updated plan?
- lots of changes/additions may need to be made
 - updating and finalizing plan will not be simple

- requirements of recovery plan need to be directed and approved by USFWS but can be drafted by persons outside of USFWS
 - improve progress towards finalizing a recovery plan
 - would likely require additional USFWS funds to contract out
 - could be augmented by outside funds
- appoint recovery team for LBVI
 - will augment development of recovery plan
 - would draw on expertise of multiple individuals
 - needs to be assessed for feasibility.

5 Summary

USACE, ERDC, the USFWS, and other members of the CWPRI organized a workshop 24–26 April 2018 at the USFWS Ecological Services Office in Carlsbad, California. The purpose of the workshop was to bring multiple federal and nongovernmental land managers together to discuss the value of conservation planning under ESA Section 7(a)(1) for LBVI in order to promote recovery. The workshop consisted of multiple talks from different agencies on the current status and management for LBVI. Leading experts on LBVI ecology and management presented. Open discussions on ways in which the federal agencies and nongovernmental partners could collaborate as a whole rather than working as separate entities to achieve greater conservation actions occurred throughout the three-day workshop. Major topics discussed to improve LBVI conservation and recovery included (1) habitat restoration with available water resources, (2) continued BHCO trapping, (3) dealing with new threats including climate change and SHBO, (4) conducting range-wide surveys and developing a distribution model, and (5) developing new habitat stepping stones to expand population back into the historic range. Incorporating these major topics into an interagency range-wide 7(a)(1) plan among the federal agencies, in cooperation with the USFWS is an overall workshop outcome.

For additional information, contact Dr. Jacob Jung (601-634-5242, Jacob.F.Jung@usace.army.mil), Dr. Richard Fischer (502-454-4658), Richard.A.Fischer@usace.army.mil) or the manager of the Dredging and Environmental Research Program, Dr. Todd S. Bridges (601-634-3626, Todd.S.Bridges@usace.army.mil). This special report should be cited as follows:

Jung, Jacob F., Stephanie Hertz, and Richard A. Fisher. 2021. “Summary of Collaborative Wildlife Protection and Recovery Initiative (CWPRI) Conservation Workshop: Least Bell’s Vireo.” *ERDC/EL-SR-21-4*. Vicksburg, MS: US Army Engineer Research and Development Center.

References

- Agriculture Improvement Act of 2018*. 2018. Public Law Number 115-334, 132 Statute 4490. <https://www.govinfo.gov/content/pkg/PLAW-115publ334/html/PLAW-115publ334.htm>.
- Borer, E. T., E. W. Seabloom, J. B. Shurin, K. E. Anderson, C. A. Blanchette, B. Broitman, S. D. Cooper, and B. S. Halpern. 2005. What determines the strength of a trophic cascade? *Ecology*, 86(2), pp.528-537. <https://doi.org/10.1890/03-0816>
- Pendleton, M. C. 2017. Integrated natural resources management plan public review draft. US Marine Corps Base and Marine Corps Air Station, Camp Pendleton, California, USA.
- United States. 1982. The Endangered Species Act as amended by Public Law 97-304 (the Endangered Species Act amendments of 1982). Washington: US G.P.O.U.S. Congress, Reclamation Projects Authorization and Adjustment Act of 1992, H.R. 429, Washington, D.C., 1992
- US Department of Interior. 1938. The Federal Aid to Wildlife Restoration Act. US Fish and Wildlife Report: Federal Government Series 105. Retrieved from <https://pubs.er.usgs.gov/publication/wl105>
- US Department of Agriculture. 2018. Healthy Forest Reserve Program. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/forests/?cid=nrcs143_008387
- US Department of Agriculture. 2016. Agricultural Conservation Easement Program. Federal Register Vol 81, No. 201 Retrieved from <https://www.govinfo.gov/content/pkg/FR-2016-10-18/pdf/2016-24504.pdf>
- US Fish and Wildlife Service. Region 1. 1998. *Draft recovery plan for the Least Bell's Vireo (Vireo bellii pusillus)*. Portland, Or.: US Fish and Wildlife Service.

Acronyms and Abbreviations

Term	Definition
ABC	American Bird Conservancy
ARNG	Army National Guard
BHCO	brown-headed cowbird
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CFWO	Carlsbad Fish and Wildlife Office
CVPIA	Central Valley Project Improvement Act
CWPRI	Collaborative Wildlife Protection and Recovery Initiative
DoD	Department of Defense
DOI	Department of the Interior
DOW	Defenders of Wildlife
ERDC	Engineer Research and Development Center
ERDC-EL	Engineer Research and Development Center, Environmental Laboratory
ESA	Endangered Species Act
GIS	geographic information system
INRMPs	integrated natural resource management plans
LBVI	least Bell's vireo
MCBCP	Marine Corps Base Camp Pendleton

MSHCP	Multiple Species Habitat Conservation Plan
NFWF	National Fish and Wildlife Foundation
NGO	nongovernmental organization
NMFS	National Marine Fisheries Service
PSHB	polyphagous shot-hole borer
REPI	Readiness and Environmental Protection Integration
SHBO	shot-hole borer
SSA	species status assessment
SWFL	southwestern willow flycatcher
TES	threatened and endangered species
TEST	Threatened and Endangered Species Team
USACE	US Army Corps of Engineers
USBR	US Bureau of Reclamation
USDA	US Department of Agriculture
USDA–NRCS	US Department of Agriculture–Natural Resources Conservation Service
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USMC	US Marine Corps
VFWO	Ventura Fish and Wildlife Office

Appendix A: Attendees at the Workshop of the Collaborative Wildlife Protection and Recovery Initiative (CWPRI) Conservation Workshop: Least Bell's Vireo, 24-26 April, 2018, Carlsbad, CA.

Jon Avery, USFWS	Douglas McPherson, (USBR)
Peter Beck, USFWS	Christine Medak, USFWS
Roberto Beltran, USBR	Michael Moore, ARNG
Doug Bryceson, Army National Guard (ARNG)	Thomas Moore, USDA–USDA-NRCS
Jodi Clifford, USACE	Shea O’Keefe, USDA–NRCS
Kyle Dahl, USACE	Jody Olson, NFWF
Eduardo Demesa, USACE	Ryan B. Orndorff, DoD
Colleen Draguesku, USFWS	Diane E. Pancoska, US Air Force
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14. ABSTRACT This special report summarizes the regional workshop held 24–26 April 2018 at the US Fish and Wildlife Service (USFWS) Ecological Services Office in Carlsbad, California on the importance of collaboration among federal, state, and nongovernmental agencies to facilitate the recovery of threatened and endangered species (TES). This workshop focused primarily on one species, the least Bell's vireo (LBVI), and how to achieve full recovery and eventual delisting through agency partnerships. A major theme of the workshop was applying the Endangered Species Act (ESA) Section 7(a)(1) conservation planning process as a building block towards recovery of LBVI—as well as other threatened, endangered, and at-risk riparian species within the Southwest. The main objective of this work-shop was to assemble an interagency and interdisciplinary group of wild-life biologists and managers to detail how the Section 7(a)(1) conservation planning approach, in consultation with the USFWS, can assist in the recovery of LBVI primarily on federal lands but also other public and private lands. Goals of this workshop were to (1) review Section 7(a)(1); (2) outline LBVI ecosystem processes, life history, threats, and conservation solutions; and (3) develop and organize agency commitments to collaborative conservation practices.					
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