



# Central Valley Joint Venture Human Dimensions Literature Review Highlights

September 2016

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## Hunters Literature Review Highlights

**Topic:** Trends in the number of waterfowl hunters in California (on public and private lands), predictors of these trends, and how to best support/create programs to support recruitment and retention of them. This inquiry will also look for insights on: how to maintain/increase hunting club ownership of land with declines in waterfowl hunting, which may be most important.

- 1) **Hunter demographics.** The California Department of Fish and Wildlife data (CDFW c2016) showed a 63% decline in the number of duck hunters in California, from 178,000 in 1971 to 66,500 in 2015. More broadly, the USFWS (2013) reported that in 2011 there were 221,000 hunters for migratory birds. Demographically, the USFWS identified that three quarters of all hunters were rural residents, 91% male, and 88% white. By contrast, there were 6.7 million wildlife watchers in California (USFWS 2013). There is a debate about how to count the number of hunters, with some proposing to count everyone who has purchased a license in their lifetime as a hunter, then distinguishing active hunters (those who purchase a permit in a given year) from inactive hunters (Duda and Young 1995; Enck et al. 1993; Enck et al. 2000; Mangun et al.1996). Alternative approaches such as a lifetime database of hunting participation have been used (e.g., Boxall et al. 2001).
- 2) **Direct expenditures for hunting.** In 2011, direct expenses for hunting trips and equipment were \$885 million, of that \$463 million was for big game, \$142 million for small game, and \$169 million for migratory birds (Raftovich et al. 2011). Angling was a significantly larger activity than hunting in terms of numbers of anglers and direct expenditures. In 2011, there were 1.7 million anglers who had direct expenditures of \$2.3 billion dollars in California. Wildlife watchers in California had \$3.8 billion in direct expenditures (Raftovich et al. 2011).
- 3) **Hunter associates.** Hunter associates have been defined as those who directly benefit from hunting, such as family members who actively support hunters in their households and gain a sense of satisfaction in doing so, and those who eat meat provided by hunters they know. This group is estimated to be double the number of hunters, using the annual hunting license sales to count hunters (Enck et al. 2000).
- 4) **Impacts of HRR efforts.** There is a great deal of literature on approaches for hunter recruitment and retention (HRR), such as effectiveness of videos (Alessi et al. 2013), hunter identities to inform engagement of hunters (e.g., Schroeder et al. 2013), and the relationship between expectations, satisfaction with hunting experiences, and intentions to hunt in the future (Brunke et al. 2008). An innovative approach to address HRR was the Vermont's Department of Fish and Wildlife's stakeholder conference to identify specific strategies to increase the number of hunters and improve habitat management. This practical and participatory approach led the group to realize “. . . that the future of hunting is up to everyone who cares about hunting, wildlife and habitat. Not one group - - be it non-profit conservation organization or government agency -- can do it all.” They identified sixteen specific and ambitious strategies to build a stronger hunting culture in

Vermont to improve wildlife habitat for viewers and hunters (Vermont Fish and Wildlife Department 2007).

- 5) **Social habitat model.** One of the most complete and recent frameworks for understanding the human dimensions of hunting was the “social habitat model” proposed by Larson et al. (2014). In this model, hunters were described as needing good social habitat to flourish, just as animals need quality habitat to survive. Three types of social habitat that hunters rely on are the micro level (the hunter, their family, hunting friends, and hunting mentors); the meso level (community support networks, including extended family and peers, and local access to hunting opportunities); and the macro level (society). The meso support was thought to be very important for those from urban areas where hunting is not a common activity nor part of local culture. The macro level considers how society’s demographics are changing, urban areas expanding, habitat being fragmented, and how agency policies affect hunters. These levels all affect each other and are nested from the micro to the macro.
- 6) **Segmenting hunters, race/ethnicity.** Some researchers (e.g., Hunt 2016; Vrtiska et al. 2016) have argued for segmenting waterfowl hunters into different types of hunters for communications and engagement activities. Particularly, Hunt argued that young white males are a dwindling market share within the population of hunters. HRR efforts must broaden their understanding of and responses to growing population segments and address ethnic-based adaptations (among others) to waterfowl and wetlands programs. Without this, he observed, it will be difficult to maintain constituency support and may cost them future legislative support.
- 7) **Private lands hunter access.** Access for hunting for urban residents has been described as an HRR challenge for urban residents (Boxall et al. 2001). An Oregon study (Rasker et al. 1991) of farmers with waterfowl habitat found that 87 percent allowed hunters on their land; of these, 54 percent charged an access fee and 46 percent allowed free hunting. Over half invested in habitat improvements, saying they did so for financial returns from hunting leases, aesthetic appreciation, and personal enjoyment from waterfowl hunting. Deterrents listed by landowners were negative attitudes toward hunters and concern about being sued by hunters who use their land. Policies designed to stimulate habitat improvement by farmers should address the issues of wildlife damage and landowner liability.
- 8) **Hunt clubs.** Duck hunting clubs (hereafter hunt clubs) have a long and noteworthy history in Central Valley and throughout California for protecting wildlife habitat, especially for waterfowl. According to Hall (2011), the hunt clubs were the primary organizations (other than some farmers) that funded site preservation, built and maintained water infrastructure to flood waterfowl habitat, and did site management until 1985, when duck stamps provided significant income for the state and federal governments to purchase and manage wetlands. While he provided some historic estimates of the number of clubs, he called for another full inventory of them. Brown (2008) conducted a statewide survey of privately owned wetlands to identify their management practices, assess the effectiveness of their management practices, and their expenditures. He identified 351 properties in California and assessed 168 of them (including 66 from Suisun Marsh), finding that management practices had a significant

impact, and that owners spent a total of \$2.8 million annually on management practices, or about \$19,000 per owner. A project was underway in the Suisun Marsh in 2016 to interview recreational users of the marsh, which may have included duck hunt club members.

- 9) **North American Waterfowl Management Plan (NAWMP)/Flyways study to have utility.** The NAWMP bi-national study of hunters will be conducted in summer/fall of 2016. It will provide a wealth of information on waterfowl hunters, their behaviors, their preferences for recreational experiences, their conservation behaviors, their perceptions of ecosystem services of wetlands, and more. The study will also provide comparative information about bird watchers and the general public. This information will be available at the flyway and regional (three regions within each flyway) level.

### **Farmer Behavior and Programs Literature Review Highlights**

**Topic:** Farmer behavior related to wildlife habitat and how to best support/create programs for habitat. Emphasis on understanding what motivates rice farmers (and to a lesser degree grain and non-grain farmers with access to water) to implement wildlife-friendly practices; to enroll in habitat incentive programs, and to identify how to best support them.

- 1) **Central Valley rice grower CSP enrollment.** Moses's (2013) thesis, which assessed Central Valley rice grower enrollment into the Conservation Security Program (CSP), provided information on rice growers' adoption or non-adoption of wildlife conservation activities in exchange for incentive payments. Although her sample was small (n= 183) and her response rate low (16%), there were insights worthy of consideration and further study. The program resulted in adoption of wildlife conservation practices, but only a small percentage of growers adopted high impact, broad-scale habitat enhancements, despite high payments. She found that loss of farm control to oversight and regulations was a significant barrier to program participation. Respondents were also concerned about the complexity and length of the application process, as well as the strictness or complexity of recordkeeping. A remarkable finding was that full-time farmers, and those with larger farms, had greater levels of participation, opposite of what is found elsewhere. She speculates that successful rice growers (particularly with large acreages) are making adequate income, providing them with the funds and management flexibility needed to pursue complex conservation schemes to benefit wildlife.
- 2) **Almond and grape growers (conservation motivations).** Like other types of farmers, almond and grape growers are not a homogenous group of people. Klonsky et al.'s (2004) research segmented California almond and wine grape growers into three types of management styles: Environmental Stewards, Production Maximizers, and Networking Entrepreneurs. Environmental Stewards placed higher priority on conservation of natural resources than on getting the highest possible yields or profits. The wildlife benefits of practices should be emphasized for them. Production Maximizers prioritized more traditional goals of producing the highest possible yields and quality and of

focusing resources on the farm rather than on outside concerns. For them, the economic benefits of wildlife conservation activities should be emphasized, and learning about conservation practices, enrollment procedures, should be concise and not “waste” any of the farmers’ time. Networking Entrepreneurs evaluated new information with a business-like attitude and had off-farm economic interests. The economic and environmental benefits should be clearly described to them. Each type of farmer preferred their own type of information and information sources and had different likelihood of adopting and maintaining wildlife habitat management. It is inferred from this and other research that some farmers need larger economic incentives to adopt wildlife management practices and less information about the practices. Others need fewer economic incentives but need to know the benefits to wildlife.

- 3) **Multifunctionality.** Mulvaney’s (2008) work in California emphasized “multifunctionality” of farmlands (i.e., the farmland is managed to have multiple benefits, such as growing crops, riceland being flooded for waterfowl habitat, having wildlife hedgerows, cutting hay to accommodate bird nesting needs, etc.). Mulvaney’s sociological research concluded that rice subsidies may be found illegal by the World Trade Organization, so if the California rice industry is to prosper, a different form of payment to growers needs to be found. He proposed payments for conservation, developing regional markets for rice, and increased work by other rural sociologists to address this issue.
- 4) **Working lands voluntary conservation.** In 2011, the Migratory Bird Partnership Migratory Bird Conservation Partnership (Audubon California, PRBO Conservation Science, and The Nature Conservancy), in collaboration with the California Alfalfa and Forage Association (CAFA) and U.C. Cooperative Extension (UCCE), convened the “Forage Crops and Migratory Birds Workshops: Exploring Challenges and Opportunities to Expanding Migratory Bird Benefits from Forage Production.” While not strictly human dimensions research, this participatory approach followed best practices for engagement (Golet et al. 2008) and provided insights on this topic. Workshop participants (farmers and conservation professionals) identified five top potential management practices farmers could use voluntarily (because they have little cost to the farmer) to improve foraging and nesting habitat and nesting success.
- 5) **Predictors of conservation behavior: specificity of benefits.** Research from beyond California has demonstrated that farmers increased conservation behavior when they understood the link between the specific conservation practice and the specific benefit to the resource, wildlife habitat, wildlife, or others who relied on the resource, (e.g., recreationists who watch the birds, downstream users of water) (Ryan et al. 2003; Ahnstrom et al. 2009). Sheeder and Lynne (2010) and Czap (2012) found very similar results: when farmers understood that there was a water quality problem that affected others then they were much more like to engage in soil conservation actions. Baumgart-Getz et al. (2012) conducted a highly rigorous meta-analysis of the literature on why farmers in the U.S. adopted best management practices (BMP). They also found that farmers who understood how actions on their farm impacted water quality increased BMP adoption. Linking the specific practice to the specific benefits to the farmer, the environment, wildlife, and others had more impact when done at the individual farm scale (Baumgart-Getz, et al. 2012).

- 6) **Predictors of conservation behavior: land ethos and social good.** One of the most consistent and important motivational factors for adopting conservation measures is a farmer's belief in the importance of conservation of the land (i.e., an ethos associated with dispositions to do social good, intrinsic motivation, and empathy for others). Erickson and De Young (1994) found that when farmers had strong intrinsic motivations (i.e., individual interests, rather than economic or social pressure reasons) about the importance of practicing conservation, they were more likely to adopt conservation practices that protect streams, kept more of their farm in woodlots and hedgerows, and practiced conservation tillage. Ryan et al. (2003) found that some farmers were willing to conserve for the social good. Similarly, Chouinard et al. (2008) identified that farmers varied in their self-versus social interests. Those with higher levels of social interest were much more willing to trade profits for the social goal of conservation measures. Sheeder and Lynne (2010) and Czap et al. (2012) found very similar results using the idea that upstream farmers who practice conservation were tempering profit maximization with empathy-based, environmentally conscious behavior.
- 7) **Predictors of conservation behavior: prior behavior.** Prior behavior (i.e., having done a conservation action before) was one of the strongest predictors of whether or not a farmer conducted a conservation behavior (Klöckner 2013; Moses 2013; Sheeder and Lynne 2010). In fact, some researchers (Moses 2013, Chouinard et al. 2008) found farmers are willing to pay for stewardship once they have invested time and money into starting conservation practices. Specifically, Chouinard et al. estimated, using survey research and econometric methods, that farmers were willing to pay \$4.52/acre/year to continue any of a wide range of conservation practices. They hypothesized that the sunk costs for purchasing equipment and obtaining training to conduct conservation practices, and the benefits of doing the practices, were an investment that farmers were willing to pay to protect.
- 8) **Predictors of conservation behavior: perceived behavioral control.** Klöckner (2013) conducted a rigorous meta-analysis of 56 studies, and found that actual conservation behavior (as opposed to behavioral intention) was best predicted by how much a farmer believed that he or she would be able to implement his or her intentions to conduct a conservation action (i.e., perceived behavioral control), as well as whether or not farmers conducted the conservation behavior before (see prior behavior section above).
- 9) **Predictors of conservation behavior: social norms.** Social norms were also important. Research by Sheeder and Lynne (2010) confirmed that farmers who knew that other farm entities (e.g., lenders, chemical and seed suppliers, equipment dealers) believed that the soil conservation management practice were worthwhile increased the likelihood that the farmer would do the practice.
- 10) **Predictors of conservation behavior: contract terms.** Characteristics of the contract also influenced adoption of conservation incentive programs. Parkhurst (2011) studied farmer willingness to participate in Payment for Ecosystem Services, finding that willingness was a function of the term of contracts (more willing to enroll in shorter-term contracts) and level of payment (more willingness for more money). Canales et al.

(2015) confirmed other studies (Klößner 2013; Moses 2013), when they found a large barrier to adoption of farm conservation practices in the Midwestern U.S. was contract restrictiveness that does not allow farmers to adjust cropping systems in response to weather and market conditions.

- 11) **Predictors of conservation behavior: messiness.** Characteristics of the practice may also influence adoption. Nassauer (1989) proposed that farmers were strongly motivated to be good stewards of their land in part because many wanted it to look good and to showcase conservation practices. In contrast, farmers had negative perceptions of conservation practices that made the farm appear messy.

### Non-hunting Recreationists Literature Review Highlights

**Topic:** Non-hunting recreationists' (e.g., birdwatchers, photographers) attitudes toward waterfowl and wetlands and potential mechanisms to engage them in supporting (through financial and other means) wetlands conservation. Consider how the NAWMP HD survey might be used at the JV scale and fill information gaps on this topic.

- 1) **Bird watcher numbers and contributions.** Nearly five million Californians reported bird watching in 2011 (U.S. Fish and Wildlife Service 2011), with 2.3 million of them travelling to do so and generating \$3.8 billion dollars in economic impact when they did. Seventy-five percent of away-from-home birders in California reported observing waterfowl (ducks, geese, etc.), making those the most watched type of bird. Also impressive, in Merced County, habitat management and wildlife associated recreation contributed \$53.4 million to the county's economy and accounted for about 1,100 jobs (Weissman 2001).
- 2) **Value of wetlands and willingness to pay for conservation.** A number of studies conducted in portions of the Central Valley (Creel 1992), near it (Colby and Smith-Incer 2005, United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census 2013), and across the nation have shown that non-hunting recreationists placed high personal and social value on wetland habitat (United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census 2011, 2013). Colby and Smith-Incer (2005) found strong economic support for riparian habitat from visitors to the Kern River Preserve; they were willing to pay \$77 (2001 dollars) per visitor to preserve the habitat, or about a half-million dollars a year for estimated visitor numbers in 2000 and 2001.
- 3) **Top reason for Refuge visitation.** A national study of all National Wildlife Refuges (Sexton et al. 2012) found similar results nationally and in the Lower Klamath and Tule Lake NWR Refuges in California (the closest refuge to the CVJV region). The number one reason visitors came to the Refuges was for wildlife viewing, with the number two reason bird watching.
- 4) **Economic impact of birdwatching on communities.** Bird watchers' impacts on local communities is notable and demonstrate the value of wetlands to communities. HD



research has shown that wetlands in Merced County provided more economic benefits as wetlands than if they were developed. They generated an estimated \$53.4 million per year for the local economy, from habitat maintenance, acquiring land, and expenditures by recreational visitors (Weissman, 2001). There was also very strong evidence from a multinomial logit model used to calculate total recreational value that water diverted back to wetlands in the San Joaquin Valley was many times more valuable when used to maintain wetlands for recreational activities (\$78 million in 1989 dollars), than when the water was sold for municipal and industrial users (\$19 million) (Creel and Loomis 1992). They identified the economic value of wildlife viewing (primarily bird watching) at \$37-44 million per year in 1997 dollars (Creel and Loomis 1992). Similarly, visitors to the Kern River Preserve in Southern California (primarily dryland habitat but also riparian habitat) generated around \$1.3 million in increased local business activity in this relatively remote rural area (Colby and Smith-Incer 2005).

- 5) **Conservation behavior.** Cooper et al. (2015) found that wildlife recreationists—both hunters and birdwatchers—were four to five times more likely than non-recreationists to engage in conservation behaviors like donating to support local conservation efforts, enhancing wildlife habitat on public lands, advocating for wildlife recreation, and participating in local environmental groups. And, effects were additive; hunter–birdwatchers had the greatest likelihood of engaging in all types of conservation behaviors. Strategies to develop programs that encourage both hunting and birdwatching are likely to help conservation.
- 6) **Conservation concern and support.** According to Sexton et al. (2012), non-hunting recreationists (along with hunters and anglers) strongly supported conservation efforts to protect riparian habitat. They were also concerned about the impacts that climate change will have on fish, wildlife and their habitats. In California and across the U.S., visitors to National Wildlife Refuges supported conservation efforts of agencies to protect wetlands.
- 7) **Conservation donations.** HD research has explored the relationship between various types of recreational activities and support for environmental organizations. A national study (Teisl and O'Brien, 2003) found that wildlife watching, including birding, was the activity that had the strongest association with increasing the individual's likelihood to donate money to or belong to an environmental organization. Interestingly, anglers were much less likely to donate money or belong to an environmental organization than wildlife watchers.
- 8) **Desire to learn about conservation.** McDuff et al. (2008) found that wildlife watchers/birders, hunters and anglers, and the general public in Florida supported and wanted to know more about sustainable watershed management. This suggests that both hunting and non-hunting recreationists can be effectively targeted for wetlands education and support for sustainable wetlands management. However, each audience had difference preferences for how they receive their information. Wildlife watchers (presumably including bird watchers) wanted their information from the parks.
- 9) **Support due to link between habitat protection and recreational experience.** Non-hunting recreational users support for wetlands protection was found to increase when

the link between the harm to the wetland habitat and their recreational experience was clear. Teisl and O'Brien (2003) and Berns and Simpson (2009) both found that when recreational users understood that diverting water from wetlands led to declines in bird watching and wildlife viewing opportunities, that support for water allocation for wetland habitat increased.

### **Urban Support for Wetlands Literature Review Highlights**

**Topic:** Urban residents' thoughts about water, wetlands and associated wildlife conservation (particularly in Central and Southern California); predictors of those thoughts; and what determines if they support allocation of limited water resources for wetland birds.

- 1) **Public believes water shortage serious.** Polling data is prevalent on this issue. In terms of public perception of the seriousness of the water shortage, California voters viewed the state's water shortage as an increasingly serious problem. In May 2015, 67% of Californians (70% in the Central Valley vs. 63% in LA County) described the situation as extremely serious, and 22% said it was serious (Field Poll Release #2503, May 2015). They also believed that drought would continue, with 86% of Californians believing that water supply issues are going to be an ongoing problem even after the drought ends or subsides (Fairbank, Maslin, Maullin, Metz & Associates, March 2015).
- 2) **Water crisis an equity issue.** The human dimensions of the water crisis include a social equity issue. Of those making less than \$50,000 annually, 24% said the drought had a "major impact" on their families, versus just 11% of those making \$50,000 per year or more. As of May 2015, 70% of the California public (67% of Central Valley residents vs. 71% LA County) said a 15-25% water bill increase would be a very/somewhat serious problem. There were large differences in responses between those making under \$40,000 annually, of which 80% say it would be a very or somewhat difficult problem, versus only 45% of those making over \$100,000 (The Field Poll. Release #2503, May 2015). This suggests that lower and middle-income households perceived themselves to be more economically vulnerable, and they would be harmed by rate increases without some type of assistance for effective and equitable water use reduction.
- 3) **Water conservation important.** California voters understood that continued water use reduction is very important for residents, both inside and outside their homes, with eight in ten voters (81%) taking this view. There was little difference between urban residents and those in the Central Valley with 80% Southern Californians saying it is very important versus 78% of Central Valley residents (Field Poll. Release #2518, May 2015). In California, the strongest arguments for reducing household water usage reflected themes of: 1) a sense that water shortages are with us to stay (97% found this very or somewhat convincing), 2) belief in collective responsibility (93% found this very or somewhat convincing), and 3) belief in responsibility to future generations (87% found this very or somewhat convincing) (Gomberg et al. 2015).
- 4) **Mixed committed to environmental protection.** In terms of commitment to environmental protection, in March 2014, Greenberg Quinlan, Rosner, and American Viewpoint reported that 46% of voters said Californians "need to protect the

environment, even if it hurts the water supply,” compared to 36% who said the water supply should be protected even at a cost to the environment, and that voters were largely opposed to suspending environmental regulations that protect fish and wildlife (55% of respondents). As of January 2015, California voters were divided (50% supported relaxing regulations, 46% opposed) about the idea of allowing the state to relax environmental regulations protecting fish and wildlife (Field Poll, Feb. 2015). This result suggests that a plurality of voters support protecting the environment over providing water supplies, a remarkable degree of commitment to the environment, and presumably to wetlands and wildlife. This support could be built upon to advocate for protecting wetlands, especially in light of public understanding that the drought is permanent, and people’s commitment to future generations.

- 5) **Willingness to pay for wetland protection.** Pate and Loomis (1997) found that willingness to pay for wetland quality and salmon fishing in the San Joaquin Valley was \$87 per hectare per year for California residents and only \$27.52 per hectare per year for Oregon residents for the same area (1989 dollars), suggesting that those live closer to wetlands support them more.
- 6) **Wetlands valued most for non-consumptive use.** In New England, the public valued wetlands more for non-consumptive use values (i.e., bird watching, recreation, existence value, etc.) than for the economic/extractive value of the jobs that wetlands created through hunting, tourism, and the flood protection services they provide (Stevens, et al, 1995). They were willing to pay an average of \$74 to \$80 per year (over a five-year period) for wetlands providing flood protection, water supply, and water pollution control and \$81 to \$96 per year for wetlands containing rare species of plants. There are no comparable studies in the West.
- 7) **Wetlands restoration meaningful.** In Utah, urban residents in the Great Salt Lake region reported that wetlands had diverse and significant meanings, and their criteria for project success differed from those identified by project managers (Davenport, et al. 2010). This research demonstrated that it is important to engage stakeholders in restoration planning efforts to avoid local burdens, maximize local benefits, and reduce uncertainty. Planning efforts also need to recognize and include diverse groups’ perspectives when designing environmental communications.
- 8) **Mandatory water restrictions.** Communications efforts not linked to mandatory water conservation policies had little impact on California water usage from 2013 to early 2015. After California mandated 25% water use reduction for water suppliers in early 2015, the state achieved a remarkable 25.5% water use reduction by January 2016 (California Water Boards 2016).
- 9) **Social contracts.** Another policy approach was studied in southern Alberta, Canada that may hold promise (Baird Belcher and Quinn 2011). Urban residents were willing to pay for water quality improvements undertaken by agricultural producers on the condition that the improvements included performance goals. In exchange, agricultural producers were willing to accept payment for performance-based water quality improvements.

## Ecosystem Services Literature Review Highlights

**Topic:** The human dimensions of ecosystem services of wetlands/habitat for birds and how to effectively message about ecosystem services to a variety of audiences (e.g., policy makers, decision makers, public).

- 1) **Ecosystem services.** This area of research is a growing, evolving field that seeks to provide critical information about the market and non-market value of biophysical and socio-cultural ecosystem services for decision-makers. The study of economic and socio-cultural values is the study of the human dimensions (HD) of ecosystem services valuation.
- 2) **Types of ecosystem valuation.** There are three common methods of ecosystem valuation typically employed: (1) direct market valuation, (2) indirect market valuation, and (3) contingent valuation (de Groot et al 2006). Direct market valuation methods identify the exchange value of ecosystem services in markets. For example, when conservation programs “buy” conservation easements, such as paying landowners to not develop wetlands, it is a market transaction, and the price established by the market establishes the value. In indirect market valuation, there are no explicit markets for ecosystem services. The indirect market evaluation method includes a variety of valuation techniques to obtain “revealed” value of the service, or their “revealed preference”. The Avoided Cost technique to indirect market value allows society to avoid costs that would have been incurred in the absence of those services (de Groot et al. 2006). Where it is difficult to identify an appropriate indirect market valuation technique, Contingent Valuation is often used. Contingent Valuation (CV) involves using questionnaires to have respondents state their preference (hence, “stated preference”) for what they would be willing to pay for some ecosystem service. For example, a questionnaire to identify the contingent value of wetlands for wildlife watching could ask respondents to state how much they are willing to pay to have a particular wetland conserved or restored so they could use it for wildlife watching. For ecosystem services values that are quite difficult to measure, such as the existence value of a wetland for future generations, the CV technique can be quite useful (de Groot et al. 2006).
- 3) **Group valuation.** An additional method for ecosystem valuation (“group valuation”), emphasizes the importance of group deliberation in setting the value of an ecosystem service, and is used as an alternative for the three previous methods. It is promoted on the grounds that ecosystem valuation gathers information that will be used to make decisions about what parts of the ecosystem to protect, or how much money or effort to spend protecting it, and even to choose which parts of the ecosystem to protect. Because the information on the value of the ecosystem will be used in decision-making, principles of deliberative democracy related to decision-making should be used for ecosystem valuation (de Groot et al. 2006). Under this method, it is not proper to aggregate the individual preferences, or the direct or indirect market values, or to identify ecosystem value. Rather, it should be identified through public debate/discussion (Wilson and Howarth 2002; McDaniels and Roessler 1998; Sagoff 1998).
- 4) **Value of acre of wetlands.** De Groot et al. (2006) used three types of value (ecological, sociocultural, and economic) to identify twelve categories of value in their total

economic value (TEV) method. The twelve ecosystem services were, in order of increasing contribution: fuelwood, raw materials, water supply, hunting, climate regulation, habitat nursery, biodiversity, water treatment, fishing, flood control, recreation, and aesthetic information. Using this approach, they calculated that, on average, each acre of wetland in the world provides about \$3,274/ha/yr. of TEV.

- 5) **Non-monetized societal value.** The World Resources Institute's (2005) TEV method recommends four categories for ecosystem services valuation: direct use values, indirect use values, option values, and non-use values. Non-use values, often called social values, include a range of non-monetized values. For example, the value the public attaches to preserving wetlands for recreational uses, the environmental justice value of preventing unfair environmental harms from flooding, knowing that wetlands and the waterfowl exist, and valuing the wetlands and waterfowl in and of themselves.
- 6) **Best practices include stakeholder engagement and communication of results.** Stelk et al. (2014) described the U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) as a best practice for ecosystem service valuation for wetland restoration. It included a seven-step approach for conducting ecosystems services valuation: 1) identify the context, 2) define the boundaries, 3) identify stakeholders, 4) develop a functional analysis, 5) perform ecosystem services valuation, 6) develop trade-off analysis, and 7) communicate results.
- 7) **Informing decision-making.** Ecosystem services are often identified to provide information to decision-makers. Rather than emphasizing deliberative democracy and group valuation of ecosystem services as discussed above, another approach to ecosystem services focused on providing decision-makers with the information they need (Bingham et al. 1995). De Groot et al. (2006) found that planners and decision-makers were frequently not fully aware of the connections between wetland condition, how this affected the provision of wetland services, and how this affected the consequent benefits for people. This lack of understanding and recognition has led to ill-informed decisions on management and distorted development that has contributed to the rapid loss, conversion, and degradation of wetlands - despite the total economic value of unconverted wetlands often being greater than that of converted wetlands.
- 8) **Communicating about.** Human dimensions of ecosystem services valuation also focuses on how to appropriately communicate and message about ecosystem services to various audiences. The Bullitt Foundation (2012) found that "... language surrounding ecosystem services projects is a jargon-rich, dense amalgam of scientific, financial, regulatory and conservation parlance." The term "ecosystem services" was very confusing to focus groups that included ecosystem services practitioners, government officials, scientists, academics and other experts. Metz and Weigel (2010) conducted a national voter survey that found that voters strongly preferred the terms "nature's value", or "nature's benefits." Focus groups also preferred green infrastructure (such as wetlands for flood control or restoration of riparian areas) to resource-intensive approaches they replace (such as dams and levees), in part because the cost of green infrastructure was lower than other approaches, saving taxpayer dollars. This suggests framing wetlands projects and riparian restoration projects that provide flood control benefits as green infrastructure.

## Environmental Justice Literature Review Highlights

**Topic:** Socio-demographic and socio-political differences within the Central Valley Joint Venture boundary and how this relates to environmental justice issues. Consider how this would influence communications and engagement strategies with these communities.

- 1) **Central Valley’s population.** The population of the Central Valley is growing quickly - from 6.5 million in 2005 to projected growth of almost 12 million by 2040. The population is also ethnically diverse. In 2006, about half the residents were White, 32% Latino, 9% African American, and several percent identified as American Indian. The poverty rate is about 8% in Sacramento, and 20% in the rest of the Valley, as compared to an average of 13% in the state (Public Policy Institute of California 2006).
- 2) **Groundwater pollution – safe drinking water a human right.** The most poignant environmental justice issue in the Central Valley was depletion and pollution of groundwater. Balazs et al. (2011) documented that community water supplies serving larger percentages of Latinos and renters received drinking water with higher nitrate levels. Lopez et al. (2012) documented that roughly 254,000 people in the Tulare Lake Basin and Salinas Valley were at risk for nitrate contamination of their drinking water. Of these, 220,000 were connected to community public (>14 connections) or state small water systems (5–14 connections), and 34,000 were served by private domestic wells or other systems smaller than the threshold for state or county regulation (which are largely unmonitored) (Harter et al. 2012). The United Nations was so concerned over water quality in the Central Valley that they assigned a Special Rapporteur on human rights to safe drinking water and sanitation to the Central Valley to investigate conditions, resulting in a number of recommendations to the State government urging them to provide access to safe drinking water, particularly for low income and Latino people living in the Central Valley (Albuquerque 2011). In response, California Governor Jerry Brown signed into law Assembly Bill (AB) 685 to ensure universal access to clean water. The bill recognizes that “. . . every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, and sanitary purposes.” AB 685 places the human right to water at the center of state policy and underscores the role of state agencies in addressing the human impact of unsafe water. California state agencies are now required to consider the human right to water (HRTW)— specifically the factors of safety, affordability, and accessibility — in all relevant policy, programming, and budgetary activities. According to relevant case law and international standards, for fulfilling the directive, “to consider,” agencies must refrain from adopting policies or regulations that run contrary to the HRTW; consider the HRTW when establishing planning priorities and initiatives; and develop an approach for public participation (Community Water Center 2016).
- 3) **Groundwater pollution – best management practices.** Nitrate contamination of drinking water sources is expected to continue to increase as nitrogen from fertilizer, manure, and other sources applied in the last half century continues to percolate downward and flow toward drinking water wells. Four types of best management practices for reducing nitrate contamination of groundwater include: 1) design and operate irrigation and drainage systems to reduce deep percolation, 2) manage crop plants to capture more nitrogen and decrease deep percolation, 3) manage nitrogen

fertilizer and manure to increase crop nitrogen use efficiency, and 4) improve storage and handling of fertilizers and manure to decrease off-target discharge. These four types of BMP's summarize 10 management measures and 50 practices and technologies to achieve the nitrate reductions to groundwater (Lopez et al. 2012).

- 4) **Environmental justice communities.** These communities are well organized in California and have worked hard to address environmental and health issues that disproportionately affect working class communities of color (California Environmental Justice Alliance Strategic Plan 2015). They are highly aware of environmental issues, involved with climate change activists, and tend to be politically astute. They may be open to partnering to decrease flooding in environmental justice communities as part of efforts to increase waterfowl habitat and riparian zone protection.
- 5) **Maintain funding opportunities.** California Environmental Justice Alliance (CEJA) worked to pass AB 1071, which created a policy that allows a percent of environmental penalty fines to be directed back into projects that benefit the impacted community (CEJA 2015). An assessment of the feasibility of using these fees for recreational or other community amenities that would be placed in restored riparian or wetland zones in their community should be done. AB 1071 expires in 2016 and needs to be reauthorized, presenting an opportunity to CVJV partners to support this legislative agenda as part of initiating a partnership.
- 6) **Potential funding sources.** The Leadership Counsel for Justice and Accountability is another environmental justice organization that has been legislatively successful and is a potential partner. The California Environmental Protection Agency's Environmental Justice Small Grant Program can help fund participation in land use planning for rural communities. This funding may be an excellent way to support participation of diverse communities in flood reduction efforts through riparian habitat restoration and wetlands creation/management.
- 7) **Spatial planning.** Communities with environmental justice issues have been identified using spatial planning tools. The California EPA, Office of Environmental Health Hazard Assessment recently developed CalEnviroScreen Version 2.0, which focuses on the burdens California communities face from environmental pollutants and their vulnerability to health and economic impacts. If CVJV works in environmental justice areas these maps could be overlaid with flood zone maps, and land use maps for two purposes. This could be a way to identify flood prone areas in environmental justice areas where restoration of riparian zones might reduce human impacts from flooding, while providing wildlife habitat and recreational spaces. It could also be used to identify communities that could benefit from upstream wetlands restoration projects that reduce flooding for their communities. Another approach that is similar to the CalEnviroScreen Version 2.0 is the Cumulative Environmental Hazard Index and a Social Vulnerability Index (CEVA).
- 8) **Meaningful participation of environmental justice organizations requires results.** According to London et al. (2008) the State of California has implemented environmental justice policy in California to improve *participation* of environmental justice organizations (EJOs) in planning processes that affect them. In doing so, the state

responded to the demands of the environmental justice movement for procedural justice. Community-based EJOs demanded self-representation and participation to speak for themselves in environmental decision making processes that impacted them where they lived, worked, played, and learned. The State of California has had mixed success in focusing on addressing environmental justice through public participation. The EJOs have tended to become very frustrated with this for three reasons: 1) they need support (payment for transportation costs, and/or time) to have meaningful participation in planning processes; 2) they need to be brought in early in planning processes so their concerns can be incorporated into projects before it is too late to do so; and 3) they define meaningful participation to mean getting *results* on their environmental justice issues, not just discussing the issues. For them, if the conditions creating problems do not change, participating in environmental justice meetings won't be meaningful for the minority or impoverished community (London et al. 2008).

- 9) **Complexity of public participation.** EJOs, like many other groups, have viewed communication efforts not as a “top-down” transfer of technical knowledge generated by scientists to them (Grorud-Colverta et al. 2010), but as a very complex process that includes their input into setting goals, with an expectation that meaningful progress toward achieving those goals will happen (London et al. 2008). The fact that the state has had difficulty with the environmental justice partnerships may mean that the EJOs are more reluctant to partner with state/federal organizations like the CVJV. The lessons learned from communications research can help the CVJV be more successful in advancing communications and decision making for resolving EJ concerns.
- 10) **Community-Based Participatory Action Research (CBPAR).** This engagement strategy works very well in an environmental justice context (Bacon et al. 2013). CBPAR brings organizations with expertise, like CVJV, who want to work with communities that have issues like flooding, to collaborate on a research project together. The communities provide specialized, local knowledge. For example, if CVJV wanted to reduce flooding in environmental justice communities it could utilize state GIS maps to identify flooding locations. But if CVJV collaborates with an environmental justice community, that community can help them identify the most important flood reduction zones in their communities, based upon what they know about who is most vulnerable, and what is most valuable in their communities, and collaboratively adjust flood maps to create a map showing where they need flood reduction the most. The communities then become partners in advocating for flood reduction efforts that benefit wetland and riparian areas.
- 11) **Communication strategies.** Grorud-Colverta et al. (2010), like many others, emphasized the need to identify and understand audiences as a critical first step in developing content and identifying what media are appropriate for which audience. An overarching message needs to be communicated that identifies the problem or context for the technical information, and an explanation about the important to the audience. For example, the fact that over 90% of wetlands have been lost in the CVJV region is not of interest to economically disadvantaged communities on its own; but it may be if it is linked to the increase in rural and urban flooding that affects environmental justice communities.



## Multiple Benefits Literature Review Highlights

**Topic:** Effectiveness of methods for developing strategies for multiple benefits (“co-benefits”) of the landscape - including for flood control, urban use, recreationists, wildlife (including fisheries), rice growers. Note: CVJC is looking for places where they overlap with others for a conservation 'win-win'.

- 1) **Definition.** “Multiple benefits” is a term used to indicate that more than one type of benefit (e.g., environmental, economic, human welfare) was sought when attempting to address a water and/or habitat management challenge (Postel 2000, Chan et al. 2006). Multiple benefits planning seeks to identify either win-win solutions or a project approach that optimizes trade-offs between competing interests. Typically, although not necessarily, there is an underlying potential conflict between or among professionals and/or the public, resulting in the need for creative and equitable difficult trade-offs.
- 2) **History.** Multiple benefits planning has a history in natural resources planning that sought multiple benefits under different names. Balancing more than two objectives, or benefits from projects, has been done in benefit-cost analysis (BCA or CBA) for some time by reducing multiple benefits into dollar values and seeing what expenditure of government funds yields the highest return. Choices then could be made to select the benefits that provided the highest returns, or the top choice(s) from each type of benefit (Hanley and Splach 1993). The Corps of Engineers (COE) incorporated CBA into the “Green Book” approach to “multiple objectives” planning in 1950 for water resources projects. Other federal and state agencies have also used the term “multiple objectives” since then. For example, the Wisconsin Department of Natural Resources Division of Forestry published the “Multiple Benefits from Forest Management” in 2002 that addressed benefits including “Wildlife Habitat & Diversity, Pride of Ownership, Soil Conservation, Scenic Beauty, Watershed Protection, Personal Enjoyment, Forest Products, Education”.
- 3) **The Central Valley Integrated Flood Management Study, California Draft Watershed Plan (CVIFMS).** The CVIFMS (2016) was developed to be the companion document to the State of California’s Central Valley Flood Protection Plan (CVFPP 2011) and Draft Conservation Strategy, as well as to the State’s Integrated Regional Water Management Plans. This plan was designed to foster collaboration among state and local stakeholders (COE 2016). We note that the COE Draft Plan (2016) does not mention other social benefits. Also of concern, the COE indicates in its “Planning SMART Guide” that it is necessary for it to retain control of decision-making in projects, rejecting more participatory planning approaches. Yet, the COE stated that it recognizes the importance of providing the public and opportunity for input into planning processes.
- 4) **Subversion of win-win solutions.** Even where win-win solutions have been identified and implemented through multiple benefits planning efforts that are participatory, the solutions can be challenged and undone because some parties continue to advance their interests and subvert existing public decision making processes. For example, this occurred with the Yolo Bypass Wildlife Area, which employed a unique participatory planning project that reconciled potentially competing land uses to restore an important

segment of the Pacific Flyway in northern California (Salcido 2012). Recently, the Bay Delta Conservation Plan (BDCP) (California Department of Water Resources 2011) proposed a more expansive ecological restoration and water diversion project that called into question the continued viability of the multiple benefits solution struck at the nearly 17,000-acre Wildlife Area (Salcido 2012). Public opposition to the BDCP led state and federal agencies to abandon the BDCP and replace it with two separate efforts: California WaterFix and California EcoRestore (California Department of Water Resources 2011).

- 5) **Community involvement.** Involvement of the community supports multiple benefits approaches because communities seek the many benefits that come from wetlands and riparian zone restoration. This has included other benefits such as flood reduction, additional recreational space and opportunities (such as fishing) that restored riparian zones provide, and economic opportunities from tourism. Community involvement in multiple benefits planning has helped to ensure that the multiple benefits they sought were incorporated into projects, and their support increases the likelihood of project success (Golet et al. 2006, London et al. 2008, Grorud-Colverta et al. 2010, Bacon et al. 2013).
- 6) **Integrated Resource Management.** In 2010 the State of California made it policy that the California Natural Resources Agency use Integrated Resource Management (IRM) for their environmental assessments, mitigation planning, etc. The IRM approach was designed to obtain multiple benefits *and* do so through collaborative processes that bring together resource groups to balance the economic, environmental, and social goals (California Natural Resources Agency 2010). They provided a series of recommendations to the legislature to improve the efficiency of habitat conservation, integration with land use planning, and better coordination among localities and state and federal agencies.
- 7) **Community engagement.** Community engagement in planning riparian restoration projects has been identified as absolutely critical in building community support for, and increasing the likelihood of successful implementation of, restoration projects. Involvement of the community strongly supports multiple benefit approaches because communities seek the many benefits that come from flood reduction, including personal and property protection, and the ability to increase economic development when lower flood risks make it possible for businesses to invest in their communities. Communities advocated for additional lands and recreational opportunities (such as fishing access) to be included in riparian restoration projects, asking for larger restoration projects. They understood that these recreational amenities would also increase economic opportunities from tourism generated from multi-benefit projects (Golet et al. 2006, London et al. 2008, Grorud-Colverta et al. 2010, Bacon et al. 2013). Meaningful public engagement from early in the process has helped project planners identify community concerns that needed to be addressed, and select and choose relevant alternatives to study to obtain information needed to make final decisions. It demonstrated the significant value of approaching the public as partners in making decisions, with real power, in identifying win-win multiple benefit solutions to flood reduction, riparian zone restoration, and habitat restoration (Golet et al. 2006).

- 8) **Complex modeling tools.** Identifying what parcels of land to preserve to obtain multiple benefits can be challenging. An approach used by Chan et al. (2006) in the Central Coast eco-region of California was particularly useful when larger scale ecosystem goals for protection had been identified. The modeling effort then identified the most efficient mix of parcels of land to protect/restore in order to meet those goals. Chan et al. (2006) used their spatially explicit conservation planning framework to explore the trade-offs and opportunities for aligning conservation goals for biodiversity with six ecosystem services (carbon storage, flood control, forage production, outdoor recreation, crop pollination, and water provision). They were then able to identify how some parcels provide multiple benefits and used a systematic planning framework that identified how to achieve multiple-benefits at a much lower cost.
  
- 9) **Adaptive management.** This approach is well known in wildlife management, and often used with a multiple benefits approach. O'Donnell and Galat (2008) focused on barriers to using adaptive management for river enhancement that addressed multiple benefits in five watersheds in the Upper Mississippi. They found that about half the projects had done some type of post-project evaluation, but that the data was neither gathered in systematic fashion nor disseminated so results could not be used in adaptive management efforts. They recommended that funding sources structure grants programs to incentivize agencies to conduct post-project monitoring and share data in ways that support adaptive management.

## Bibliography

### Hunters

AECOM (San Diego, CA). 2015. Suisun Marsh human dimensions recreational use study Suisun Marsh, California Research Plan. Sacramento (CA): California Department of Water Resources. 24 p. Available from: <https://www.wildlife.ca.gov/Regions/3/Suisun-Marsh>.

Alessi MG, Miller CA, Harper EE. 2013. Content analysis of three waterfowl hunting DVDs. *Human Dimensions Wildlife Manag* [Internet]. [cited 2016 March 7];18(2):152-158. Available from: <http://dx.doi.org/10.1080/10871209.2013.745103>.

Boxall PC, Watson DO, McFarlane BL. 2001. Some aspects of the anatomy of Alberta's hunting decline: 1990–1997. *Human Dimensions Wildlife Manag* [Internet]. [cited 2016 March 7];6(2):97-113. Available from: <http://dx.doi.org/10.1080/108712001317151949>.

Brown MG. 2008. Assessing California's wetlands: A comprehensive survey of management techniques and a new rapid assessment method. [M.S. Thesis]. [Davis(CA)]: University of California Davis. 139 p.

CDFW: California Department of Fish and Wildlife. (Sacramento, CA). License Statistics. [Internet]. [cited 2016 August 11]. Available from: <https://www.wildlife.ca.gov/Licensing/Statistics>

Brunke KD, Hunt KM. 2008. Mississippi waterfowl hunter expectations, satisfaction, and intentions to hunt. *Human Dimensions Wildlife Manag* [Internet]. [cited 2016 March 7];13:1-12. <http://dx.doi.org/10.1080/10871200802227422>.

Devers PK, Roberts A, Padding P, Raftovich R, Knoche S. 2016. Integrating human dimensions into habitat delivery: Relationships among landscape characteristics and recreation. Paper presented at: 7th Annual North American Duck Symposium; Annapolis, MD.

DJ Case & Associates (Mishawaka, Indiana). 2009. Bibliography. Hunting and shooting recruitment and retention. Wildlife Management Institute. Washington (DC). Available from: [https://huntingheritage.org/hunting\\_rr\\_report\\_bibliography.pdf](https://huntingheritage.org/hunting_rr_report_bibliography.pdf).

Duda, MJ, Bissell SJ, Young KC. Responsive Management. (Harrisonburg, Virginia). 1995. Factors related to hunting and fishing participation in the United States. Phase V: Final Report. Boise (ID): Western Association of Fish and Wildlife Agencies. U.S. Fish and Wildlife Service. [Internet]. [cited 2016 March 7];Federal Aid in Sport Fish and Wildlife Restoration Grant Agreement: 14-48-0009-92-1252. 43 p. Available from: <https://huntingheritage.org/sites/default/files/factorsrelatedtohuntingUS.pdf>.

Enck JW, Decker DJ, Brown TL. 2000. Status of hunter recruitment and retention in the United States. *Wild Society Bul* [Internet]. [cited 2016 March 7];28(4):817-824. Available from: <http://www.jstor.org/stable/3783836>.

- Hall F. 2011. They came to shoot: A history of California duck clubs and wetland conservation. Sacramento (CA): California Waterfowl. 512 p.
- Hunt KL. 2016. Who are our future stakeholders? The implications of a changing social landscape for achieving North American Waterfowl Management Plan goals. Paper presented at: 7th Annual North American Duck Symposium; Annapolis, MD.
- Larson LR, Stedman RC, Decker DJ, Siemer WF, Baumer MS. 2014. Exploring the social habitat for hunting: toward a comprehensive framework for understanding hunter recruitment and retention. *Human Dimensions Wildlife Manag* [Internet]. [cited 2016 March 7];19(2)105-122. Available from: <http://dx.doi.org/10.1080/10871209.2014.850126>.
- Raftovich RV, Wilkins K, Williams, Spriggs SS, Howard L, Richkus KD. 2011. Migratory bird hunting activity and harvest during the 2009 and 2010 hunting seasons. US Fish & Wildlife Publications. [Internet]. [cited 2016 March 7]; Paper 359. 63 p. Available from: <http://digitalcommons.unl.edu/usfwspubs/359>.
- Raymond R, Johnson RL, Cleaves D. 1991. Corvallis (OR): Forest Research Lab, College of Forestry. Oregon State University. The market for waterfowl hunting on private agricultural land in Western Oregon. [Internet]. [cited 2016 March 7]; Research Bulletin 70. 14 p. Available from: [http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/7968/RB\\_no\\_70.pdf;sequence=1](http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/7968/RB_no_70.pdf;sequence=1).
- Responsive Management/National Shooting Sports Foundation (Harrisonburg PA/Newtown CT). 2008. The Future of Hunting and the Shooting Sports: Research-Based Recruitment and Retention Strategies. Washington (DC): U.S. Fish and Wildlife Service. Grant Agreement CT-M-6-0. 261 p. Available from: [http://www.responsivemanagement.com/download/reports/Future\\_Hunting\\_Shooting\\_Report.pdf](http://www.responsivemanagement.com/download/reports/Future_Hunting_Shooting_Report.pdf).
- Schroeder SS, Fulton DC, Lawrence JS, Cordts SD. 2013. Identity and specialization as a waterfowl hunter, *Leisure Sci* [Internet]. [cited 2016 March 7];35(3)218-234. Available from: <http://dx.doi.org/10.1080/01490400.2013.780511>.
- United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census (Washington, DC). 1997. 1996 National survey of fishing, hunting, and wildlife-associated recreation. [Internet]. [cited 2016 March 7]. 115 p. Available from: <http://www.census.gov/prod/2003pubs/fhw01-us.pdf>.
- United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census (Washington, DC). (2012). 2011 National survey of fishing, hunting, and wildlife associated recreation: national overview. [Internet]. [cited 2016 March 7]. 161 p. Available from: <http://www.census.gov/prod/2012pubs/fhw11-nat.pdf>.

United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census (Washington, DC) 2013. 2011 Historical hunting license data. [Internet]. [cited 2016 March 7]. 115 p. Available from: <http://wsfrprograms.fws.gov/Subpages/LicenseInfo/Hunting.htm>.

United States Department of Interior United States Fish and Wildlife Service, United States Department of Commerce, Bureau of the Census (Washington, DC). 2013. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation California, revised. [Internet]. [cited 2016 march 7]. 82 p. Available from: <http://digitalmedia.fws.gov/cdm/singleitem/collection/document/id/1535/rec/4>.

Vermont Fish and Wildlife Department (Montpelier, VT). 2007. Future of hunting in Vermont Plan. 2007. [Internet]. [cited 2016 March 7]. 20 p. Available from: [http://www.vtfishandwildlife.com/library/Reports\\_and\\_Documents/Hunting\\_and\\_Trapping/Future\\_of\\_Hunting\\_book.pdf](http://www.vtfishandwildlife.com/library/Reports_and_Documents/Hunting_and_Trapping/Future_of_Hunting_book.pdf).

Vrtiska MP, Raedeke AH, Gammonley JH, Naylor LW. 2016. Integrating population, habitat, and people NAWMP goals: A new look at old tools to help achieve habitat management, population management, and hunter participation goals. Paper presented at: 7th Annual North American Duck Symposium, Annapolis, MD.

Wilcox A, Giuliano W, Wynn C, Sanders JS. 2014. Wildlife management on private lands in Florida. Proceedings of the 2009 Annu. Conf. Southeast Assoc. Fish and Wildl Agencies. Pp 27-34. Available from: <http://seafwa.org/resource/dynamic/private/PDF/Willcox-27-34.pdf>.

### **Farmer Behavior and Programs**

Ahnström J, Höckert J, Bergeå HL, Francis CA, Skelton P, Hallgren L. 2009. Farmers and nature conservation: What is known about attitudes, context factors and actions affecting conservation? *Renew Ag Food Sys* [Internet]. [cited 2016 March 7];24(1): 38–47. Available from: <http://digitalcommons.unl.edu/agronomyfacpub/361>.

Baumgart-Getz A, Prokopy LS, Floress K. 2012. Why farmers adopt best management practice in the United States: A meta-analysis of the adoption literature. *US Army Research*. [cited 2016 March 7]. Paper 179. Available from: <http://digitalcommons.unl.edu/usarmyresearch/179>.

Bergtold CE, Williams JS, Peterson J. 2015. Estimating farmers' risk attitudes and risk premiums for the adoption of conservation practices under different contractual arrangements: A stated choice experiment. [Internet]. [cited 2016 March 7]. Paper presented at: 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Annual Meeting, San Francisco, CA, July 26-28, 2015. Available from: <http://ageconsearch.umn.edu/handle/205640>.

- Chouinard HH, Paterson T, Wandschneider PR, Ohier AM. 2008. Will farmers trade profits for stewardship? Heterogeneous motivations for farm practice selection. *Land Econ* [Internet]. [cited 2016 March 7];84(1):66-82. Available from: <http://le.uwpress.org/content/84/1/66.full.pdf>.
- Czap NV, Czap HJ, Khachaturyan M, Lynne GD, Burbach M. 2012. Walking in the shoes of others: experimental testing of dual-interest and empathy in environmental choice. *J Socio-Econ* [Internet]. [cited 2016 March 7];41:642– 653. Available from: <http://dx.doi.org/10.1016/j.socec.2012.05.005>.
- Erickson D, De\_Young R. 1994. Management of farm woodlots and windbreaks. *J Env Sys* [Internet]. [cited 2016 March 7];22(3):233-247. Available from: [https://deepblue.lib.umich.edu/bitstream/handle/2027.42/83707/Erickson, D. & R. De Young \(1993-1994\) Management of farm woodlots and windbreaks, JES, 22, 3, 233-247.pdf?sequence=1](https://deepblue.lib.umich.edu/bitstream/handle/2027.42/83707/Erickson, D. & R. De Young (1993-1994) Management of farm woodlots and windbreaks, JES, 22, 3, 233-247.pdf?sequence=1).
- Jackson-Smith D, de la Hoz E, Halling M, McEvoy J, Horsburgh J. 2010. Measuring conservation program BMP implementation and maintenance at the watershed scale. *J Soil Water Conserv* [Internet]. [cited 2016 March 7];65(6):413-423. Available from: <http://dx.doi.org/10.2489/jswc.65.6.413>.
- Klößner CA. 2013. A comprehensive model of the psychology of environmental behaviour – a meta-analysis. *Global Environ Chang* [Internet]. [cited 2016 March 7];23(5): 1028-1038. Available from: <http://dx.doi.org/10.1016/j.gloenvcha.2013.05.014>.
- Brodt L, Klonsky K, Tourte L, Duncan R, Hendricks L, Ohmart C, Verdegaal P. 2004. Influence of farm management style on adoption of biologically integrated farming practices in California. *Renew Agric Food Syst* [Internet]. [cited 2016 March 7];19(4):237-47. Available from: <http://dx.doi.org/10.1079/RAFS200488>.
- Moses R. 2015. California rice grower participation in the Conservation Security Program and wildlife conservation behavior on working land. [M.S. Thesis]. [Davis(CA)]: University of California Davis. 83 p.
- Mulvaney DR. 2008. Identifying vulnerabilities, exploring opportunities: reconfiguring production, conservation, and consumption in California rice. *Ag Hum Values* [Internet]. [cited 2016 March 7];25(2):173-176. Available from: <http://dx.doi.org/10.1007/s10460-008-9123-3>.
- Nassauer JI. 1989. Agricultural policy and aesthetic objectives. *J Soil Water Conserv* [Internet]. [cited 2016 March 7];44(5):384-387. Available from: <http://www.jsowonline.org/content/44/5/384.full.pdf+html>.
- Parkhurst, B. 2011. An evaluation of ranch and farm operator attitudes towards emerging ecosystem service markets in California and Eastern North Carolina [M.E.M. Degree]. [Durham NC] Nicholas School of the Environment at Duke University [Internet]. [cited 2016 March 7]. 66 p. Available from:

[http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/3689/Ben\\_Parkhurst\\_MP\\_Final\\_2011.pdf?sequence=1](http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/3689/Ben_Parkhurst_MP_Final_2011.pdf?sequence=1).

Ryan RL, Erickson DL, de Young R. 2003. Farmers' motivations for adopting conservation practices along riparian zones in a mid-western agricultural watershed. *J Environ Plan Manag* [Internet]. [cited 2016 March 7];46(1):19-37. Available from: <http://www.tandfonline.com/doi/pdf/10.1080/713676702>.

Sheeder R, Lynne GD. 2011. Empathy conditioned conservation: "Walking-in-the-shoes-of-others" as a conservation farmer" *Land Econ* [Internet]. [cited 2016 March 7];87(3):433–4. Available from: <http://le.uwpress.org/content/87/3/433.short.pdf>.

University of California Cooperative Extension. 2011. Forage crops and migratory birds workshops: exploring challenges and opportunities to expanding migratory bird benefits from forage production: summary report. Woodland (CA) UC Cooperative Extension, June 6<sup>th</sup>, Bowles Farm, Los Banos, CA, June 17<sup>th</sup>, 2011. 8 p.

### **Non-hunting Recreationists**

Colby B, Smith-Incer E. 2005. Visitor values and local economic impacts of riparian habitat preservation: California's Kern River Preserve. *J. Am Water Resour Assoc* [Internet]. [cited 2016 March 7];709-717. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2005.tb03765.x/full>.

Cooper CC, Larson L, Dayer A, Stedman R, Decker, D. 2015. Are wildlife recreationists conservationists? linking hunting, birdwatching, and pro-environmental behavior. *J Wildlife Manage* [Internet]. [cited 2016 March 7];79(3):446–457. Available from: <http://dx.doi.org/10.1002/jwmg.855>.

Creel M, Loomis J. 1992. Recreation value of water to wetlands in the San Joaquin valley: linked multinomial and count data trip frequency models. *Water Resour Res* [Internet]. [cited 2016 March 7];28(10):2597-2606. Available from: <http://dx.doi.org/10.1029/92WR01514>.

McDuff, M.M., G.S Appelson, S.K. Jacobson and G.D. Israel. 2008. Watershed management in Florida: public knowledge, attitudes, and information needs. *Lake Reserv Manage* [Internet]. [cited 2016 March 7]; 24(1):47–56. Available from: <http://dx.doi.org/10.1080/07438140809354050>.

Newhouse Berns G, Simpson S. 2009. Outdoor Recreation Participation and Environmental Concern: A Research Summary. *J. Experiential Educ* [Internet]. [cited 2016 March 7];32(1):79–91. Available from: <http://jee.sagepub.com/content/32/1/79.full.pdf+html>.

Sexton NR, Dietsch AM, Don Carlos AW, Koontz L, Solomon S, Miller HM. 2012. National Wildlife Refuge visitor survey 2010/2011: individual refuge results for Lower



Klamath and Tule Lake National Wildlife Refuges. Arlington (VA). U.S. Fish and Wildlife Service Division of Visitor Services and Communications Headquarters Office. [Internet]. [cited 2016 March 7]. 26 p. Available from: <http://pubs.usgs.gov/ds/643/>.

Teisl MF, O'Brien K. 2003. Who cares and who acts? outdoor recreationists exhibit different levels of environmental concern and behavior. *Environ behav* [Internet]. [cited 2016 March 7];35(4):506-522. Available from: <http://dx.doi.org/10.1177/0013916503035004004>.

Torpen DR, Hearne RR. 2008. Stakeholder preferences for water management alternatives in the Red River basin. Fargo (ND). Department of Agribusiness and Applied Economics Agricultural Experiment Station North Dakota State University. Agribusiness and Applied Economics Report No. 629. [Internet]. [cited 2016 March 7]. 31 p. Available from: <http://dx.doi.org/10.1080/02508061003663437>.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, U.S. Department of Commerce, U.S. Census Bureau. Washington (DC). 2013. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: California. [Internet]. [cited 2016 March 7]. 82 p. Available from: <https://www.census.gov/prod/2013pubs/fhw11-ca.pdf>.

Weissman KG. . Land use and economics study grassland ecological area Merced County, California. Los Banos (CA) Grassland Water District. 35 p. Available from: [Weissman@Traenviro.com](mailto:Weissman@Traenviro.com).

### **Urban Support for Wetlands**

Baird J, Belcher K, Quinn MS. 2011. A performance-based approach to agri-environmental policy in Canada: Development and Comparative Assessment. University of Alberta Department of Resources Economic and Environmental Sociology. [Internet]. [cited 2016 March 7]. Research Project number: PR-02-2011 Project Report 201. 31 p. Available from: [http://learnnetwork.rees.ualberta.ca/en/PublicationsCommunications/~media/learnnetwork/Publications%20and%20Communication/Documents/PR-02-2011\\_Baird-Belcher-Quinn.pdf](http://learnnetwork.rees.ualberta.ca/en/PublicationsCommunications/~media/learnnetwork/Publications%20and%20Communication/Documents/PR-02-2011_Baird-Belcher-Quinn.pdf).

Polasky BT. 2004. Valuing wetlands: a review of non-market valuation studies. *Wetlands* [Internet]. [cited 2016 March 7];24(4):744–755. Available from: <http://environmentportal.in/files/file/URBAN%20WETLANDS.pdf>.

California Water Boards. February 2016. California meets governor's conservation mandate for seventh straight month. [Internet]. [cited 2016 March 7]. 3 p. Available from: [https://www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal/docs/2016feb/pr2216\\_dec\\_conser.pdf](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2016feb/pr2216_dec_conser.pdf)

Davenport MA, Bridges CA, Mangun JC, Carver AD, Williard KW, Jones EO. 2010. Building local community commitment to wetlands restoration: A case study of the

Cache River wetlands in Southern Illinois. Springer Science+Business Media. Wetlands [Internet]. [cited 2016 March 7];45:711–722. Available from: <http://dx.DOI.org/10.1007/s00267-010-9446-x>.

Eisenhauer B, Nicholson B. 2005. Using stakeholders' views: a social science methodology for the inclusive design of environmental communications. Applied Environmental Education & Communication [Internet]. [cited 2016 March 7];4(1)19-30. Available from: <http://www.tandfonline.com/loi/ueec20>.

Metz D, Below C. 2015. Key findings from a recent survey on water conservation in California. Los Angeles (CA): Fairbank, Maslin, Maullin, Metz & Associates (FM3). [Internet]. [cited 2016 March 7]. 9 p. Available from: <http://waterfoundation.net/wp-content/uploads/2015/07/CA-Water-Foundation-Survey-Memo-7-29-15.pdf>.

Field Poll. 2015 Feb. Nearly unanimous view that State's water shortage is serious. Growing concerns about the adequacy of the water storage and supply. San Francisco (CA): Field Research Corporation. Release #2501. [Internet]. [cited 2016 March 7]. 6 p. Available from: <http://www.field.com/fieldpollonline/subscribers/Rls2501.pdf>.

Field Poll. 2015 May. Californians support Governor's urban water reduction plan three to one, But many homeowners say it will be difficult for their household to cut back on their own water use. San Francisco (CA). Field Research Corporation Release #2503. [Internet]. [cited 2016 March 7]. 7 p. Available from: [www.field.com/fieldpollonline/subscribers/Rls2503.pdf](http://www.field.com/fieldpollonline/subscribers/Rls2503.pdf).

Gomberg M, Maestu R, Oppenheimer E. 2014. Urban water supplier drought response survey results and observations. Sacramento (CA). Office of Research, Planning, and Performance. California State Water Resources Control Board. PowerPoint. July 17, 2014. [cited 2016 March 7]. 13 p. Available from: [ca.gov/Drought/pdf/.../Drought\\_Survey\\_Presentation\\_Final.pdf](http://ca.gov/Drought/pdf/.../Drought_Survey_Presentation_Final.pdf)

Greenberg Quinlan Rosner and American Viewpoint (Washington DC, Alexandria VA). 2014, May. Drought freaks out more California voters: Poll. [Internet]. [cited 2016 March 7]. Available from: <http://www.futurity.org/drought-poll-california-voters/>.

Pate, Loomis J. 1997. The effect of distance on willingness to pay values: a case study of wetlands and salmon in California. Ecol Econ [Internet]. [cited 2016 March 7];20,199 - 207. Available from: [http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/people/economics/12\\_wetlandsSalmonCa\\_pate\\_paper.pdf](http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/people/economics/12_wetlandsSalmonCa_pate_paper.pdf).

Stevens TH, Benin S, Larson JS. 1995. Public attitudes and economic values for wetland preservation in New England. Wetlands [Internet]. [cited 2016 March 7];15(3):226-231. Available from: <http://link.springer.com/article/10.1007/BF03160702>.

## Ecosystem Services

- Bingham G, Brody M, Bromley D, Clark E, Cooper W, Costanza R, Hale T, Hayden G, Kellert S, Nargaard R, Norton B, Payne J, Russell C, Suter, G. 1995. Issues in ecosystem valuation: improving information for decision making. *Ecol Econ* [Internet]. [cited 2016 March 7];14(2):73-90. Available from: [http://www.academia.edu/download/45239095/Bingham\\_20Bishop\\_20Brody\\_20et\\_20al\\_201995\\_1.pdf](http://www.academia.edu/download/45239095/Bingham_20Bishop_20Brody_20et_20al_201995_1.pdf).
- Resource Media (Seattle WA). 2012. Ecosystem services messaging: needs assessment and initial messaging recommendations. Seattle (WA). Bullitt Foundation. [Internet]. [cited 2016 March 7]. 23p. Available from: [www.ucanr.edu/sites/RangelandES/General/?uid=600&ds=577](http://www.ucanr.edu/sites/RangelandES/General/?uid=600&ds=577).
- Ducks Unlimited (Memphis TN). 2010. Assessing waterbird benefits from water use in California ricelands. Sacramento (CA). California Rice Commission. [Internet]. [cited 2016 March 7]. 8 p. Available from: <http://calrice.org/pdf/DucksUnlimited.pdf>.
- De Groot R, Stuij M, Finlayson M, Davidson N. 2006. Valuing wetlands: Guidance for valuing the benefits derived from wetland ecosystem services. (Gland Switzerland, Montreal Canada) Secretariat of the Convention on Wetlands, Secretariat of the Convention on Biological Diversity. [Internet]. [cited 2016 March 7]. Ramsar Technical Report No. 3. CBD Technical Series No. 27. 46 p. Available from: <https://www.cbd.int/doc/publications/cbd-ts-27.pdf>.
- De Groot RS, Wilson MA, Boumans RMJ. 2002. A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecol Econ* [Internet]. [cited 2016 March 7];41:393–408. Available from: [http://dx.doi.org/10.1016/S0921-8009\(02\)00089-7](http://dx.doi.org/10.1016/S0921-8009(02)00089-7).
- McDaniels, TL, Roessler, TL, 1998. Multiattribute elicitation of wilderness preservation benefits: a constructive approach. *Ecol Econ* [Internet]. [cited 2016 March 7];27:299–312. Available from: [http://dx.doi.org/10.1016/S0921-8009\(98\)00005-6](http://dx.doi.org/10.1016/S0921-8009(98)00005-6).
- Metz D, Weigel L. 2010. Key findings from recent national opinion research on ecosystem services. Los Angeles (CA), Alexandria (VA). Fairbank, Maslin, Maullin, Metz & Associates and Public Opinion Strategies. [Internet]. [2016 March 7]. Unpublished polling data. 12 p. Available from <https://www.conservationgateway.org/Documents/Summary/Memo/Polling.pdf>.
- Sagoff M. 1999. Aggregation and deliberation in valuing environmental public goods: a look beyond contingent pricing. *Ecol Econ* [Internet]. [cited 2016 March 7];24:213–230. Available from: [http://dx.doi.org/10.1016/S0921-8009\(97\)00144-4](http://dx.doi.org/10.1016/S0921-8009(97)00144-4).
- Stelk, MJ, Christie J. 2014. Ecosystem service valuation for wetland restoration: what it is, how to do it, and best practice recommendations. Windham (ME). Association of State Wetland Managers. [Internet]. [cited 2016 March 7]. 74 p. Available from:

<http://bibliotecavirtual.minam.gob.pe/biam/bitstream/handle/minam/1832/BIV01603.pdf?sequence=1>.

Wilson MA, Howarth RB. 2002. Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Integrat Econ Ecol Perspec* [Internet]. [cited 2016 March 7];41(3):431–443. Available from: [https://dx.doi.org/10.1016/S0921-8009\(02\)00092-7](https://dx.doi.org/10.1016/S0921-8009(02)00092-7).

World Resources Institute. 2005. Ecosystems and human well-being: wetlands and water: Synthesis Global assessment of ecosystem services. Washington (DC). World Resources Institute. [Internet]. [cited on 2016 March 7]. 69 p. Available from: [www.millenniumassessment.org/documents/document.358.aspx.pdf](http://www.millenniumassessment.org/documents/document.358.aspx.pdf)

### **Environmental Justice**

De Albuquerque C. 2011. Report of the Special Rapporteur on the human right to safe drinking water and sanitation: Mission to the United States of America United Nations. Addendum. New York (NY) United Nations. Human Rights Council Eighteenth session, Agenda item 3, Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development. A/HRC/18/33/Add.4. 21 p. (cited 2016 March 7). Available from: <https://daccess-ods.un.org/TMP/9500821.82884216.html>

Bacon C, deVuono-Powell S, Frampton ML, LoPresti T, Pannu C. 2013. Introduction to empowered partnerships: community-based participatory action research for environmental justice. *Env Justice* [internet]. [cited 2016 March 7];6(1):1-8. Available from: <https://dx.doi.org/10.1089/env.2012.0019>.

Community Water Center. [Internet]. c2016. Visalia (CA) [Cited 2016, April 29]. Available from: <http://www.communitywatercenter.org>.

Balazs C, Morello-Frosch R, Hubbard A, Ray I. 2011. Social disparities in nitrate-contaminated drinking water in California's San Joaquin Valley. *Env Health Perspect* [Internet]. [cited 2016 March 7];119(9):1272-1278. Available from: <http://dx.doi.org/10.1289/ehp.1002878>.

California's Central Valley groundwater study: a powerful new tool to assess water resources in California's Central Valley. San Diego (CA) U.S. Geological Survey. California Water Science Center. [Internet]. [cited 2016 April 29]. Available from: <http://pubs.usgs.gov/fs/2009/3057/>.

California Environmental Justice Alliance. 2015. Strategic Plan 2015-2018: Powering up healthy hoods throughout California. Oakland (CA). [Internet]. [cited 2016 March 7]. 22 p. Available from: [http://caleja.org/wp-content/uploads/2015/07/CEJA\\_strategicplan\\_9.pdf](http://caleja.org/wp-content/uploads/2015/07/CEJA_strategicplan_9.pdf).

California Environmental Justice Alliance. 2015. Green zones across California. Transforming toxic hotspots into healthy hoods. Oakland (CA). [Internet]. [cited 2016

March 7]. 36 p. Available from: <http://caleja.org/wp-content/uploads/2015/09/GREENZONES.2015.30MB.pdf>.

Grorud-Colverta K, Lester SE, Airamé S, Neeley E, Gaines SD. 2010. Communicating marine reserve science to diverse audiences. *Proc Natl Acad Sci* [Internet]. [cited 2016 March 7];107(43):18306–18311. Available from: <https://www.pnas.org/cgi/doi/10.1073/pnas.0914292107>.

Huang G, London JK. 2012. Cumulative environmental vulnerability and environmental justice in California's San Joaquin Valley. *J Environ Res Public Health* [Internet]. [cited 2016 March 7];9(5):1593-1608. Available from: <https://dx.doi.org/10.3390/ijerph9051593>.

London JK, Sze J, Lievanos RS. 2008. Problems, promise, progress, and perils: critical reflections on environmental justice policy implementation in California. *J Environ Law and Policy* [Internet]. [cited 2016 March 7];26(2):255-289. Available from: <http://escholarship.org/uc/item/2hb823dd>.

Harter T, Lund JR, Darby J, Fogg GE, Howitt R, Jessoe KK, Pettygrove GS, Quinn JF, Viers JH. 2012. Addressing nitrate in California's drinking water with a focus on Tulare Lake Basin and Salinas Valley Groundwater. Report for the State Water Resources Control Board Report to the Legislature. Davis (CA) Center for Watershed Sciences, University of California, Davis. Groundwater Nitrate Project, Implementation of Senate Bill X2 1 [Internet]. [cited 2016 March 7]. 78 p. Available from: <http://groundwaternitrate.ucdavis.edu>.

Public Policy Institute of California. 2006. Just the Facts: California's Central Valley. San Francisco (CA). [Internet]. [cited 2016 March 7]. 2 p. Available from: <http://www.ppic.org/main/publication.asp?i=566>

State of California. 2013. The human right to water bill in California: an implementation framework for state agencies. Sacramento (CA) International Human Rights Law Clinic. University of California, Berkeley, School of Law. [Internet]. [cited 2016 March 7]. 19 p. Available from: [https://www.law.berkeley.edu/files/Water\\_Report\\_2013\\_Interactive\\_FINAL.pdf](https://www.law.berkeley.edu/files/Water_Report_2013_Interactive_FINAL.pdf).

State of California EPA. Office of Environmental Health Hazard Assessment. (Software). CalEnviroScreen Version 2.0 [Internet]. [cited 2016 April 29]. Available from: <http://oehha.ca.gov/ej/ces2.html>.

State of California. 2016. Draft Sacramento River basin-wide feasibility study and associated appendices. Sacramento (CA). The Natural Resources Agency. Department of Water Resources. [Internet]. [cited 2016 April 29]. 205 p. Available from: [http://www.water.ca.gov/cvfmp/bwfs/docs/SacBWFS\\_Main-Document\\_Mar\\_2016.pdf](http://www.water.ca.gov/cvfmp/bwfs/docs/SacBWFS_Main-Document_Mar_2016.pdf)  
[http://www.water.ca.gov/cvfmp/bwfs/docs/SacBWFS\\_Main-Document\\_Mar\\_2016.pdf](http://www.water.ca.gov/cvfmp/bwfs/docs/SacBWFS_Main-Document_Mar_2016.pdf)

## Multiple Benefits

Bacon C, deVuono-Powell S, Frampton ML, LoPresti T, Pannu C. 2013. Introduction to empowered partnerships: community-based participatory action research for environmental justice. *Environ Justice* [Internet]. [cited 2016 March 8];6(1):1-8). Available from: <https://dx.doi.org/10.1089/env.2012.0019>.

California Natural Resources Agency. The future of natural resource management: a white paper and action plan. 2010. Sacramento (CA). 8 p. Available from: [http://www.resources.ca.gov/docs/IRM\\_Action\\_Plan12-10.pdf](http://www.resources.ca.gov/docs/IRM_Action_Plan12-10.pdf)

California Dept. of Natural Resources. An Overview of the Draft Conservation Strategy for the Bay Delta Conservation Plan. Sacramento (CA). [Internet]. [cited 2016 March 9]. Available from: <http://baydeltaconservationplan.com/Home.aspx>.

Cowin MW, Bardini GB. June 2012. State of California's Central Valley flood protection plan. California Department of Water Resources. [Internet]. [cited on 2016 March 10]. ADD PAGES. Available from: [http://www.water.ca.gov/floodsafe/fessro/docs/flood\\_tab\\_cvfpp.pdf](http://www.water.ca.gov/floodsafe/fessro/docs/flood_tab_cvfpp.pdf).

California Department of Water Resources. U.S. Department of Interior. California Natural Resources Agency. 2016. Bay delta conservation plan. [Internet]. [cited 2016 March 13]. Available from: <http://baydeltaconservationplan.com/Home.aspx>.

Chan KMA, Shaw MR, Cameron DR, Underwood EC, Daily GC (2006) Conservation planning for ecosystem services. *PLOS Biology* [Internet]. [cited 2016 March 14];4(11):2138-2152. Available from: <http://dx.doi.org/10.1371/journal.pbio.0040379>.

Golet GH, MD Roberts, Larsen EW, Luster RA. 2006. Assessing societal impacts when planning restoration of large alluvial rivers: A case study of the Sacramento River project, California. *Environ Manage* [Internet]. [cited 2016 March 9];37(6):862–879. Available from: <http://dx.doi.org/10.1007/s00267-004-0167-x>.

Grorud-Colverta K, Lester SE, Airamé S, Neeley E, Gaines SD. 2010. Communicating marine reserve science to diverse audiences. *Proc Natl Acad Sci* [Internet]. [cited 2016 March 13];107(43):18306-18311. Available from: <https://dx.doi.org/10.1371/journal.pbio.0040379>.

Hanak E, Lund J, Dinar A, Gray B, Howitt R, Mount J, Moyle P, Thompson B. 2011. Managing California's water from conflict to reconciliation. San Francisco (CA). Public Policy Institute of California. [Internet]. [cited 2016 March 9]. 482 p. Available from: [http://www.ppic.org/content/pubs/report/R\\_211EHR.pdf](http://www.ppic.org/content/pubs/report/R_211EHR.pdf).

Kondolf GM, Anderson S, Lave R, Pagano L, Merenlender A, Bernhardt ES. 2007. Two decades of river restoration in California: what can we learn? *Restor Ecol* [Internet].



[cited 2016 March 9];15(3):516–523.. Available from: <http://dx.doi.org/10.1111/j.1526-100X.2007.00247.x>.

London JK, Sze J, Lievanos RS. 2008. Problems, promise, progress, and perils: critical reflections on environmental justice policy implementation in California. *J Environ Law and Policy* [Internet]. [cited 2016 March 9];26(2):255-289. Available from: <http://escholarship.org/uc/item/2hb823dd>.

Migratory Bird Conservation Partnership. Homepage [Internet]. c2016. [cited 2016 March 10]. Available from: <http://www.camigratorybirds.org/>

Multi-Benefit Water Management Project. Homepage. c2016. [Internet]. A multi-benefit approach to flood protection in California's Central Valley. [cited 2016 March 9]. Available from: <http://www.multibenefitproject.org/what-is-multiple-benefit/>.

O'Donnell, TK, DL Galat. 2008. Evaluating success criteria and project monitoring in river enhancement within an adaptive management framework. *Environ Manag* [Internet]. [cited 2016 March 9];41:90–105. Available from: <https://dx.doi.org/10.1007/s00267-007-9010-5>.

Pincetl SS, Alagona P. 2005. The Coachella Valley multiple species habitat conservation plan/natural community conservation plan. Compliance with the federal Endangered Species Act and land use planning considerations. Department of History. University of California, Los Angeles. A Report to the California Policy Research Center. 43 p. [cited 2016 March 9]. Available from: [http://www.history.ucsb.edu/projects/histpublications/files/08236-alagona\\_pincetl\\_2008.pdf](http://www.history.ucsb.edu/projects/histpublications/files/08236-alagona_pincetl_2008.pdf).

Postel S. 2000. Entering an era of water scarcity: the challenges ahead. *Ecol Appl* [Internet]. [cited 2016 March 11];10(4):941–948. Available from: [http://dx.doi.org/10.1890/1051-0761\(2000\)010\[0941:aeows\]2.0.co;2](http://dx.doi.org/10.1890/1051-0761(2000)010[0941:aeows]2.0.co;2).

Salcido R. 2012. The success and continued challenges of the Yolo Bypass Wildlife Area: a grassroots restoration. *Ecol Law Quart* [Internet]. [cited 2016 March 20];39:1085-1134. Available from: <http://dx.doi.org/doi:10.15779/Z38B541>.

U.S. Army Corps of Engineers. c2016. Planning SMART guide. Washington (DC). [Internet]. [cited 2016 March 17]. Available from: <http://planning.usace.army.mil/toolbox/smart.cfm?Section=1&Part=a>.

U.S. Army Corps of Engineers. c2016. Central Valley integrated flood management study. Washington (DC). [Internet]. [cited 2016 March 17]. Available from: <http://www.spk.usace.army.mil/Missions/CivilWorks/CentralValleyIntegratedFloodManagementStudy.aspx>.