BOISE RIVER ENHANCEMENT NETWORK

- We are a network of people that live, work and play in the Boise River watershed dedicated to promoting the ecological enhancement of the river

Photo: Liz Paul, Idaho Rivers United.

# Boise River Wetland and Riparian Habitat

Literature Review | Network Feedback | Key Issues and Solutions

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# Contents

## Introduction

At the 2011 workshop titled "Lower Boise River: From Vision to Reality", participants identified wetland and riparian habitat as a priority enhancement goal. When participants were asked what should happen next, the most common response was: "continue this group and develop a plan." Three years later, a group has been formed, the Boise River Enhancement Network (BREN). Through a grant from the Bureau of Reclamation, the group is widening its membership, developing structure, performing outreach, and developing a Watershed Enhancement Plan for the Lower Boise River (LBR) from Lucky Peak Reservoir to the confluence with the Snake River. Although an effort to address the entire watershed is critical, it is beyond the scope of this effort. For this reason, our effort is concentrated on the main river channel and its associated floodplain. As part of this planning effort, identifying the key issues and possible solutions associated with wetland and riparian habitat of the LBR is critical.

## Purpose

The purpose of this document is to provide a framework for the wetland and riparian habitat section of the BREN watershed management plan. This is a living document that will be updated with new information and revised based expert opinion and public input. It is meant to be the reference from which the BREN plan will draw its information. It is a reference guide to gather all of the information BREN has collected on wetland and riparian habitat into one place. It is divided into the following sections:

**Summary.** This provides a brief narrative overview of the information contained within this document.

**Part I**: **Existing Information**. This report contains an overview of the existing information pertaining to the Boise River wetland and riparian habitat. Overall conclusions from pertinent existing reports are summarized and the issues and solutions identified within those plans are discussed. Much of this information was used in a public meeting on October 22nd, 2014, in which feedback was solicited and recorded. A reference list is provided at the end of the document.

**Part II**: **Network Feedback**. This section contains the feedback from the BREN participants on wetland and riparian issues. This includes information from the October, 2011 workshop and from participants at the October 22nd, 2014 wetland and riparian meeting. At the meeting, feedback on issues, solutions, additional literature, and expert reviewers was collected.

**Part III: Key Issues and Solutions**. This section has not yet been completed.

## Summary

Due to a long history of land alteration, wetland and riparian areas along the LBR and the region have been reduced in extent and function. Idaho has lost more than half of its historic wetland extent, mainly due to drainage, filling, land clearing, and conversion to cropland. Along the LBR, the channel has been confined and historic wetland and riparian floodplain areas have been destroyed or separated from the river channel by levees and rip-rap, especially in the upper reaches. In the downstream areas, many historic sloughs have been converted for agricultural use or drained completely. Road construction, urbanization, floodplain development and flood control are currently larger threats to wetlands than historic factors. Grazing, recreation, dam operation and flood control all impact the function of existing wetland and riparian habitats.

The black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) dominated riparian forest has historically provided important habitat along the LBR. The historic floodplain forests were a mix of cottonwood, willow (*Salix* spp.), alder (*Alnus incana*), water birch (*Betula occidentalis*), Wood's rose (*Rosa woodsii*), and other riparian shrubs that extended far beyond the current width. Regeneration of black cottonwood (and to a lesser degree willow) has been negatively impacted primarily by flow alteration, the lack of appropriate parafluvial surfaces (those formed by the river within the channel) and land development on the floodplain. Today, numerous old gravel pits and ornamental ponds have created a large amount of open water habitat in off-channel locations along the Lower Boise. The banks of these ponds are generally steep, sparsely vegetated and provide little in the way of functional habitat or other ecosystem services. Flood risk reduction is a large issue due to development within the floodplain. However, vegetation and large wood have a complex interaction with flood events. Trees on the stream bank and large wood in the river continue to be removed for flood risk reasons. Invasive, non-native weed species (especially various deciduous trees), false indigo (*Amorpha fruticosa*), several grasses, (*e.g.* reed canarygrass [*Phalaris arundinacea*]), and purple loosestrife (*Lythrum salicaria*), on Idaho's noxious weed list) have colonized the riverbanks and decreased the function and value of these critical habitats. Despite the large amount of information that does exist, the Idaho Department of Fish and Game (IDFG) and the City of Boise, along with many other organizations, recognize that a comprehensive survey of the wetlands and riparian areas of the Boise River has never been performed, and is needed.

Many enhancement projects have occurred in recent years including wetland mitigation sites, created wetlands, and invasive weed control efforts. There are projects currently being proposed on Eagle Island, Dixie Drain, and several other locations. Among many experts, conservation and protection of existing functional and high quality wetland and riparian areas is the highest priority action. IDFG and other professionals have identified high priority sites for conservation and protection including Fort Boise, Barber Pool Conservation Area, Eagle Island, the reach between Barber Pool and Warm Springs Golf Course, the reach below Garden City, and along the Boise River from Caldwell to Notus. Other enhancement tools include flood easements, re-contouring of the floodplain (including engineering

floodplains to promote cottonwood recruitment), planting native species, and clearing of non-native and invasive species. Site-specific recommendations include raising Barber Pool; restoration of native trees, willows, alders and shrubs, fencing existing riparian habitats, and closing unofficial volunteer trails between Barber and Glenwood; moving the greenbelt trail back where possible, re-vegetating riverbanks using bioengineering techniques, minimizing beaver impacts, expanding no mow zones, and working with other partners to improve riparian function on City of Boise owned lands.

# Part I: Overview of Current Literature

Although many more references have been collected than those referenced in this section (see the references section), we have summarized the issues, solutions and conclusions from key pieces of literature. It is meant to be updated throughout the process. We have chosen to present short summaries of the main points concerning wetland and riparian values, historic wetland and riparian loss and modification, current and future loss and modification, the black cottonwood forest, open water habitats, flood risk reduction, data gaps, existing enhancements, proposed enhancements, proposed enhancement tools, and site specific recommendations.

## Wetland and Riparian Functions and Values

Wetland and riparian habitat along the LBR play a vital role in river ecosystem function. The location, extent and functionality of these habitats affect a myriad of other riverine-riparian resources, including hydrology, aquatic and wildlife habitat, flood risk, water quality and recreation. The range of benefits, or values, to fish, wildlife and ecosystem function is well documented in many reports from the Boise and other basins. Riparian vegetation stabilizes stream banks and reduces channel erosion, thereby reducing property damage and the need for costly stabilization projects. Young fish require slow moving water with vegetation cover. Wetlands and riparian areas shade the stream, improve water quality and reduce flood severity. Overhanging riparian vegetation provides cover and a food source for aquatic and terrestrial organisms. Numerous wildlife species, including bald eagles and many special status species, rely on the wetland and riparian habitat associated with the Boise River. Benefits extend to the human environment in the form of environmental, economic and social benefits.

Although tributary and foothill habitats are important to the LBR ecosystem, we have chosen to concentrate on the wetlands, riparian and terrestrial habits more directly adjacent to the Boise River for this paper due to limited time and resources.

## Issues Identified in Literature Review

Although there is a body of literature that addresses the wetlands and riparian habitats of the LBR, few are have wetland and riparian habitats as their focus. A primary source utilized in this review is IDFG's "Wetland conservation strategy for the middle Snake River and lower reaches of its major tributaries including the Boise and Payette River," (Jankovsky-Jones 2001). Though it is nearly 15 year's old, it specifically addresses wetland and riparian area quality, function and conservation within the LBR.

## Historic Wetland and Riparian Loss and Modification

- Wetland functions throughout the greater region (Lower and Western Snake River and it major tributaries – including the Boise River) have been negatively impacted by a long history of land use, and maintaining existing functions should be a high priority (Jankovsky-Jones 2001). Conservation efforts should be placed on areas that support native vegetation, unaltered hydrology, or critical wildlife habitat.
- Idaho lost an estimated 386,000 acres of wetland habitat (56%) between 1780 and 1980 (Dahl 1990). Many existing wetlands are degraded in function and condition.
- Historically, drainage, land clearing, and conversion to croplands accounted for most wetland loss in the Boise system (Jankovsky-Jones 2001).
- The Boise River floodplain has been confined by channelization and former wetlands have been eliminated throughout the City of Boise (USACE 1995).
- In urbanized areas, levees constructed to protect development from flooding have substantially reduced the natural qualities of riparian habitat along the river (USACE 1995).
- Changes in wetland functions caused by conversion of floodplain wetlands to open water wetlands resulting from agricultural activities, urbanization, gravel mining, and hydraulic manipulation (Jankovsky-Jones 2001).
- Sloughs (wetland areas associated with former river channels) that were once abundant in many reaches of the Boise River are now eliminated or severely reduced in all reaches of the river (MacCoy 2006).
- Many of the historical sloughs in the lower river reaches have been converted to irrigation or drainage ditches (MacCoy 2006).
- The presence of upper Boise (Anderson Ranch and Arrowrock) and lower Boise (Lucky Peak, Diversion Dam, and Barber Dam) reservoirs and dams, numerous diversions, and local flood control policies have significantly altered the flow regime and the physical and biological characteristics of the LBR (IDEQ 1999).
- Cottonwood stands did occur between Eagle Island and the canyon mouth (the current location of the diversion dam) historically, but they were not dominant - there were clumps of cottonwoods with a dense understory of willows. Willow and wild rose were the dominant vegetation in this reach (MacCoy and Blew 2005).

- Riparian forest vegetation below Eagle Island is dominated by non-native tree species (IDFG per. Com.)

## Current and Future Wetland Loss and Modification

- Future losses are likely to be driven by road construction, home building and flood control (Jankovsky-Jones 2001).
- Development within the floodplain while protecting wetland and riparian habitat function is a challenge (RSI 1983).
- Development in the former floodplain continues as agricultural lands are subdivided both upstream and downstream of the city of Boise (USACE 1995, Jankovsky-Jones 2001, and many others).
- Livestock grazing continues to impair wetland and riparian function in some areas (Jankovsky-Jones 2001).[*Reviewers have noted that this is a minor factor in comparison to factors such as development*]
- Recreation and other human activities introduce non-native species and disturb wildlife, compact soils, create conditions for less desirable species to thrive, and reduce or eliminate tree and shrub cover (Jankovsky-Jones 2001).
- Dam operations and hydrologic alteration has reduced the environmental conditions necessary for regeneration of cottonwood and other flood dependent species. The seeds of cottonwoods and other flood dependent species such as willow, which require moist, exposed alluvial surfaces at the proper time of the year to germinate and survive (USACE 1995, MacCoy and Blew 2005, Tiedemann 2011 and many others).
- Although beaver are a natural part of the river ecosystem, beaver management is needed due to the damage they can do to remaining riparian vegetation (City of Boise 2014).

## Black Cottonwood Riparian Forest

- The typical historic riparian community adjacent to the Boise River was black cottonwood forest interspersed by willow-dominated patches (Kaltenecker et al. 1994).
- Much of cottonwood riparian forest has been converted to urban, agricultural and non-native species dominated landscapes (USACE 1995).
- Regeneration of the native black cottonwood forest has been reduced by flow regulation and floodplain development (USACE 1995, USACE 2013, Tiedemann 2011 and many others).
- These cottonwood riparian forests are important to many of the bird and wildlife species in the basin, especially wintering bald eagles. The USACE cited that great blue heron rookeries are also associated with healthy forested wetland communities along the Boise River, especially on Eagle Island (USACE 2013).

- "Today, due to the lack of extreme flows to recruit and move instream and riparian substrates, there is a lack of parafluvial surfaces and limited recruitment of new cottonwood or willow trees" (MacCoy and Blew 2005).
- "Overall, the mosaic of large, neighboring blocks of even-aged stands of black cottonwood trees that were historically present and remain, to a lesser extent today, on the LBR floodplain will not persist. In the absence of temporal pulses of sexual reproduction at locations favorable to the germination and growth of seed, trees will continue to propagate asexually by sucker growth from roots and runners, resulting over time in a loss of genetic diversity. Active intervention is required if the benefits of ground disturbance attributable to flood flow events, and the gradual decline in river stage common to unregulated rivers cannot be maintained."(Tiedemann 2011).
- Flow modification, along with other factors, has reduced cottonwood recruitment within the City of Boise portion of the river (Eckert road to Glenwood Bridge). Cottonwoods reproduce through suckering, but rarely grow into large trees (City of Boise 2014).

## Open Water Habitats

- Open water habitat has likely increased in the vicinity of Boise. Numerous gravel mining pits and other artificial water bodies are now filled with groundwater. The banks are steep and sparsely vegetated. These water bodies primarily provide for aesthetics and recreation, and provide a limited array of wetland functions and ecosystem services (Jankovsky-Jones 2001).
- Multiple gravel extraction ponds and residential neighborhood landscape ponds have been developed along the LBR, typically bordered by push up berms which are typically of uncertain structural integrity. These may be susceptible to pit capture, which could result in a head cut or other river channel instability issues (USACE 2006, USACE 2013, and City of Boise 2014). Though some researchers find pit capture to be less of an issue, and see opportunities for enhancement in existing gravel ponds in appropriate locations (Richardson and Guilinger 2015).

## Flood Risk Reduction

- Flood risk reduction is a large issue due to development in the floodplain (USACE 1995).
- Riparian vegetation encroachment on the stream channel can increase flood risk (USACE 1995). [*several reviewers disagree with this statement and would change this statement to: floodplain development increases flood risk. However, this is a view of the USACE and therefore remains here*]
- Vegetation and large wood can have complex interactions with flood events. Vegetation introduces roughness and reduces velocities. Vegetation and large wood can raise water levels, introduce local scour, reduce flood peaks, delay and lengthen flood events, and have many other effects on river channel function and morphology (University of Idaho 2011).

## Solutions Identified in Literature Review

Many of the enhancements listed below have multiple system benefits; for example, the development of wetlands adjacent to the channel has positive effects on water quality and flood risk reduction (USACE 1995).

## Proposed Enhancement Tools

**Conservation and Restoration of Existing Functional Areas**

Creation and maintenance of wetlands are more costly than conservation or restoration (Jankovsky-Jones 2001). Therefore conservation and protection of existing wetland areas should be prioritized over creation.

- High quality wetland or riparian sites on public land should be protected by special status designations (e.g., wildlife habitat preserve with limited human activity) combined with implementation of long-term restoration and stewardship plans (Jankovsky-Jones 2001).
- High quality wetland or riparian sites on private land should be purchased or easements acquired by land trusts or other entities for their long-term conservation (Jankovsky-Jones 2001). Alternatively, agencies can work with landowners to ensure management is compatible with long-term sustainability of habitat.

**Identified High Value Sites**:

Although no sites within the Boise River attained the Class I or Class II designation (the highest rated sites in an Idaho Department of Fish and Game conservation strategy for regional wetlands (Jankovsky-Jones et al. 2001) several Reference Sites (the 3rd tier) are identified . Identified high value wetland and riparian sites include:

1. **Fort Boise Wildlife Management Area**: Wetlands, ponds, old oxbows, sloughs and riparian areas associated with the confluence of the Snake and Boise Rivers (Fort Boise). This area is important to waterfowl and performs many riparian and wetland functions. The Fort Boise Wildlife Management Area Management Plan (Archibald 2014) identifies issues (from both the public and management staff) and proposed management actions to address these issues. The management priorities for the WMA are in order of priority:
    1) Waterfowl Habitat
    2) Upland Game Bird Habitat
    3) Special Status Species Habitat
    4) Wildlife Based Recreation and Education

    Listed among the conservation targets is Wetland and Riparian Habitat, as 84% of the flagship and special status species benefit from efforts to restore and improve wetland and riparian habitat. The target conservation area for species that utilize the Fort Boise WMA includes the

wetlands and riparian area associated with the Boise River from the confluence with the Snake upstream to Caldwell.
[*Reviewers have noted that although the Fort Boise area is high priority for conservation and protection, due to its location in the watershed, it does not provide water quality or flood risk reduction benefits for the majority of the watershed*]

2. **The Barber Pool Conservation Area**: Above the City of Boise, the Barber Pool area was identified as one of the largest blocks of riparian habitat in Ada County by IDFG and the Bald Eagle Task Force as a key habitat area, including as a communal roost site (Jankovsky-Jones 2001, Kaltenecker et al. 1994, USACE 1985). (*This area currently has an active Bald Eagle nest*)

3. **Eagle Island**: Non-native species are abundant, but much open space and wet meadow and wetland habitats still occur. With a large portion managed as a State Park, opportunities exist to conserve and restore much of the habitat function (Jankovsky-Jones 2001). (*This area currently has an active Bald Eagle nest*)

Two sections of the Boise River represent "Habitat Site" designation according to Jankovsky-Jones (2001):

1. **Barber Pool to Warm Springs Golf Course**: Patches of intact native vegetation and some connection to the floodplain remains. Important area for bald eagles (Kaltennecker et al. 1994).
2. **Garden City Reach from river mile 46 to 51:** The reach from Main Street Bridge to Eagle Island contains four properties that represent the largest tracts of undeveloped riparian bottomland left within city limits (Jankovsky-Jones 2001). This may explain why this area contains wintering population of bald eagles (Kaltennecker et al. 1994). The vegetation is a mix of native and non-native species, but remains one of the largest areas in the urban area that provides wetland and riparian habitat and function.

   Additionally, **Lake Lowell** and its associated wetland habitats may provide opportunities for enhancement (Jankovsky-Jones 2001).

The 2012 IDFG Wetland Priority Plan (Murphy et al. 2012) identified:

**Boise River (Caldwell to Notus)** — Wetlands are associated with the Boise River floodplain, including its oxbows, sloughs, swales, and islands. The sandy banks and islands below the average high water line support unusual ephemeral plant species, some of which are rare in Idaho. The river valley contains numerous natural and human-made ponds and marshes supporting cattail, bulrush, and common reedgrass. Water levels are maintained by a network of ditches fed by irrigation return flow from surrounding agricultural lands. Ponds and riverine floodplains function to enhance water quality and provide valuable wildlife, waterfowl, and wading bird habitat. While much of the LBR floodplain is dominated by non-native trees and shrubs, native black cottonwood trees also occur with willow, rose, and golden currant (*Ribes*

*aureum*). Adjacent, alluvial valley bottom supports remnant alkaline wetland vegetation. The landscape is being rapidly urbanized and impacts related to flood control remain. In part due to urban development, the value of the floodplain as open space for natural floodplain processes, recreation, and wildlife habitat is increasing.

**Flood Easements**

Originally proposed by the USACE in 1977, the 1995 USACE Lower Boise Reconnaissance study identifies flood easements as a flood risk reduction technique that provides for environmental restoration. Areas having high flood potential could be purchased and improvements cleared from the area. In addition to flood damage control, there would be an increase in the amount of habitat available. Water quality, bald eagle habitat, and other wildlife benefits are possible with this tool (USACE 1995).

**Re-contouring the Floodplain**

- As another means of reducing flood risk and providing additional benefits, 1995 USACE Lower Boise Reconnaissance study identifies re-shaping the floodway by lowering the surface elevation of areas adjacent to the river and planting them with cottonwood trees. This measure also includes reinstating old abandoned flow channels by excavating them to ensure that they hold water at lower flow levels (USACE 1995). USACE suggests that this is most applicable to the Barber Pool area.
- Rather than planting the recontoured surfaces, Tiedemann and Rood (2015, *in press*) constructed an engineered channel on Eagle Island that was designed to simulate cottonwood recruitment sites. They were able to create the conditions suitable for successful recruitment, despite the lack of large flow events. They recommend the selective clearing and re-grading of the floodplain according to an engineered design as a method to create cottonwood colonization sites.

**Recommendations from Tiedemann 2011 include:**

- Rather than attempt to replicate the present community, restoration efforts should seek to establish key pioneer species common to the area including black cottonwood, coyote willow (*Salix exigua*), yellow willow (*Salix lutea*), golden currant, and Wood's rose; and rarer species that contribute to species diversity including Pacific willow (*Salix lucida* ssp. *caudata*), red-osier dogwood (*Cornus sericea*), Saskatoon serviceberry (*Amelanchier alnifolia*), and the common native herbaceous species, such as woolly sedge (*Carex pellita*) and Baltic rush (*Juncus balticus*). IDFG has constructed a list of suggested species for planting and restoration efforts and non-desirable species to avoid (*provided at the end of this document*).
- Golden currant and Wood's rose provide important wildlife food and black cottonwood provides important perch sites, roost areas, and other habitat for wildlife. The presence of these species at almost all sample sites suggests they grow readily and are good candidates for restoration of riparian areas.

- Black cottonwood, coyote willow, yellow willow, Douglas hawthorn (*Crataegus douglasii*), red-osier dogwood and serviceberry are also resilient after drought stress, contributing further to their utility and practical use in restoration.
- Possible active interventions to the flow regime (will come with costs and consequences):
    - the manipulation of the ground surface of the floodplain to a point at, or near, the mean groundwater elevation during the growing season to allow establishment of pioneer species from the seed bank of salvaged riparian soils and the seasonal seed shower; or the purposeful installation of seed, cuttings, and nursery stock.
    - Another is the clearing of existing vegetation to establish a seed bed appropriate for the establishment and growth of pioneer species, with or without intentional planting, and the use of temporary establishment water until the roots of maturing vegetation reach the mean groundwater elevation during the growing season.
    - Finally, a restoration ecologist may be able to provide at local, select sites the hydraulics appropriate for the establishment of pioneer species by intentionally provoking scouring events. This would be followed by the control of river and groundwater surface elevations to cause their slow decline. Management of large woody debris may be way to accomplish this.

## Site Specific Enhancement Recommendations

**Raising Barber Pool**

By raising the height of Barber Dam, managers could periodically raise the water elevation of the Barber Pool area, flooding appropriate landforms with the intent of ensuring that this important habitat area is viable in the long term (USACE 1995).

**Actions Recommended For Barber Park to Glenwood Bridge**

From the Boise Parks and Recreation Department stewardship plan for the riparian corridor from Barber Park to Glenwood Bridge (USACE 2002) that apply to wetlands, riparian and terrestrial habitat:

<u>Maintenance and Restoration</u>

- Mature cottonwood –All major riparian habitats should be fenced, and the number of volunteer trails should be limited.
- Willows, alders, shrubs and herbaceous dominated habitat areas should be monitored, because they provide a very important link in a healthy riparian corridor.
- Dryland vegetation such as grasses, rabbitbrush, and sagebrush - limit access, especially during the growing season (March to July), planting of native wildflowers and the addition of other species of native prairie grasses. Assigning a staff member sole responsibility for this upland cover. Contract restoration to local experts familiar with the establishment of native species in the local geographic area for restoration efforts.

Habitat Improvements

- Trees, shrubs, and herbs that produce fruits or seeds appear to be limited. Since this food source is important to both small mammals and songbirds, additional native plantings are recommended.
- Plant willows in suitable sites to attract sapsuckers (red-naped sapsuckers) since they provide nesting and feeding sites for other species (see discussion for more detail).
- Fencing is recommended for all upland cover types.
- All secondary footpaths should be closed with debris such as tree branch and other nature material, such as wild rose.

Noxious Weed Control Plan

A field investigation conducted in October 2001 discovered very few noxious weed infestations from Barber Park downstream to Glenwood Street, with the exception of false indigo. [*reviewers consider this information dated and should be re-evaluated]*

- The eradication of false indigo species within the park system would be very costly and may not provide improved wildlife habitat in the future. At this time, no recommendations are made to control or eliminate this species. [*Reviewers consider this information dated and that is should be re-evaluated*]
- Implement weed control program for Scotch thistle, purple loosestrife, Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), puncture vine (*Tribulus terrestris*), and Russian knapweed (*Acroptilon repens*).

**The Boise River Resources Management & Master Plan (City of Boise 2014)**

The plan identifies the following recommendations:

Habitat Management

1. Commission an ecological assessment of terrestrial and aquatic habitat
    - Develop a riparian management plan when the ecological study is complete
    - Collaborate with other city departments
2. Work with IDFG and others to improve habitat and restore structure/function of riparian zone
3. Move the path back from the river bank and wetlands wherever possible; consider raised walkways in ecologically sensitive areas; expand no-mow zones
4. Use bioengineering and native plants to re-vegetate and reclaim river banks
5. Document river bank projects in a spatial database so project impacts can be monitored
6. Use volunteers to wrap diverse age classes of trees to protect from beavers
7. Remove beavers when a significant amount of vegetation is damaged in an area
8. Create a position for a naturalist or ecologist

Wetlands and Water Quality

9. Inventory and document wetland enhancement sites along the river and in tributaries that are not wetland banking sites
10. Form partnerships to build treatment wetlands on Boise Parks and Recreation lands
11. Restore riparian areas; plant trees to shade the water
12. Incorporate sustainable/green infrastructure in park development and redevelopment
13. Work with Boise Public Works Department and others to identify projects that improve habitat and water quality and meet National Pollution Discharge Elimination System permit requirements, including land acquisition
14. Continue, and expand where possible, the Integrated Pest Management program

## Data Gaps

- IDFG recognizes that no comprehensive wetland and riparian surveys have been conducted on the LBR, and that a thorough evaluation is needed (Murphy et al. 2012)
- City of Boise recommends that an ecological assessment of terrestrial and aquatic habitat be commissioned (City of Boise 2014).

## Existing Enhancements

- Several wetland mitigation sites exist and have included the planting of native trees and shrubs. Long term monitoring will determine their success in mitigating for wetland functions lost to development.
- Created wetlands provide water quality improvement and other functions and values, such as educational opportunities (e.g., MK Nature Center and wetlands around Warm Springs Golf Course), but are expensive to create and maintain (Jankovsky-Jones 2001).
- Government agencies have made efforts to control noxious weeds (e.g., IDFG beetle releases to control purple loosestrife in Fort Boise Wildlife Management Area, Idaho Department of Parks and Recreation mapping and herbicide treatments for scotch thistle (*Onopordum acanthium*) at Barber Pool) (Jankovsky-Jones 2001).

## Examples of Specific Projects Include

**Marianne Williams Park** (from the City of Boise website)

- Once the home of Barber Mill, a large-scale lumber operation, the park has been cleared of invasive trees and bushes and replanted with hundreds of trees and riparian vegetation.
- The park features an open grass area, two large ponds, paved walking paths, a gazebo, picnic shelter, restroom and benches.
- Streams, ponds, wetlands, and forested riparian areas benefit wildlife, improve fisheries, and provide viewing opportunities.

- Much of the new riparian growth now occurring is a direct result of floodplain modification that has allowed more frequent flooding of areas that were formerly upland. (RSI-per. Com).
- Construction of Marianne Williams Park and the Barber Valley Wetland Bank incorporated the restoration, creation or enhancement of over 20 acres of wetlands along the Boise River. This project included the addition of riparian areas, side channels, ponds, and emergent, shrub and forested wetlands. The project also preserve forested riparian areas providing benefits such as flood attenuation, improved wildlife and fisheries habitat, and provide wildlife viewing opportunities to park visitors.

**Willow Lane Wetland Bank (**from The Wetlands Group**)**

- The Willow Lane Wetland site created a wetland riparian area from an upland area dominated by grasses and weedy forbs. The site was designed to add flood water storage and create an environment for riparian wetlands including emergent, shrub and forested vegetation. The site is functioning as planned, receiving floodwaters during high river flows and the emergent, shrub and forest vegetation have been established. The site created an environment that has successfully established cottonwoods produced by seed from the surrounding forests.

**Hyatt Hidden Lakes Preserve (from the Boise City webpage)**

- The City of Boise created the Hyatt Hidden Lakes Reserve, a 44-acre haven for birds, animals, and people located on the edge of Boise's West Bench. During construction the city installed an innovative stormwater treatment pilot project to treat flows to the Boise River. The project demonstrates appropriate methods for decentralized stormwater treatment using sand filtration technology in addition to construction of vehicle parking with porous materials that mimic natural hydrologic conditions. In addition, the construction included wetland restoration, enhancement and creation and three wildlife habitat islands along with building trailheads, pathways, and overlook areas. Since completion, the Hyatt Hidden Lakes Reserve, it has been used extensively as an outdoor education center by the Boise Watershed project to educate students from Boise schools on wetlands and water quality.

**Alta Harris Creek: a Boise River Side Channel Project at Harris Ranch** (From Trout Unlimited website)

- Alta Harris Creek, a Boise River side channel, creates a new side channel of the Boise River for the purposes of restoring spawning, rearing, and over-wintering fish habitat, all of which have been lost over time due to a changed river ecosystem. The complete channel is nearly a mile in length. The side channel is located near the Harris Ranch development along the Boise River.

**Julia Creek Daylighting Project** (Trout Unlimited website)

- In 2007 the Ted Trueblood Chapter and Boise Parks and Recreation constructed the Julia Creek Project in Julia Davis Park in downtown Boise. Located at the south end of Julia Davis Park, the 300 foot long channel is connected to the Boise River and provides off channel spawning, rearing and overwintering habitat for trout and other fishes.

**The Island Creek Project: Restoration of Tributary to the Boise River at Eagle Island** (Trout Unlimited website)

- The Island Creek Project goal is to restore habitat for salmonid spawning and rearing tributary to the Boise River for the purposes of restoring designated beneficial uses that are not fully supported in the Boise River. The restored channel is about 3,300 feet (slightly over 1/2 mile) in length.

**Harris Ranch Wetland Mitigation Site (From RSI)**

- A Wetland mitigation site that involved wetland creation on the north bank of the Boise River northeast of downtown. On January 9, 2015 the Corps provided a letter of full compliance and stated "Based on field surveys and aerial photographic interpretation, the designed mitigation site exceeded all performance criteria in the referenced plan. The engineered site created conditions to establish an estimated 6.96 acres of wetlands (3.09 acres of Palustrine Emergent Wetlands and 3.87 acres of Palustrine Forested/Scrub-Shrub Wetlands) during the past 18 months. This is an exceptional accomplishment considering the engineering foresight of designing the mitigation site to function in drought conditions, which unfortunately is the present condition in Southwest Idaho." (RSI, pers. Com.)

**Perkins Nature Area (Land Trust of the Treasure Valley website)**

- A 12.9 acre parcel at the absolute head of Eagle Island was put into easement by The Land trust of the Treasure Valley (LTTV). The parcel includes riparian forest and floodplain surfaces that are inundated by high flow events. The LTTV has implemented a non-native species control program and cottonwood plantings on this site that has remained undeveloped and is now protected into the future.

## Proposed Enhancement Projects

- Mace River Ranch Nature Park: This is a floodplain modification to help provide a sustainable riparian community. The historic floodplain was excavated to normal high water and filled with suitable soil capable of developing wetland and riparian species. The site is currently under development. (RSI, pers. Com.)

- The BPA (2003) identified the need for wetland creation for watershed restoration of the Boise River watershed. They proposed the creation of seven **wetland cells on Mason Creek** to improve water quality, restore wetland habitat, and create new wildlife habitat.
- The City of Boise **Dixie Drain Project** is focused on improving water quality, specifically phosphorous reduction, by creating an artificial wetland to process wastewater (City of Boise 2014).
- The USACE performed a feasibility study and made recommendations for the proposed **Boise River at Eagle Island Ecosystem Restoration Project** (USACE 2013) as mitigation for the impacts associated with the construction of Luck Peak dam in 1955. Their recommendations include a multi-million dollar project to improve 41.62 acres of forested wetlands, emergent wetlands and rearing and spawning habitat for resident fish for multiple benefits, including increasing wildlife habitat (USACE 2013). Enhancement of gravel pit habitat and flood risk reduction is included in this plan.

## References

This section will be updated as an ongoing process. Below is a list of references that are specific to wetland and riparian habitat within the LBR watershed. The following table is an image of a select portion of the BREN database showing all sources that include a discussion on wetland and riparian habitat, though this may not be the primary focus of the citation.

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| Author | Date | Title | Area/Extent |
|---|---|---|---|
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| City of Boise, Ada County, Boise County, Idaho Department of Lands | 2014 | Interagency Foothills Management Plan - Draft | Boise Foothills |
| Archibald, T. (IDFG) | 2014 | Fort Boise Wildlife Management Area | Boise River, at confluence with Snake |
| Idaho Department of Environmental Quality | 2014 | Idaho's 2012 Integrated Report | Idaho, statewide |
| Korte, A.C. (IDEQ) | 2013 | Aparent movement of birds within an urban riparian corridor during the breeding season | Boise River, Lucky Peak to Star |
| Murphy, C. and Weekley, T. (IDFG) | 2013 | Measuring outcomes of wetland restoration, enhancement, and creation in Idaho—Assessing potential | Idaho, statewide |
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| Bonnevile Power Administration | 2003 | Lower Boise River Wetlands Restoration Project - Description | Boise River from Lucky Peak to Snake River |
| USACE, Walla Walla District | 2002 | Barber Pool Conservation Area Inventory and Analysis | Boise River near downtown Boise |
| USACE, Walla Walla District | 2002 | Barber Pool Conservation Area Master Plan | Boise River near downtown Boise |
| USACE, Walla Walla District | 2002 | Boise Parks and Recreation Department Stewardship Plan for the Riparian Corridor for Barber Park to G | Boise River from Barber Park to Glenwood Bridge |
| Jankovsky-Jones, M. (IDFG) | 2001 | Wetland conservation strategy for the middle and western Snake River and lower reaches of its major t | Snake River and lower tribs |
| U.S. Army Corps of Engineers | 2001 | Preliminary Restoration Plan, Section 1135, Boise River below Barber Dam, Idaho | Boise River below Barber Dam |
| Spatial Dynamics | 2000 | Public Lands Open Space Management Plan for the Boise Foothills | Boise Foothills |
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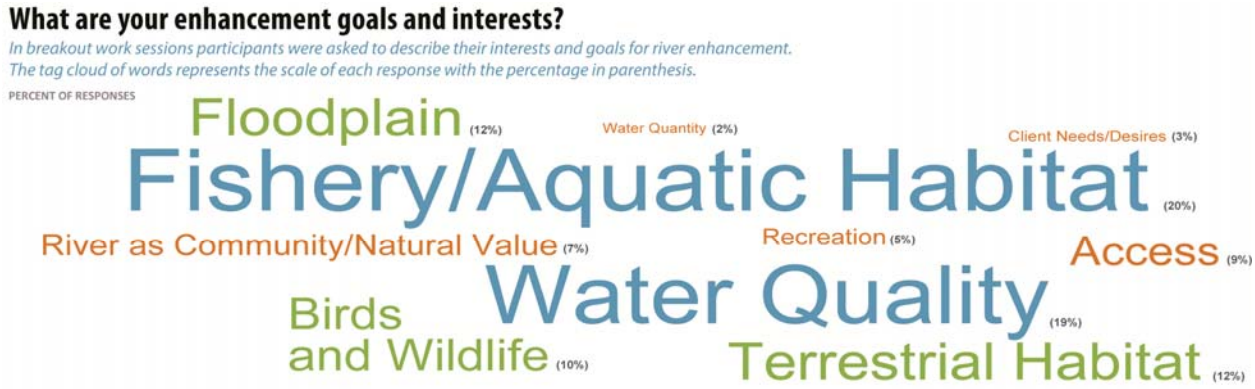
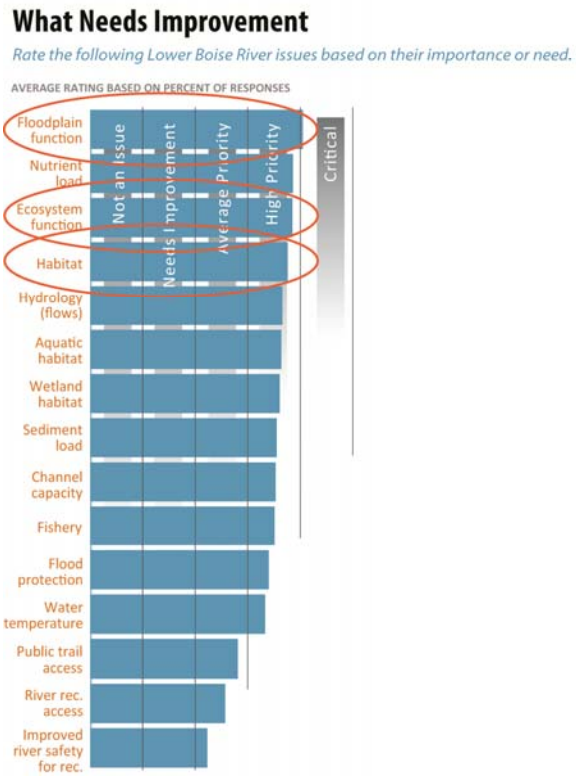
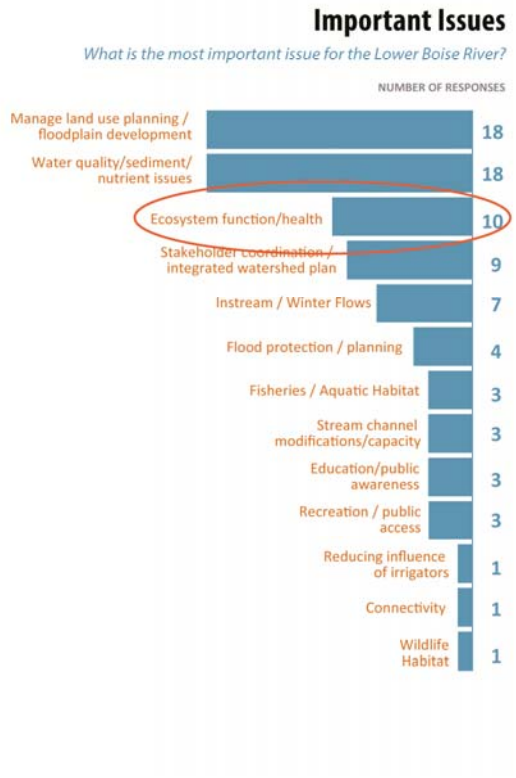
# Part II: Network Feedback

## 2011 Boise River from Vision to Reality Workshop

During and following the October 2011 workshop participants provided feedback though working groups and an online survey. The graphics presented below represent the synthesis of this feedback as it pertains to Boise River wetland and riparian habitat.



## October 22nd, 2014 Wetland and Riparian Habitat Meeting

At this meeting at which participants were provided handouts detailing the overall conclusions, issues and solutions from a preliminary literature review, participants provided written comments and feedback. Although not all participants in the meeting provided written feedback, they all participated in the discussion which consisted of small groups discussions on issues and solutions. Their written feedback is summarized in the table below.

### Issues and Solutions Identified

| ISSUES | SOLUTIONS |
|---|---|
| **Flow Management**<br>• Effects geomorphology and persistence of cottonwood and other riparian species<br>• Periodic scouring essential for cottonwoods<br>• Dam operations must be accounted for – flow manipulation negatively impacts wetland and riparian habitat | • Regulation of flood flows and declining limb of hydrograph must be considered Army Corp and BoR and not regarded as "off the table"<br>• Irrigation companies are looking for new customers. Instream flow, side channels, wetlands, flow augmentation could all be customers…given some legal gymnastics.<br>• Barber Dam repair/upgrade coming up, opportunity for improvement in management |
| **Development and Channelization**<br>• Development most significant challenge to Boise River wetlands<br>• Improper zoning leading to conversion of floodplain, especially in Eagle<br>• No conservation ordinance for Boise River<br>• Conserving open space does not always fall within local government<br>• Local ordinances downstream of Boise are inadequate to conserve riparian open space and protect public health and safety<br>• No directive from the county/city for agencies that habitat restoration has to occur when implementing projects<br>• Complacency on part of local govt. Too much reliance on FEMA.<br>• Too many exceptions are granted to developers<br>• Lack of enforcement, deadlines, hard commitments for projects<br>• Development ownership rapidly changes hands – keep up with education of public as well as developer almost impossible<br>• Has there ever been a preservation effort like the foothills preservation efforts?<br>• Stream channel alteration (rip rap) occurring | • Floodplain ordinances and conservation easements (looking at geomorphic assessment)<br>• Boise River system ordinance that conserves everything beyond 6500 cfs river flow up to 200 feet (200 foot setback)<br>• Creation of Boise River Enhancement District, like Recreation Dist. – there is no one entity that overseas entire river<br>• Agencies and elected officials have to be pushed to change the status quo<br>• Hire a lobbyist to approach Idaho Legislator, City and County<br>• Encourage local govt. to conserve areas within the floodplain not just floodway<br>• Consider continuous, un-fragmented habitats when planning development and projects<br>• Permeable pavers are a good resource, but must be maintained. Silva cells are good for under pathways to prevent root uplift and reduce maintenance costs.<br>• Are there areas where channelization can be minimized – possibly Canyon County?<br>• Proactive engineering to minimize flood risk for new development |
| **Wetland-Riparian Degradation/Removal** | • Focus on wetland-riparian protection/ conservation |

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| • Flood Districts remove vegetation along irrigation canals and drains; should be using more advanced management practices<br>• The drains and irrigation waste water (like the water in Ann Morrison and Kathryn Albertson Park, etc.) create riparian and wetland habitat. Some is tended but most is unknown and vulnerable to destruction.<br>• Pruning of trees and vegetation that interfere with "view" of river<br>• Grazing still an issue in lower watershed | of high quality areas<br>• Emphasis on enhancement not restoration (don't focus on Boise River 200 years ago)<br>• Look for projects with multiple benefits<br>• Expand use of wetland banks and other economic tools; ecosystem services market<br>• Engage the irrigation companies and incentivize them to conserve<br>• Plant riparian habitat around irrigation ponds (pump filter issues)<br>• Reform FCD #10 into an ecological enhancement organization<br>• Find alternative ways to reduce flood risk – i.e. floodplain connectivity enhancement; identify old gravel pits/pools to connect to floodplain<br>• Daylight Cottonwood and other creeks<br>• Identify state lands to conserve along river<br>• Improve management of Fort Boise WMA |
| **Recreation/Access**<br>• Sections of river "loved to death", while most of river is inaccessible to people<br>• Those secondary "volunteer" paths that are truly having an adverse habitat impact should be closed and perhaps alternate paths can be provided. | • City parks can enhance habitat by decreasing recreational trampling<br>• Designate areas for dogs to access river<br>• Applying gravel for spawning areas could discourage people from walking<br>• BSU looking to formalizing path down the river/greenbelt. Movement at BSU campus to close access to river near Chavez St. Trying to balance access with conservation<br>• Boise River Water Trail- opening greenbelt all of the way<br>• Greenbelt – future locations further from river<br>• Improve management when greenbelt is flooded; more rip rap not the answer<br>• Secondary trails provide a sense of wildness for many people interested in the river, along with fishermen, bird watchers, etc. Many of the secondary paths can be properly retrofitted to minimize erosion. |
| **Cottonwood Forest decline**<br>• Due to current flow management, channelization and development, black cottonwood will not be restored to former role in ecosystem | • What alternatives are available, such as what trees/habitat can we establish that provide similar functions given limitations<br>• Better management of flow regime<br>• The river was never bordered by a perfect, uniform cottonwood forest. All ecosystems are patchwork. We just need to identify high priority patches to protect/enhance.<br>• Adopt a cottonwood forest strategy |

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| | • Re-contouring the floodplain considered both in-channel and out of channel |
| **Invasive species**<br>• Terrestrial and aquatic invasives a problem<br>• Literature is dated and is more of an issue now; widespread impact is significant<br>• Need to control "white top" (*Cardaria draba*)<br>• Russian olive is an issue below Glenwood Road. | • Most invasives are unpopular – public to volunteer to remove some species, i.e. false indigo<br>• Integrated Pest Management (IPM) – City does a good job<br>• Weed control program needed |
| **Lack of Funding**<br>• Federal agencies can spend money on restoration but not purchase of property where restoration work can be done | • Identify funding and partner opportunities for enhancement projects |
| **Education**<br>• What role can education and advocacy play to instill new attitude of protection and enhancement?<br>• Public/Developers not well schooled in use of pesticides and herbicides.<br>• Education and persistence is key | • School and student involved project on the river/wetland areas<br>• Education through neighborhood programs, classes or workshops– xeric gardening; water conservation; maybe partner with Zamzows…<br>• Maybe incentivize good practices by owners/developers for participating in education programs and good management practices.<br>• Increase communication among stakeholders |
| **Data Gaps**<br>• Lack of current riparian/wetland and habitat studies, inventory or functional assessment along Boise River, especially in lower reaches<br>• Lack of data on invasive and non-native species<br>• What high value functions are impaired due to current and future conditions? Are there other ways to provide these functions (i.e. different species)?<br>• How will climate change impact habitat?<br>• Evaluate ecosystem services of Boise River | • Map and inventory wetlands, black cottonwoods and other high-value areas<br>• Study Boise River ecosystem function at species and community scale to guide enhancement<br>• Full ecological wetland and riparian study needs to be done – update of RSI 1983 would be worthwhile<br>• Model climate change and potential impacts<br>• Inventory wetlands and vegetation along the Boise River, especially downstream of Boise.<br>• Funding for research |

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## Part III: Key Issues and Solutions.

Based on the literature review, network feedback, and expert reviewer input, the following Key Issues and Solutions are identified.