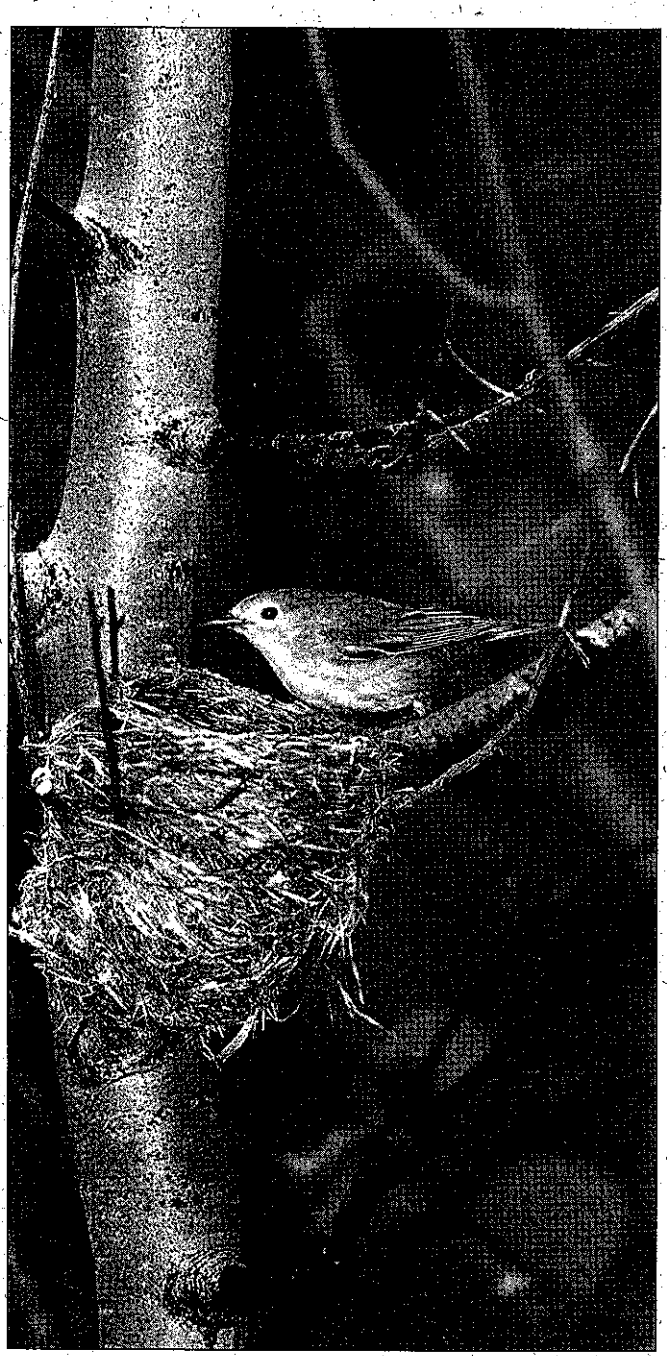
RIPARIAN RICHES



HABITAT MANAGEMENT FOR BIRDS IN IDAHO

Idaho Partners in Flight

1998

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ACKNOWLEDGMENTS

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Cover photo by Colleen Sweeney: female Yellow Warbler at nest

RIPARIAN RICHES:
HABITAT MANAGEMENT FOR BIRDS IN IDAHO

An Invitation to Help

In Idaho, no wildlife habitat type is more important to more bird species than riparian habitat. That is why Idaho Partners in Flight compiled these habitat management recommendations. Idaho Partners in Flight is a coalition of federal and state agencies, the forest products industry, private citizens, and nongovernmental groups. We are part of a hemispheric effort to conserve bird populations.

These recommendations have a single purpose—to maintain or restore structurally diverse, healthy native plant communities for the benefit of birds and other wildlife. If you manage land, perhaps as a private landowner or as a member of a land trust or government agency, you have one or multiple goals for that land. Your main goal may be to raise a crop, produce beef or timber for market, provide wildlife habitat, or extract mineral deposits.

Whatever your main goal, we invite you to use the recommendations in this document to help you meet that goal while still providing quality riparian habitat for birds.

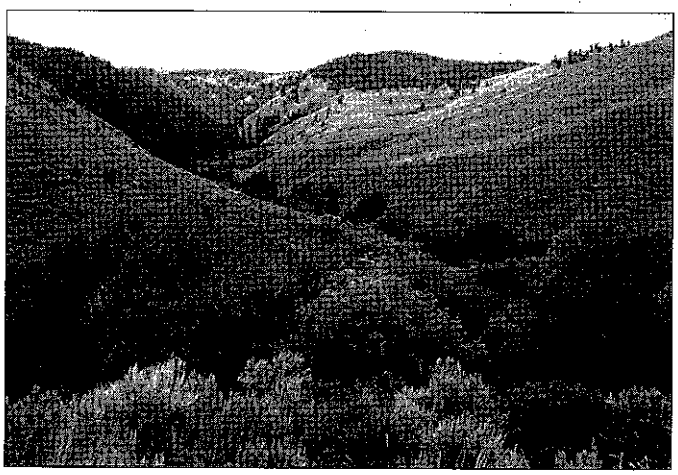
These are only recommendations, based on our best current knowledge about birds and how they use their habitat. These should not be used or viewed as regulations or policies.

What is riparian habitat?

Idaho's riparian habitat ranges from wide cottonwood forests along large rivers to narrow bands of shrubs along small mountain streams.

For this document, we define riparian habitat as lands adjacent to creeks, streams, rivers, and standing water where vegetation is strongly influenced by the presence of water.

Although lodgepole pine, cedar, aspen, and other forest types are often associated with streams and included in some riparian classification systems, we are excluding these types. Marshes are also important to birds in general and many riparian species in particular, but are also excluded as they require different management techniques. We plan to address these habitats in future recommendations.



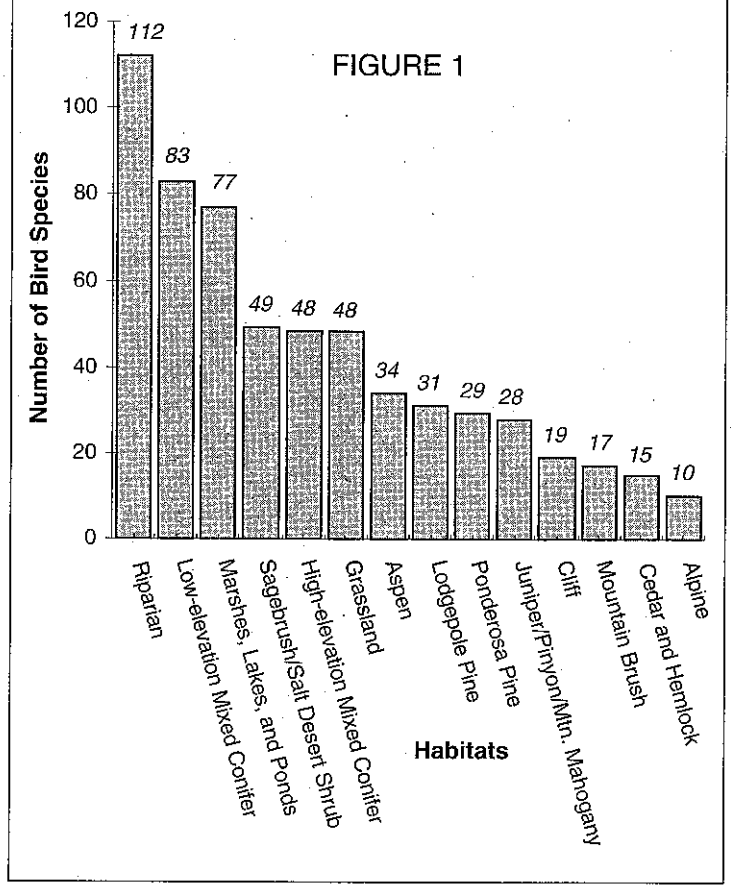
BLM - Salmon Field Office

Riparian vegetation occurs along streams, rivers, and standing water where it gets the moisture needed to thrive. It can range from wide cottonwood or willow stands to narrow stringers of vegetation.

The importance of riparian habitat to birds and other wildlife

Of the 242 naturally occurring bird species breeding in Idaho, 112 (46%) use riparian habitat as their primary nesting habitat (Figure 1). Many of the other 54% also use riparian habitat as a source of water, as migratory corridors, or for other purposes. Of the 119 neotropical migratory landbirds (those that breed in the temperate areas but winter in the tropics), 68 (57%) use riparian habitat, and some are considered specialists, *only* found in this habitat (Table 1). Many of Idaho's mammals, amphibians, reptiles, fish, and mollusks also depend on riparian habitat for survival.

FIGURE 1



Data collected over the last three decades by scientists and volunteers show declines in some species' populations. We are particularly concerned about the populations of some neotropical migrants (See "Bird Life History Information" on page 15). The primary cause for these declines is the destruction of natural habitats, including those on North American breeding grounds, on wintering areas in the tropics, and along the connecting migration routes in between.

Riparian vegetation covers less than 1% of the landscape in the arid West and in Idaho. More than 90% of the original western desert riparian habitat has been diminished by flood control and irrigation projects (Saab and Groves 1992). Riparian areas are among the most threatened habitats on the continent because of their multiple values for livestock grazing, agriculture, timber harvest, recreation, mining, urbanization, and as water and power sources. These multiple uses are not always carried out in ways that are compatible with each other or with bird conservation.

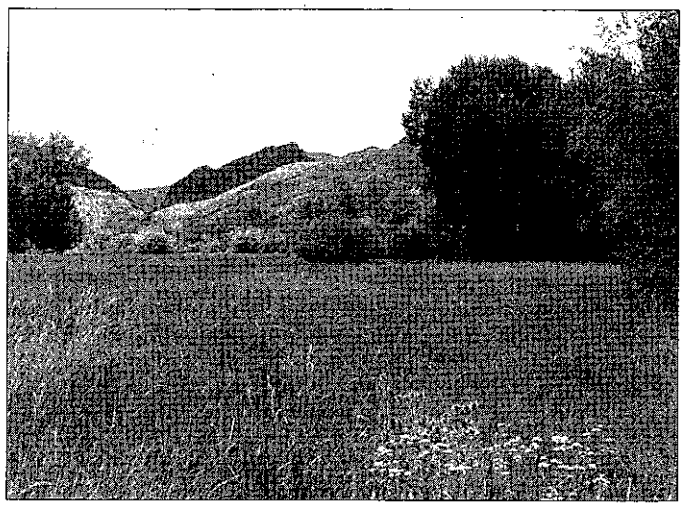
TABLE 1

Birds considered to be riparian habitat specialists in Idaho. Many more species use riparian habitat in addition to one or more other habitats.

Harlequin Duck	Gray Catbird
Spotted Sandpiper	Red-eyed Vireo
Black-billed Cuckoo	Yellow Warbler
Yellow-billed Cuckoo	American Redstart
Belted Kingfisher	Wilson's Warbler
Willow Flycatcher	Blue Grosbeak
Eastern Kingbird	Lincoln's Sparrow
Bewick's Wren	Bullock's Oriole
American Dipper	Lesser Goldfinch
Veery	American Goldfinch

What does good riparian habitat look like?

Because of the wide variety of soils, channel configurations, slope, elevation, valley width, hydrologic regimes, and riparian and adjacent upland vegetation, no single description of good riparian habitat fits all situations. There



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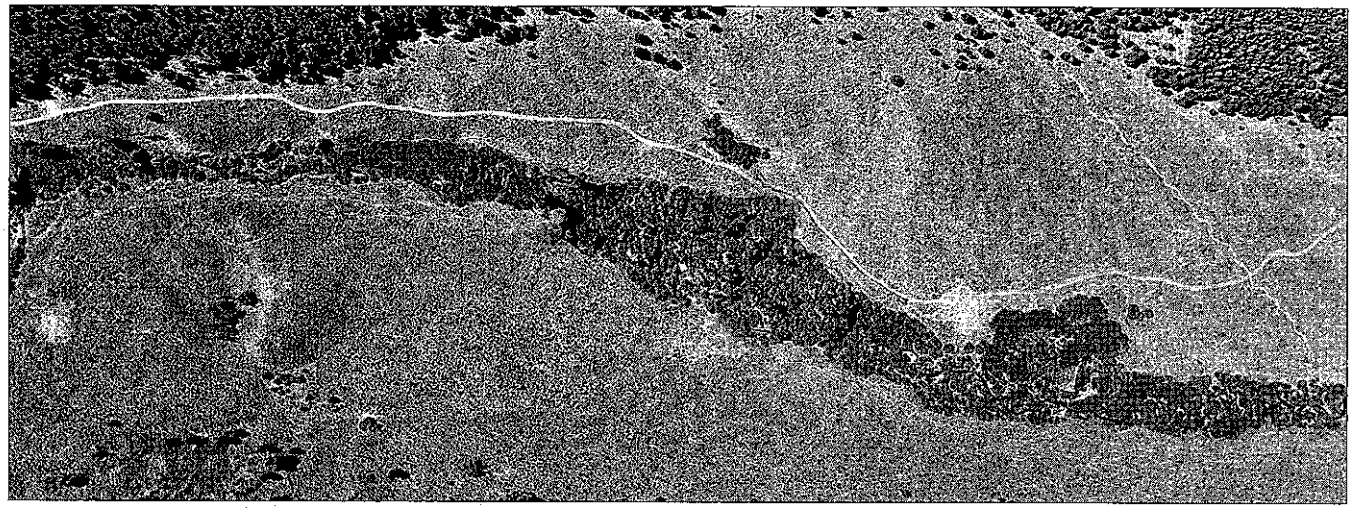
Bird species require different types of vegetation for foraging or nesting. They will find these in a riparian area having layers of trees, shrubs, and understory grasses and forbs.



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Riparian habitat in the West is linear and narrow, restricted by water availability and topography. Although riparian habitat makes up only about 1% of the West's land surface, its importance to wildlife is immense.

are also so many bird species using riparian zones for many different purposes (feeding area, nest site, escape cover, song perch, movement corridor, etc.), it would be difficult to describe the "ideal riparian vegetation." Instead, we will generalize.

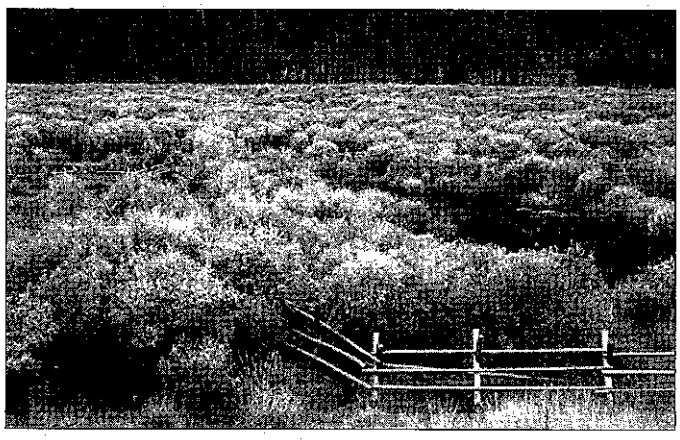
Good riparian habitat will have complete and relatively undamaged layers of vegetation that is native to the site. Riparian meadows will have only an herbaceous layer; shrub riparian areas will have an herbaceous and a shrub layer; deciduous riparian forests will have three layers: herbaceous, shrub, and tree. Forests should also have dead trees, called snags, that provide habitat for woodpeckers and other hole-nesting species.

Riparian zones should be continuous up and down the drainage and be as wide as the soil and water table will allow riparian vegetation to exist. This will reduce fragmentation, which leads to increased predation and nest parasitism by Brown-headed Cowbirds (cowbirds lay their eggs in other species' nests, letting *those* species raise the cowbird young).

IDFG

Cottonwood forests should have several canopy layers and ages of trees, a shrub layer, and good ground cover of grasses and forbs.

Riparian habitats that approach these general patterns will provide a variety of birds and other animals with food, nest sites, water, good movement corridors, and the best protection from predation and nest parasitism.



IDFG

This willow stand has both shrub and grass/forb layers and is wide enough to support many pairs of birds.

BLM - Salmon Field Office

These "mushroomed" willows and the trampled ground provided little cover and few foraging opportunities for wildlife. This area later improved with increased herding and a 20% voluntary reduction in stocking levels.

HABITAT MANAGEMENT RECOMMENDATIONS

Please note: These habitat management recommendations promote practices that will benefit birds. Where our recommendations differ from standards and guidelines produced by federal or state agencies, for example the higher recommended stubble height mentioned in the "Grazing" section, it is because of our more narrowly defined purpose, namely the maintenance or improvement of riparian vegetation that supports native bird communities.

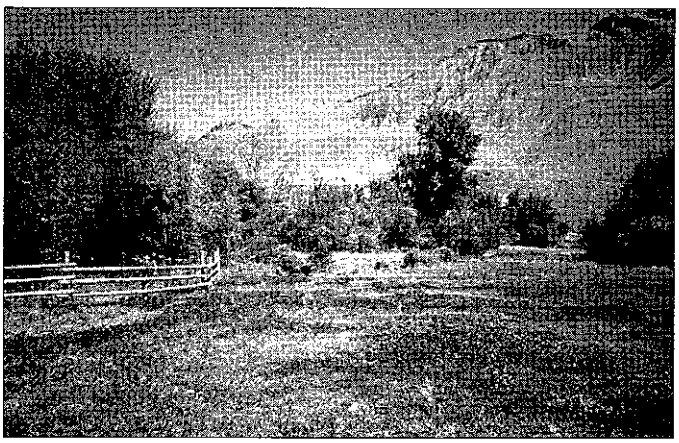
Below are some general management goals that cover all land uses, followed by recommendations listed by major categories of land use.

GENERAL RIPARIAN MANAGEMENT GOALS

- Maintain multiple vegetation layers in woody riparian habitats.
- Ensure that the population of native woody species is stable or increasing. All age classes of woody species should be present—seedlings, young plants, and mature and decadent plants.
- Manage for a variety of locally native plant species. Different plant species host different insect populations. The insects in turn support bird populations. Avoid Russian olive and tamarisk, two non-native woody species popular in landscaping. Though vigorous and easy to establish in many areas, they out-compete native species and support fewer insect species than do native plant species. Most birds avoid Russian olive and tamarisk for foraging.
- Maintain good water quality. Clean water provides a healthy aquatic habitat that supplies insects for foraging birds.

GRAZING

Heavy livestock use, whether by sheep, cattle, or horses, is a concern in riparian areas. Inappropriate grazing can eliminate the understory herbaceous and shrub layers, especially willows, and can decrease the number of tree seedlings and saplings. Over time, as mature trees die, insufficient numbers of young trees grow to replace them. Livestock also trample stream banks, resulting in wider stream channels, deeper channel bottoms, and a lower water table. In a review of studies on 68 species of migrant landbirds, Saab et al. (1995) found that nearly half (46%) of these species decreased in abundance with cattle grazing, 29% increased, and the rest showed no clear response. While complete removal of livestock from riparian areas would be good for riparian management, we recognize that this is not acceptable to many landowners or possible without significant cost. Therefore, many of our suggested grazing practices focus on protecting riparian areas during crucial growing periods for plants.

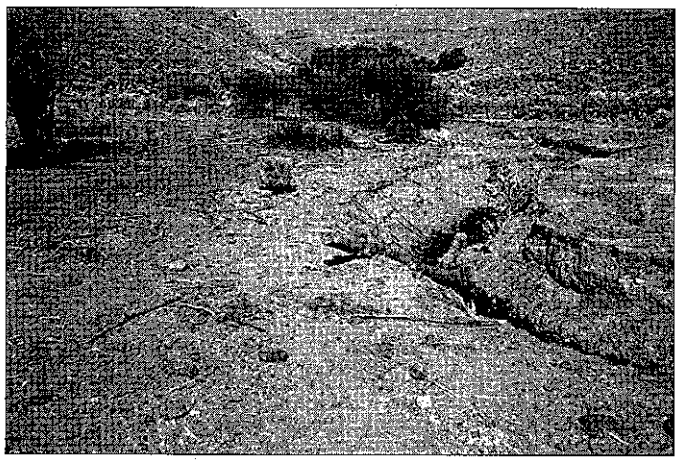


BLM - Salmon Field Office

A landowner/government partnership built this fence to protect riparian areas while allowing grazing nearby.

- No single grazing strategy will fit all situations of hydrologic conditions, climate, geology, soils, plant species, elevation, etc. Before developing a livestock use plan, know the current riparian condition and assess its future potential.
- Maintain proper stocking and livestock distribution to protect riparian and adjacent upland habitats. Limit grazing intensity to a level that will maintain or improve desired plant species composition and vigor (see next page). Add more rest to grazing cycles to increase plant vigor, to allow stream banks to regenerate, and to encourage desirable plant species composition.
- Sagebrush or juniper growing up to the edge of an existing or historical stream channel is evidence of

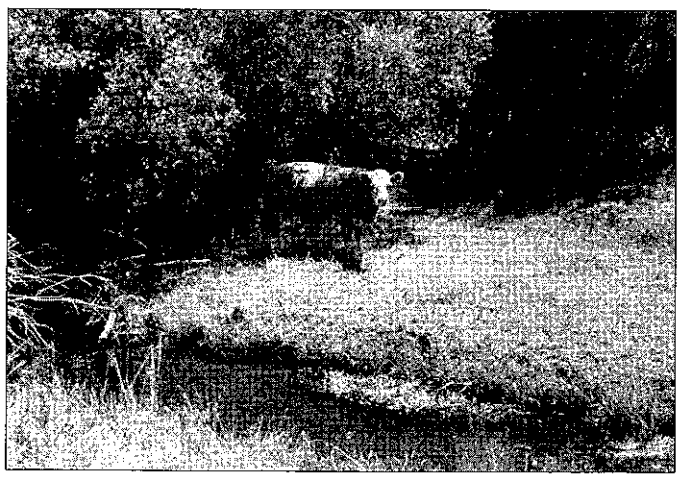
chronic problems. If grazing is the cause, consider livestock management or exclusion, or other management options, until the water table is restored and moisture-loving plant species have reestablished themselves on the site. Both birds and livestock will ultimately benefit.



BLM - Salmon Field Office

Season-long access by cattle damaged this long water gap. Water gaps should be only 3-6 m (10-20 ft) long and on straight stretches of streams with gentle banks. This area later improved after season of use was reduced from 4 months to 1 and stocking levels were decreased by 20%. The water gap will be eliminated when upland water sources are developed.

- Exclude livestock from riparian areas having high risk of degradation when there is no practical way to protect those riparian areas while grazing nearby uplands. If the riparian area is already degraded, a few years of complete rest from grazing will be necessary to begin the recovery process (Clary and Webster 1989). For a livestock watering site (water gap), provide access to a short, straight section of stream with a gentle bank, avoiding bends where the stream flow puts additional pressure on the banks.



BLM - Salmon Field Office

Cows, like people, love riparian areas. These areas are cool and have lush grasses. Unfortunately, too much use, by either creature, can be harmful.

- Locate fences that parallel a stream well outside the riparian zone, so that animals trailing along the fences will not affect the stream banks and riparian vegetation. Fences can create barriers for other wildlife so should be considered on an individual basis. Discourage trailing along stream banks by placing logs across trails, perpendicular to the stream channel.
- Herding can be an effective tool for managing livestock in riparian areas. However, in hot weather, herding livestock from riparian areas may be almost impossible, and livestock may need to be removed completely from the area.
- Time grazing to protect all vegetation layers.
  - Avoid continuous grazing and hot season grazing (mid- to late summer) in riparian areas. During the summer period, livestock are especially likely to concentrate in riparian areas. Once the upland forage cures, move livestock to a pasture without riparian areas or regularly herd them out of riparian areas.
  - Early, short-term spring cattle grazing may increase the herbaceous component of the understory (Clary and Medin 1993), which is very important for bird species dependent upon ground foraging and seeds.

BLM - Salmon Field Office

Herding livestock is effective for riparian habitat protection. Cattle graze this site a few weeks a year with herders daily moving them out of the riparian area to an upland site. When the vegetation shows a specified use level, grazing ceases.

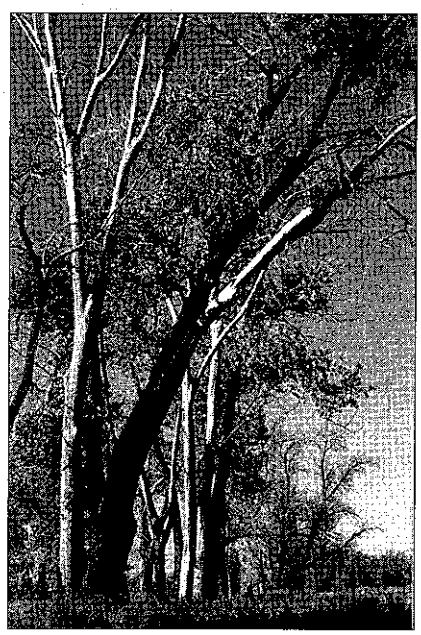
Grazing must be completed with time for the plants to regrow. Grazing should remove no more than 25-40% of the current growth and leave 15 cm (6 in) stubble height to provide cover for ground nesters and to keep livestock from feeding on willows (Clary and Webster 1989). However, time grazing to keep livestock off stream banks when they are most vulnerable to damage (when the ground is saturated) and to coincide with the physiological needs of desired plant species. Also, grazing near riparian areas attracts Brown-headed Cowbirds that parasitize nests of many songbirds. Cowbirds will travel several kilometers (several miles) from feeding sites to lay their eggs in other species' nests. If possible, eliminate grazing near riparian areas during the peak nesting season, from May through June.

- Light fall grazing can help maintain functioning riparian areas. Grazing should result in herbaceous use of less than 30%, stubble heights of at least 15 cm (6 in), and no significant consumption of willows and other shrubs (Clary and Webster 1989). Willows are especially susceptible to overgrazing. End-of-season stubble height should be sufficient to ensure complete ground coverage, soil stabilization during high flows, and cover for riparian-dependent species. Saab et al. (1995) reviewed studies on 68 bird species and found that grazing riparian habitats moderately during autumn months, as compared to other seasons of the year, apparently has the least impact on breeding birds.
- Maintain several age classes of trees to provide a continuous long-term source of mature trees, multiple vegetation layers, and snags. If there are too few young trees, then limit livestock use until a new crop of trees is old enough to withstand grazing or trampling—about 5 years for cottonwoods (Bayha and Schmidt 1983).
- Develop water and shade in upland areas to help spread grazing pressure. Place salt used to attract livestock away from riparian areas in locations that encourage animals to make better use of upland vegetation.
- Locate livestock-handling facilities outside riparian areas. Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to areas and times that do not harm riparian areas.

FORESTRY

Timber harvesting, including firewood cutting, can affect riparian areas by removing foraging sites and nesting trees from the riparian zone. Trees left standing trap sediments and nutrients, moderate stream temperatures, and provide large organic debris. Habitat management options include the following:

- Leave buffer zones around timber harvest and firewood cutting areas—buffers where no cutting or other land disturbance is allowed. Maintain these buffer zones to protect deciduous riparian areas and to provide habitat for bird species dependent upon larger trees. Biologists with the USDA Forest Service or USDI Bureau of Land Management can give advice on the appropriate buffer width for the area.
- Maintain mature stands of trees next to wet meadows to help species such as the Olive-sided Flycatcher. Maintain snags and dead-topped trees along perimeters of wet meadows and in stream corridors. These provide nesting cavities for birds and increase the number of insects available for food. Snags do not remain standing long, so retain an abundance of mature trees to replace them over time.
- Do not locate landings, log decks, or skid trails in or through riparian areas.
- Route helicopter flight paths away from riparian areas from May through July. Locate helicopter landing areas



USFWS

Older cottonwoods and dead ones provide cavities for species such as woodpeckers and owls.

more than 0.4 km (1/4 mile) from riparian areas during this period. Helicopters and other loud noises interfere with songbird breeding activity, which depends heavily on singing and being heard.

- Maintain a shrubby understory in stands next to meadows and along stream courses to help species such as the MacGillivray's Warbler and Yellow Warbler.
- Avoid operating heavy equipment through, along, or across riparian areas. If equipment operation is necessary, use tracked equipment rather than wheeled vehicles, and only during winter when the ground is frozen and less vulnerable to damage.
- During fire activities, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside riparian areas. Design fuel treatment and fire suppression strategies, practices, and actions to reduce disturbance of riparian vegetation. Keep chemical retardant, foam, or additives out of surface waters.
- Follow Idaho Division of Environmental Quality Best Management Practices for road-building activities, staying well away from streamsides. Check with the Division's Watershed and Aquifer Protection Bureau in Boise, (208) 373-0502.

ENGINEERING

Well-planned roads and stream crossings reduce riparian disturbance.

- Design roads to protect riparian habitat. The Idaho Department of Fish and Game Environmental Coordinator or Regional Supervisor in each Region will know the appropriate contact for information on government road-building standards.

  Panhandle Region · (208) 769-1414
  Clearwater Region · (208) 799-5010
  Southwest Region (incl. McCall) · (208) 465-8465
  Magic Valley Region · (208) 324-4359
  Southeast Region · (208) 232-4703
  Upper Snake Region · (208) 525-7290
  Salmon Region · (208) 756-2271

- Avoid building roads parallel to streams in riparian zones or through wet meadows. Stream crossings should be at right angles to the stream to reduce impacts on riparian vegetation and water quality.
- Roads and rights-of-way often cross riparian corridors; this can fragment bird habitat and reduce its effectiveness. Combine these disturbance types at one crossing site to decrease the area impacted.
- Design roads with adequate structures to prohibit vehicles from leaving the roads and off-roading in riparian zones or nearby uplands.
- Construct new and improve existing culverts, bridges, fords, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those crossings could pose a substantial risk to riparian conditions.
- Revegetate all disturbed areas with native vegetation, and prevent grazing by livestock while the areas recover.
- During road maintenance and snowplowing activities, avoid side-casting of soils and snow on roads within riparian areas.

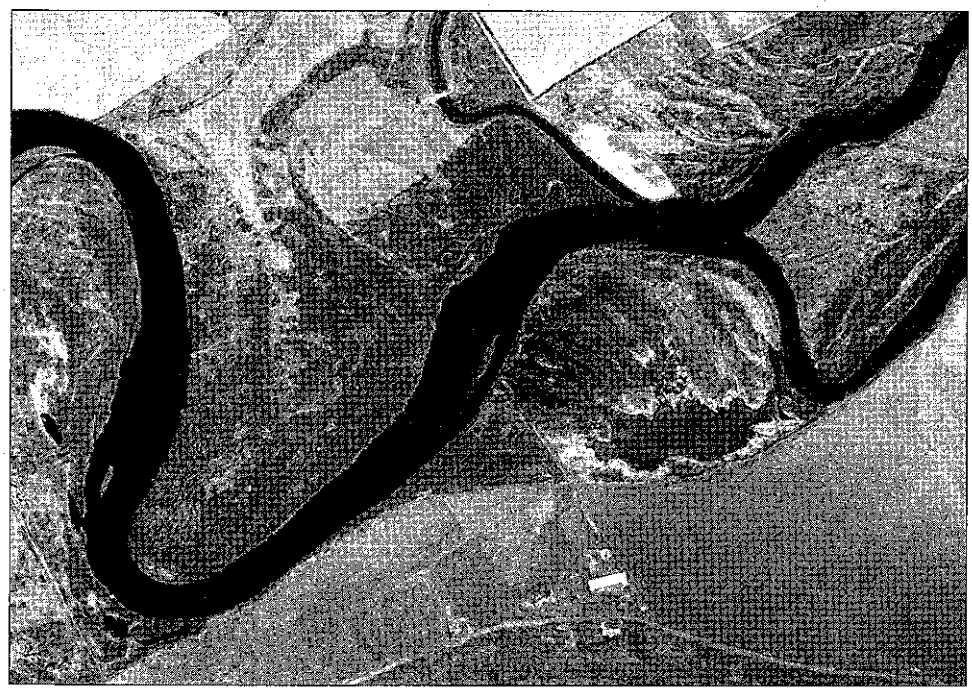
MINING

- Keep mining, oil, gas, sand/gravel, and geothermal activities, including structures, roads, and support facilities, outside riparian buffer zones. Maintain buffer zones to protect deciduous riparian areas and to provide habitat for bird species dependent upon larger trees. Biologists with the USDA Forest Service or USDI Bureau of Land Management can give advice on the appropriate buffer width for the area. Additional protection should be added to prevent run-off or seepage of toxic materials that could harm aquatic life or riparian vegetation.
- Also see "Engineering."

FARMING

These recommendations for farming practices will benefit birds and other wildlife and help protect water quality.

- Leave a buffer of uncultivated brush and trees along all waterways. Where such vegetation has been removed, establish woody and herbaceous vegetation through plantings and, if necessary, fencing (see "Grazing"). Buffers stop excess sediments and nutrients from entering the water.
- Avoid driving tractors or other equipment in riparian areas.
- When cleaning irrigation ditches, use techniques that are least damaging to vegetation. Vegetation along irrigation banks reduces erosion, filters run-off, maintains water quality, and provides wildlife habitat. If possible, avoid burning ditch banks and stream banks. Otherwise, limit burning to the interior of the flow channel by mowing or grazing the top of the banks and containing the fire inside the channel. Allow other desirable vegetation to remain unburned. Time the burning to avoid the nesting season.
- Retain large patches of riparian vegetation, instead of smaller fragments. Fragmented riparian habitat increases predation by mammalian and avian predators and increases parasitism by cowbirds. Some species of migrants will not nest or will nest in lower abundance in smaller patches than in larger ones (Freemark et al. 1995).
- Avoid depleting ground water by pumping too much water for irrigation. Ground water depletion and diversion of streams outside their natural channels can kill the moisture-dependent riparian plants.
- Prevent chemical run-off into streams and rivers. These chemicals can harm downstream riparian vegetation and wildlife.



Idaho BLM and USFS Rocky Mountain Research Station

Farming, housing developments, utility rights-of-way, and roads can chop riparian habitat into fragments. Some species can tolerate this fragmentation, while others prefer more continuous habitat.

PESTICIDES/HERBICIDES

Pesticides and herbicides can harm bird populations if used incorrectly. Users should always follow label directions. Pesticides can negatively affect bird populations for the very reason they were created—killing insects. Birds, even seed-eating ones, depend on insects to feed their young. Loss of insect prey during the nesting season can be devastating and can turn a habitat that regularly produces birds into one that does not. In addition, many migrants rely on food resources in riparian areas to store up or replenish fat reserves for the long migration. Improperly used pesticides can also directly kill birds or weaken them, making them susceptible to disease or unable to produce young. Herbicides change the vegetation in riparian habitat, resulting in loss of nesting sites and declines in prey abundance (O'Connor and Shrubb 1986 as cited by Gard and Hooper 1995).

For more specific information, check with the Idaho Department of Agriculture's Bureau of Agrichemical Standards, (208) 332-8590, or the Environmental Protection Agency, (208) 378-5746, in Boise.

- Limit pesticide/herbicide applications in riparian areas and adjacent sites to activities that improve or maintain the riparian vegetation and aquatic community (for example, elimination of competitive noxious weeds). Where pesticides are essential, their use should be part of integrated pest management (IPM) systems. IPM involves closely monitoring pest populations (plants and animals) and using chemicals only when and where pests are likely to cause economically or ecologically important damage. This reduces exposure of wildlife to harmful chemicals and reduces the destruction of nontarget insects (Rodenhouse et al. 1995). If a biological control is available for target noxious species, attempt to use this form of control rather than pesticides.
- When possible, apply chemicals by hand to target weeds and other pests as specifically as possible.
- Carefully plan aerial application of herbicides to prevent drift of chemicals to riparian areas. Depending on the wind speed, provide a buffer zone of 1.6 to 6.4 km (1 to 4 miles) downwind of the aircraft, and 76 m (250 ft) to 800 m (1/2 mile) upwind. Do not spray herbicides in winds exceeding 16 kph (10 mph) or during temperature inversions.
- Avoid using xylene and other chemicals to reduce algae. Some of these chemicals wick up through the soil, destroying riparian vegetation.

RESIDENTIAL AND URBAN DEVELOPMENTS

Urban or residential environments can be particularly hazardous for breeding birds (Freemark et al. 1995). Nest predators such as jays, squirrels, raccoons, and house cats are common, as are nest-parasitizing Brown-headed Cowbirds. In addition, human impacts on the environment and on the birds themselves can be intense (Freemark et al. 1995). Within riparian corridors, individual houses result in habitat fragmentation, human disturbance, and introduction of exotic plant species and predators like cats. Some residential areas built on other habitats now resemble riparian habitat due to landscape plantings and water availability. However, the fragmented nature of these habitats and the frequent lack of understory vegetation reduce their value to birds.

- Retain and plant *native* vegetation in landscaping, including a natural distribution of vegetation in the ground, shrub, and tree layers. This will result in a less "clean" yard (i.e., grassy lawn), but will still allow use by ground-, shrub-, and canopy-nesting species. Also retain snags and dying trees, though for safety reasons these could be cut to a height of a few meters (yards). Vigorous non-natives such as Russian olive and tamarisk can spread easily to riparian areas and out-compete native tree and shrub species (see "General Riparian Management Goals").
- Clump housing into a small area, leaving the rest of the riparian corridor as "open space" to reduce fragmentation. This will not completely prevent problems related to predators and human disturbance. Conservation easements can be used to protect the open space for perpetuity.

- Construct recreational paths along the edge of the riparian zone, rather than right through it, to decrease disturbance to birds and to prevent further fragmentation.
- While bird- and squirrel-feeding are becoming more popular, these create hazards for birds by exposing them to cats or to contaminated food. Provide plenty of cover near feeders, clean feeders and bird baths monthly, and remove feeders if bird mortality is high.
- Keep garbage covered and do not put food out for animals like raccoons. Predators and scavengers drawn into a residential area by free food will prey on eggs and nestlings.
- Keep cats leashed or indoors, especially during daylight hours. Other techniques meant to protect birds, like declawing cats and putting bells on collars, do not work. Nationwide, rural cats probably kill hundreds of millions of birds each year, and urban cats add to this toll (Coleman et al. 1997).
- Reduce or eliminate use of pesticides and herbicides that can directly harm birds or pollute streams (see "Pesticides/Herbicides"). Avoid using foggers for mosquito control in riparian habitats. Encourage natural insect control by swallows and bats by leaving snags and providing nest/roost boxes.
- Teach children with air guns to use them responsibly and avoid living targets.

RECREATION

Some recreational uses may be incompatible with conservation goals. Recreational use can affect birds by creating disturbance, especially during the breeding season. Birds are also affected by vegetation trampling and firewood gathering. One study found that of 106 nonconsumptive uses, 73% of these negatively affected wildlife (Schaefer and Brown 1992). Unfortunately for birds, healthy riparian areas are the same areas that people like to use (Krueper 1993).

- Consider potential disturbance to nesting birds when locating camping sites, picnic areas, and other areas of human activity. Manage or restrict ATVs, bicycles, and horses using riparian areas and wet meadows, because soil compaction and ruts can lead to the drying of these wet areas. Avoid constructing new trails along or parallel to riparian areas. Provide firewood to decrease use of riparian areas as a wood source.
- Plant dense native vegetation to screen and reduce human use of vulnerable wildlife habitats and fragile riparian areas.
- Concentrate camping activities rather than spread them throughout a riparian area to lessen impacts to breeding birds. Keep disturbance to soils and vegetation to less than 15% of the area within the developed site (Smith and Prichard 1992). If possible, locate new recreation sites outside riparian areas.
- Control pets in recreation areas. Dogs and cats can be devastating to low-nesting species such as ducks, upland game birds, and sparrows.
- Reduce recreational disturbances in riparian areas, especially during the bird nesting season. Disturbances include bird watching, especially in nesting areas of rare, sensitive, or endangered species.
- Avoid using foggers for mosquito control in riparian habitats.

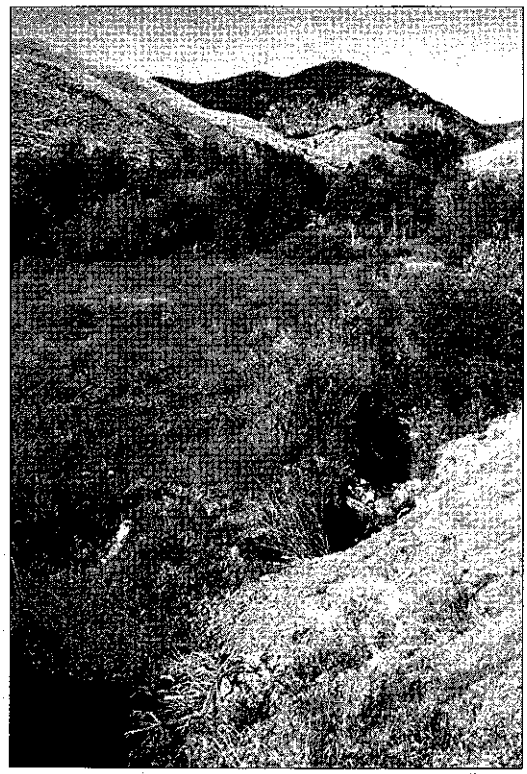
BLM - Salmon Field Office

This campground concentrates campsites in one area, rather than spreading them throughout the riparian habitat. This decreases disturbance to nesting species and reduces harm to vegetation.

REHABILITATION

Degraded riparian areas can be rehabilitated using a combination of methods.

- To rehabilitate stream banks and upland sites that erode and add soil to streams, use willow planting, dry root stock transplanting, native seeding, and/or exclusion of livestock. Plant only native species to increase nesting cover and foraging opportunities. However, before planting, address the causes of the riparian habitat degradation. Many planting operations will fail without a change in other management activities (for example, grazing) (Smith and Prichard 1992).



BLM - Salmon Field Office

Simple rock dams placed in this stream raised the water table, resulting in more lush growth of grasses, sedges, forbs, willows, and other riparian shrubs.

- Do not attempt to reroute a natural river or stream by channelizing it, straightening the meanders, or diking a channel. Where channelization has occurred in the past, restoring meanders will raise the water table, narrow the stream width, deepen channels, stabilize banks, and allow regrowth of woody vegetation.
- Introduce beavers into drainages where gullying occurs and where reestablishment of willow shrubs is desired. This should not be done unless dam-building materials and a sufficient food source are already available and the stream gradient is less than 4%. If necessary, provide supplemental dam-building materials and food. See Smith and Prichard (1992) for more information and sources. Introduce beavers only into areas where they previously occurred.
- Remove exotic plant species, such as Russian olive and tamarisk, that compete with native plant species and do not provide foraging or nesting opportunities for wildlife.
- If necessary, stabilize and protect eroding banks with professionally designed rock riprap, tree revetments, or gabions. Structural options include placement of in-stream structures, such as low-head dikes, to improve riparian systems by slowing flow, increasing sediment deposition, and allowing reestablishment of riparian vegetation. These structures should not be used as substitutes for proper riparian management but as temporary solutions while addressing the causes of deterioration.
- For successful regeneration, cottonwood forests rely on periodic flooding that scours out a seedbed for cottonwood seedlings. Where flood control and other water storage or diversions have removed this scouring action, consider more drastic measures to encourage regeneration, for example, sod removal, irrigation, and seeding (Friedman et al. 1995).
- There is financial help and expert advice for landowners interested in improving riparian habitat on their lands. Contact the U.S. Fish and Wildlife Service's Partners for Wildlife Program, (208) 378-5098; U.S. Natural Resources Conservation Service, (208) 378-5723; or the Idaho Department of Fish and Game regional offices (see "Engineering").

WILDLIFE MANAGEMENT

Wildlife, especially big game animals, have impacts on riparian areas. Sometimes, managing for one species can have negative impacts on other species, such as birds.

- Consider riparian area conditions and big game impacts (for example, on willows) when setting herd objective levels. Do not exceed the carrying capacity of riparian habitats.
- Cooperate with the Idaho Department of Fish and Game to identify and eliminate wild ungulate impacts to riparian areas. Locate ungulate feed sites outside riparian areas.

BEAVER

Beavers alter landscapes. They cut down trees, but they also create suitable sites for new growth of trees and shrubs. Where their populations are stable, they help store water, buffer floods, raise water tables, and provide a diversity of habitats and vegetation.

- Maintain beaver populations in locations where they currently occur. Encourage and promote reintroduction into areas historically occupied by beaver, and provide suitable habitat for reintroduced animals (see "Rehabilitation").
- Willow planting may create suitable beaver habitat where absent; aspen regeneration may improve suitability in some areas.
- Where beaver populations are too high, resulting in excessive loss of mature trees, control them by harvest or relocation.

IDFG

Beaver dams raise the water table so that riparian vegetation can grow. Biologists who have reintroduced beaver to degraded riparian areas report new growth of riparian vegetation, decreased sediment loads, and stabilized streambanks.

BIRD LIFE HISTORY INFORMATION

Below is life history information for some of the highest priority neotropical migratory bird species that use riparian habitats in Idaho as listed by Ritter (1996). This provides a quick guide to some of the specific needs of these species. Table 2 (see page 17) summarizes nest location and riparian habitat type used by these species. Information is from Ehrlich et al. (1988), Dobkin (1994), and Groves et al. (1997) unless otherwise noted. See those publications for citations specific to each species.

Calliope Hummingbird • Calliope Hummingbirds are found in meadows, canyons, and streams in mountain areas, open montane forests, clearcuts, burned areas, and willow and alder riparian thickets. They often reuse their old nests, which are primarily in riparian streamside vegetation and road/forest edges on a tree limb or cone, or in a shrub. The males rely most heavily on open shrubfields in early successional patches where they use tall shrubs as perch sites and display areas (Hutto 1995). Calliopes feed on nectar, spiders, and insects. Nectar sources include paintbrush, penstemon, columbine, trumpet gilia, and elephant head. Calliopes winter in Mexico.

Rufous Hummingbird • Rufous Hummingbirds breed north of the Snake River plain in open montane coniferous forests, woodland edges, clearcuts, early post-fire woodlands, and riparian thickets. They often reuse their old nests, which are built in conifer or deciduous trees, vines, or shrubs. They may nest in a loose colony of up to 10 nests. Rufous Hummingbirds feed on nectar, spiders, insects, and tree sap. They winter in Mexico.

Lewis' Woodpecker • Lewis' Woodpeckers breed in open forests and woodlands, primarily ponderosa pine, often in logged or burned areas with abundant snags. They also breed in riparian woodlands, especially cottonwood forests. Populations using riparian woodlands in arid and semiarid areas have declined precipitously, apparently responding to loss and degradation of these habitats by livestock. The birds nest in cavities in live trees or standing snags, 30.5-100 cm (12-40 in) dbh. Competition with European Starlings for nest cavities may be another factor in population declines. Lewis' Woodpeckers feed on insects by sallying from a perch or by gleaning food from the ground or tree bark. Their diet also includes nuts, fruit, and pine seeds. They winter within the United States and Mexico.

Willow Flycatcher • Willow Flycatchers use willow or alder thickets along streams. In an Idaho study, Willow Flycatchers were intermediate in association with mesic and xeric willow habitats. In an Ontario study, territory size ranged from 1,000 to 4,700 m^2 (10,800 to 49,600 ft^2). Their nest is a loosely woven cup built in a horizontal fork or upright crotch on the outside edge of a low shrub or tree. Declines in the West have been attributed to a combination of riparian habitat degradation by livestock and heavy parasitism by cowbirds. They may also be threatened by deforestation on the wintering grounds. Populations increase in response to reduction of cattle grazing and cessation of willow control in riparian habitats. In northern Colorado, there was a high rate of cowbird parasitism on nests of this species. Southwestern U.S.A. populations are endangered. Willow Flycatchers feed on flying insects or take food from foliage. They winter in southern Mexico and Central America.

Dusky Flycatcher • Dusky Flycatchers use a wide range of open woodland and shrub habitats: early successional ponderosa pine or other conifers with well-developed shrub layers; mountain mahogany; aspen; riparian woodland and thickets; and montane shrubsteppe. They are often found near water. In a Montana/Idaho study, Dusky Flycatchers were associated with rotation-aged Douglas-fir stands. They nest in shrubs or low trees and are common cowbird hosts. Dusky Flycatchers feed on insects by sallying from a perch or by hovering to glean insects from vegetation. They winter in the southern United States and Mexico.

Veery • Veeries are usually found near water in moist, low-elevation (below 2,000 m [6,500 ft]) deciduous forest (especially aspen, willow, and cottonwood bottomlands) with a shrubby understory. They are also found in willow or alder riparian thickets. An Idaho study indicated that the probability of finding Veeries present in cottonwood forests increased with patch size. In that study, Veeries showed a preference for dogwood canopies. Numbers were significantly reduced in grazed areas and campgrounds compared to relatively undisturbed sites. They nest on the ground, low in a shrub, or on top of a low stump. Veeries are common cowbird hosts. They feed on insects and spiders during the breeding season, switching to small fruits during the autumn. They winter in South America.

Swainson's Thrush • Swainson's Thrushes inhabit dense coniferous forest (especially spruce) with a dense, tall understory shrub layer; tall, second-growth shrub stands in moist sites or near water; aspen/poplar forests; and willow or alder thickets. In a northern Idaho study, the species was more abundant in continuous stands of old-growth cedar/hemlock than in fragmented or selectively harvested stands. In southeast Idaho, the species was strongly associated with cottonwood patches next to natural upland vegetation as opposed to agricultural areas, and preferred cottonwood forests with willow subcanopies. Swainson's Thrushes build a bulky cup nest on a horizontal conifer branch, usually near the trunk, or

in a shrub. They feed on insects gleaned from the forest floor, vegetation, and branches. They also eat some berries and fruit. Swainson's Thrushes are highly vulnerable to tropical deforestation. They winter from central Mexico south to South America.

Plumbeous Vireo • The Plumbeous Vireo, recently split from the Solitary Vireo, is found in shrubsteppe areas of southern Idaho where they nest in riparian vegetation (D. Svingen, pers. comm.). They are also found in pinyon-juniper. They lay their eggs in a nest suspended from a twig fork of a horizontal hardwood or conifer branch 1 to 6 m (3-20 ft) above ground. Plumbeous Vireos are common cowbird hosts. They feed on insects taken from twigs and foliage or catch flying insects. They occasionally eat small fruits. They winter in Mexico and Central America.

Yellow Warbler • Yellow Warblers prefer moist, shrubby habitats along streams, also edges of open conifer or mixed deciduous forests, second-growth woodlands, and farmlands and gardens, especially near water. In mountainous areas, Yellow Warblers are often restricted to shrub-willow habitat. Several Idaho studies have found this species to be a riparian habitat generalist. Western populations have declined markedly in response to loss of riparian thickets due to a combination of drought, channelization for flood control and agriculture, and impacts from livestock grazing. Reduced grazing apparently results in increased population size. The Yellow Warbler pair builds their nest in an upright fork of a tree or bush. Yellow Warblers glean insects and spiders from limbs of shrubs and trees. This species is one of the most common cowbird hosts. They winter from central Mexico south to northern South America and the Caribbean Islands.

MacGillivray's Warbler • The MacGillivray's Warbler uses coniferous forest undergrowth and edges, low dense shrubs, shady damp thickets, burn areas, brushy hillsides, and cut areas in early successional stages, but reaches highest densities in riparian thickets. In a southern Idaho study, the species was considered a riparian habitat specialist, preferring dry, tall willow areas with grasses and forbs. Riparian populations are adversely affected by livestock grazing. MacGillivray's Warbler nests are built approximately 0.3 to 1.5 m (1 to 5 ft) above ground in fir saplings, alders, chokecherry, or other shrubs. These warblers are an uncommon cowbird host. They feed mostly on insects such as click beetles, flea beetles, and caterpillars. They migrate to central Mexico, southern Baja California, and south to western Panama.

Wilson's Warbler • Wilson's Warblers are found in streamside shrubs, bogs with scattered trees or shrubs, and alpine willow-fir or alder thickets in the mountains. They usually nest in dense vegetation on or near the ground, especially at the base of a tree or shrub. Wilson's Warblers are uncommon cowbird hosts. Riparian populations are negatively affected by livestock. A California study found territory size in different habitats ranged from about 0.2 to 2.0 ha (0.5 to 5 ac). Wilson's Warblers eat primarily insects gleaned from vegetation or caught in flight. They winter from southern California and Texas south to Panama.

OTHERS

Four other migratory species listed by Ritter (1996) occur in small numbers in Idaho and use riparian habitat. These species have probably always been rare here, but the decline in area of good quality riparian habitat may have contributed to their rarity.

Black-billed Cuckoo • This cuckoo breeds in forests and open woodlands of all types, but in Idaho is restricted to riparian forests. Nests are usually in a tree or shrub. Black-billed Cuckoo productivity often varies in concert with outbreaks of caterpillars, cicadas, and other large insects.

Yellow-billed Cuckoo • Yellow-billed Cuckoos require extensive, mature riparian woodlands, especially cottonwoods or willows, and other open woodlands with dense undergrowth at lower elevations. They are extremely sensitive to fragmentation of mature cottonwood (and other riparian) habitat and are found most reliably in intact riparian woodlands of at least 40 ha (about 100 ac), preferably 80 ha (about 200 ac) or more (Layman and Halterman 1989). Yellow-billed Cuckoo productivity often varies in concert with outbreaks of caterpillars, cicadas, and other large insects. This species is declining in parts of its range due to deterioration and fragmentation of riparian habitat and to prey scarcity caused by pesticides.

Black Swift • Black Swifts breed in montane areas associated with cliffs or canyons, especially those near water. Their nests are on high rock cliffs or shallow caves, near or behind waterfalls. They often nest in small colonies. Their nest site persistence and tenacity are almost absolute.

Scott's Oriole • Scott's Orioles breed in pinyon-juniper with moderate to sparse canopy cover and in riparian woodlands. They nest in trees.

TABLE 2

High priority neotropical migratory landbirds that nest in riparian habitat in Idaho. This table shows where they nest and what type of riparian habitat they use for nesting.

Species	Nest Location	Riparian Habitat Type: Riparian Thickets	Riparian Woodlands
Black-billed Cuckoo	Deciduous tree, shrub		✓
Yellow-billed Cuckoo	Deciduous tree, shrub		✓
Black Swift	Cliff	(Waterfalls)	
Calliope Hummingbird	Tree, shrub	✓	✓
Rufous Hummingbird	Tree	✓	✓
Lewis' Woodpecker	Cavity in deciduous tree or snag		✓
Willow Flycatcher	Shrub, low deciduous tree	✓	✓
Dusky Flycatcher	Shrub, tree	✓	✓
Veery	Ground, shrub	✓	✓
Swainson's Thrush	Shrub, coniferous tree	✓	✓
Plumbeous (Solitary) Vireo	Tree		✓
Yellow Warbler	Shrub, small deciduous tree	✓	✓
MacGillivray's Warbler	Shrub, ground	✓	
Wilson's Warbler	Ground, shrub	✓	
Scott's Oriole	Deciduous tree		✓

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