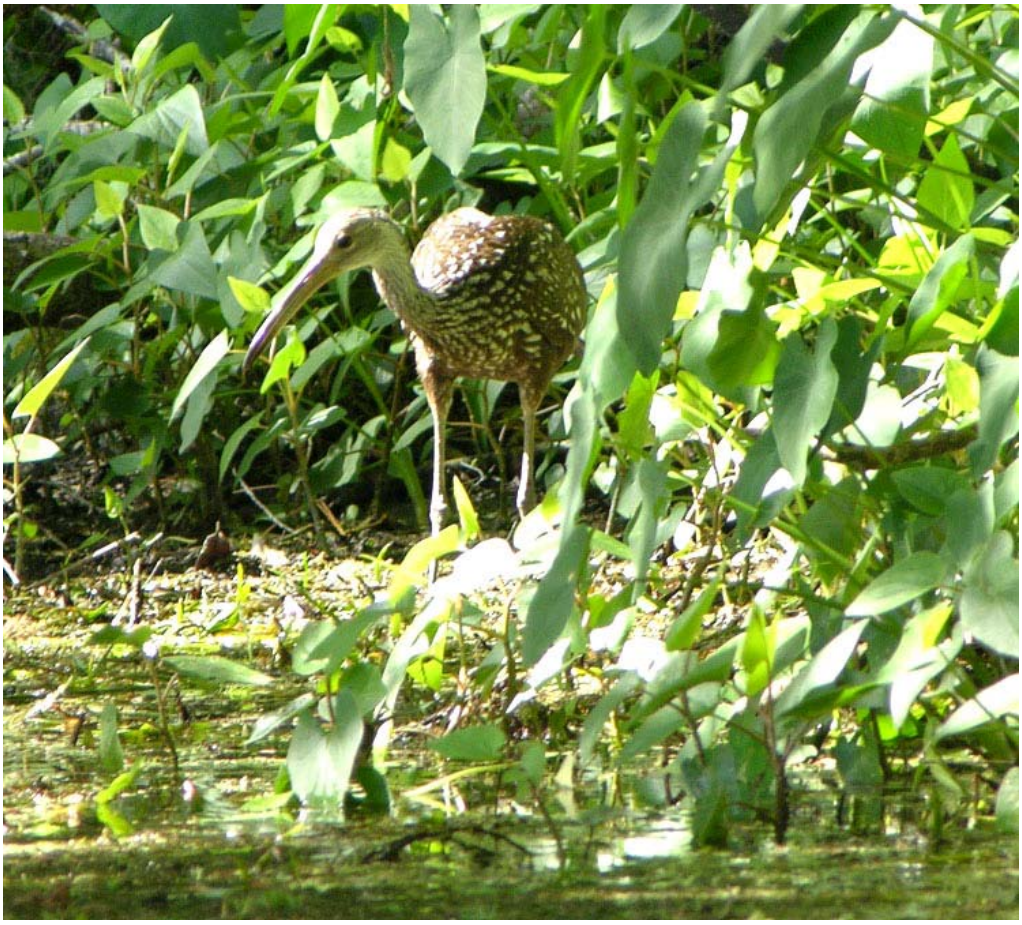
Survey of Birds Along The Lower Rainbow River In Dunnellon Florida

Spring 2006



Limpkin in Rainbow River East Blue Cove Marsh

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1. Introduction

Rainbow Springs, the source of the Rainbow River, located in Rainbow Springs State Park, is a *first magnitude* spring with an outflow of 460 million gallons of crystal clear water each day. The quality of this water and the natural beauty along the river draw thousands of visitors each year. Undeveloped land in and along the edge of the river provides food, shelter and nesting sites for a variety of fish, birds, turtles and amphibians. Otters and alligators are also found along the river. Some of these are listed on the South West Florida Water Management District (SWFWMD) endangered species list.

The beauty of the river has added a natural lure for people to build homes in the area. Property near or on the river has always had the highest value. Inevitably this adjacent property also can have the most impact on the quality of the river.

There are several public access points on the river where people with different interests can access the river and enjoy, boating, kayaking, canoeing, tubing, diving, fishing and swimming. Watching the birds and other animals that use and live along the river adds a special treat to the overall experience.

This survey of birds was performed to formally note some of the species that are found on the lower portion of the Rainbow River north of Route 484.

Plans for development of large housing projects are ongoing and should be reviewed in the context of the impact on the Rainbow River and of its true *highest and best use* as an irreplaceable natural resource for all the citizens of the community.

Headwaters of Rainbow River in Rainbow Springs State Park

2. River Description

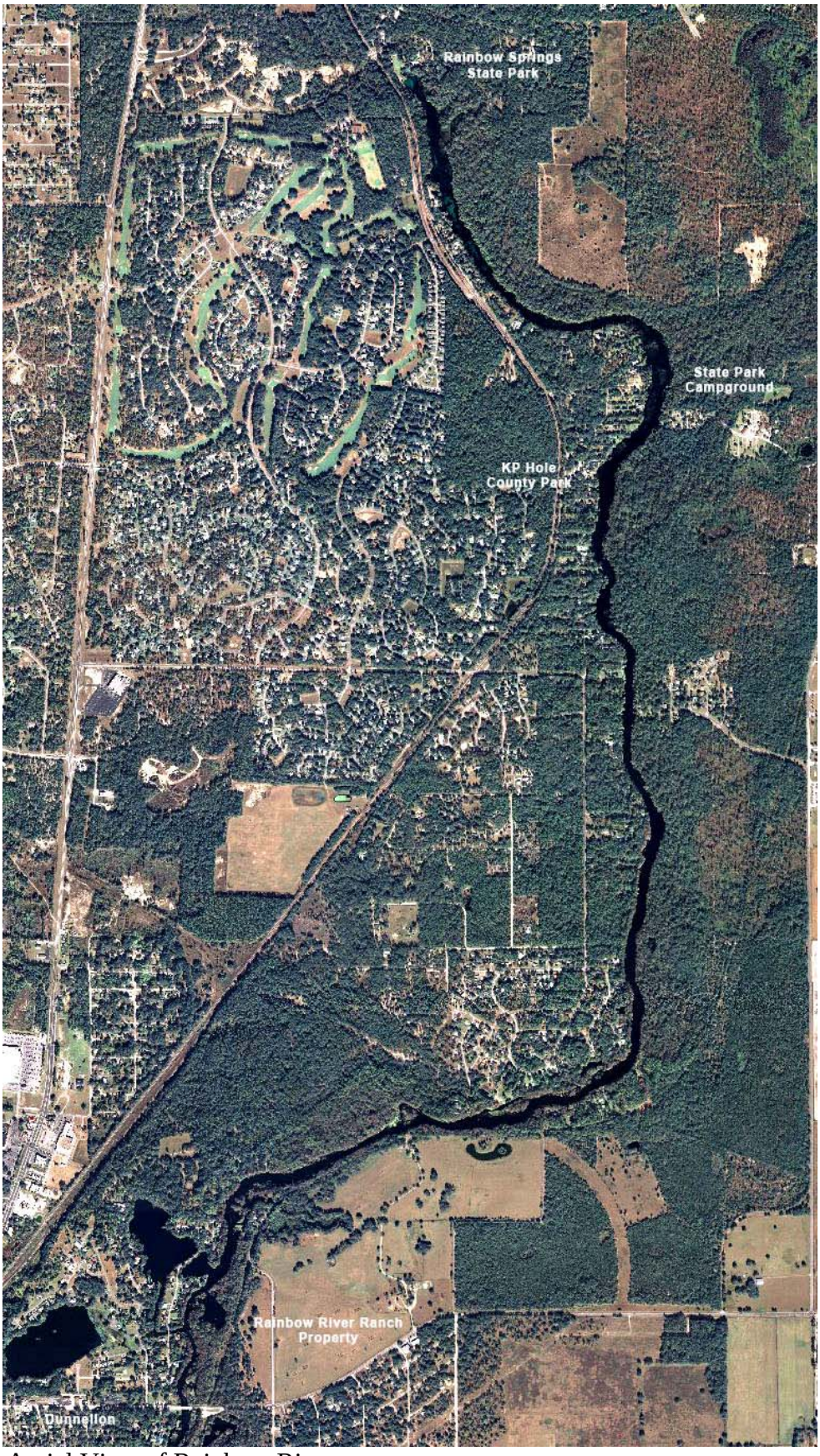
The Rainbow River's primary source stems from Rainbow Springs and the Floridan aquifer that flows from Georgia through central Florida. The recharge area of Rainbow Springs includes major portions of Alachua, Levy and Marion Counties. The river flows 5.7 miles south through cypress, pine and oak woodlands until it merges with the Withlacoochee River in the southern portion of the city of Dunnellon, Florida

The river is shallow in many areas with a common depth of three to six feet over a sandy bottom, while can reach a depth up to 30 feet in other areas. The river's width varies, up to 220 feet wide and as narrow as 60 feet wide. There are no significant tributary streams that flow into the Rainbow River. A few small inlets or coves can be found along its length.

The river flows at a moderate one mile per hour and the temperature of the water is a consistent 72 degrees due to the spring sources. The water level is fairly stable but is influenced by drought, and storms. The recharge rate of Rainbow Springs and the water level at the dam on Lake Rousseau are key determinants on the river water level.

The shallow depth, clear water and sandy bottom provide an optimum setting for vegetative growth, ideal habitat for fish and amphibians.

The marsh grass islands along the river's course, along with the undeveloped small coves, inlets and woodlots along the Rainbow River, provide an essential source of food, shelter, and nesting sites for the river's many inhabitants. The plants and trees contained in these undeveloped edges also constitute riparian buffer zones, helping to minimize erosion and herbicide and pesticide loading from human use.



Aerial View of Rainbow River (Source - Marion County Property Appraiser - Spring 2003 Data)

3. Current Land and Water Use

The use of land along the Rainbow River has evolved since the Boomtown days in the 1890's when phosphate production was the center of economic activity. Home residences, farming, timber production, parkland, and boating recreation are the contemporary uses in the area today. A study of an aerial photo of the river shows the following land use profile for land adjacent to the river.

Rainbow River Adjacent Land Use Profile	
Residential Land	42.3 %
Public Access Points	3.0 %
Community Access Points	3.0 %
Parkland	22.5 %
Undeveloped Land	29.2 %

The unique value of this river system caused special legislation to be passed to protect the water and natural quality of the environment. The **Rainbow River Aquatic Preserve** was set was set up by the State of Florida and the river was defined as a **Florida Outstanding Waterway**. Marion County legislation prohibiting use of alcoholic beverages, carrying disposable packages and bottles in boats and creating a *no-wake* speed limit have been established for boating use along the Rainbow River

Many of the existing residential houses are on narrow lots and are landscaped down to the waters edge. As shown on the diagram below, a large majority of the west side of the Rainbow River has been developed. Retaining walls are often built on the water's edge and they, along with docks, have eliminated much of the natural marshes in these areas.

A large majority of the east side of the river is either state parkland or undeveloped land. Past owners farmed this land and left a significant natural buffer zone between the fields and pastures and the river. This allowed trees, bushes and reeds to grow through their full life cycle and support abundant wildlife in the process.

A wide variety of stakeholders have taken an interest in the Rainbow River. Marion County acquired and manages KP Hole Park with a boat ramp, swimming site and canoe and inner tub rentals. The County also manages the *tubers takeout* landing at the Route 484 Bridge. In the early 1990's the State of Florida acquired Rainbow Springs and then established a state park in the headwaters area. The Villages of Rainbow Springs, Rio Vista Estates, and Sateke Village have established community parks on the river for their resident's enjoyment.

The City of Dunnellon is proud of the river and supports a wide variety of programs focused on maintaining the quality of the river, as well as promoting its assets as a draw for tourism. Thousand of people use the river, some estimating as many as 5,000 per weekend in the summer or on a holiday weekend. They bring or rent canoes, kayaks, fishing and pontoon boats, and float devices Dive shops from Ocala, Crystal River, Homosassa and Orlando bring their customers to practice their skills and explore the river's bottom.

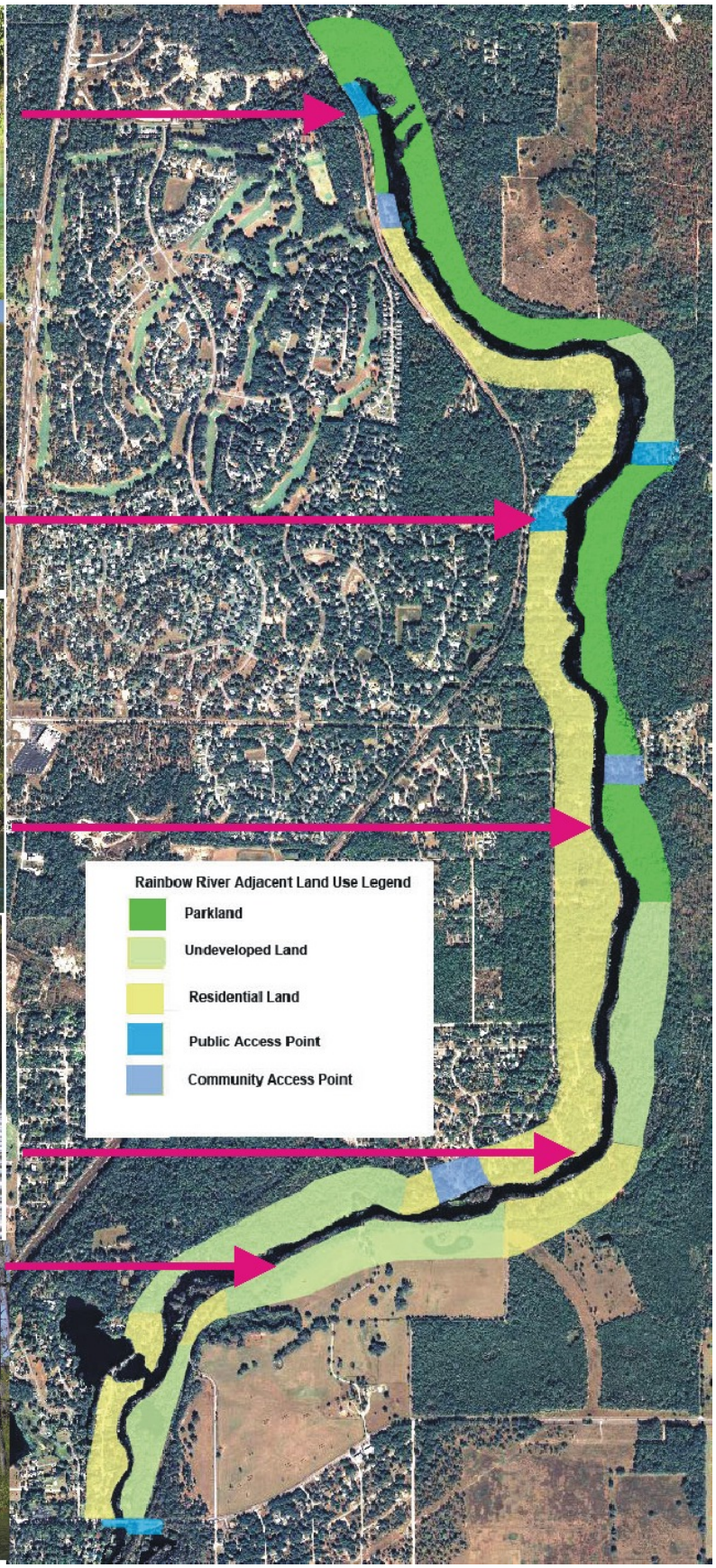
Kayaking At Rainbow Springs

KP Hole County Park

House On Rainbow River

Floating Down River On Inner Tubes

Wood Duck Box And Nesting Habitat



4. Survey of Birds on Lower Rainbow River

During 2005 there has been an ongoing discussion of potential development adjacent to the Rainbow River. The most active debate has centered on the Rainbow River Ranch Property, which encompasses a significant portion of the eastern side of the lower Rainbow River north of Route 484. This survey was performed to inventory the bird population along this section of the river. Special attention was paid to the East Blue Cove located 1,500 feet north of the Route 484 Bridge.

The survey was performed from the water during three days in the spring; March 31, April 12 and April 14, 2006. The initial survey was conducted from a pontoon boat captained by Herb Reichelt. The second two survey days were performed from a kayak. Although land management practice should be planned with a larger viewpoint, this survey and the data in this section are limited to this lower portion of the river.

The overall results of the survey are presented in the table below. Thirty-nine species of birds were observed. Five of the species are on the Rainbow River Preserve Endangered Species List. (Appendix A).

In addition to birds, numerous other species of animal life were present, including a number of turtles, fish, several alligators and a river otter.

Wood Duck Boxes installed by the Rainbow River Conservation organization have had a positive affect and several breeding families of Wood Ducks were observed. The abundance of marsh grasses and reeds offer protection for the young chicks from predators and an abundant food source.

Juvenile Little Blue Herons were seen feeding in the reeds, along with Green Herons, White Ibis, Common Moorhens, a Limpkin and a Great Blue Heron.

A pine tree at the entrance to the cove has seven active nests. Double Crested Cormorants are in six and an Anhinga inhabits the seventh..

A selection of photos taken on the survey will follow the table.

Survey of birds along the lower Rainbow River - Spring of 2006

Species	03/31/06	04/12/06	04/14/06	
American Crows	3	2	0	
American Coots	7	0	0	
Anhingas	6	4	2	27 flying over in a group
Bald Eagle-immature *	1	0	0	
Barred Owls	1	0	1	
Belted Kingfishers	1	1	0	
Black Vultures	2	0	4	
Blue Jays	2	1	2	
Boat Tailed Grackles	4	2	0	
Cardinals	5	5	4	
Carolina Chickadees	0	2	0	
Carolina Wrens	5	7	5	
Common Moorhens	5	3	7	
Double Crested Cormorants	10	14	16	
Fish Crows	2	1	1	
Great Blue Herons	2	0	1	
Great-Crested Flycatchers	2	3	2	
Green-backed Herons	3	0	1	
Hooded Warbler	0	0	2	
Limpkins *	1	1	0	
Little Blue Herons *	2	2	0	
Dove, overhead	0	0	1	
Osprey *	1	1	1	
Pied-billed Grebes	3	0	1	
Pileated Woodpeckers	2	1	1	
Pine Warbler	1	0	0	
Red-Bellied Woodpeckers	1	1	2	
Red-Eyed Vireos	1	2	3	
Red-shouldered Hawks	1	2	1	
Red-Winged Blackbirds	3	0	0	
Snowy Egret *	0	0	1	Chris Richardson observation
Tufted Titmouse	2	3	2	
Tree Swallows	20	8	0	
Tri-Colored Herons *	0	1	1	
White Eyed Vireos	2	1	1	
White Ibis	1	5	1	
Wood Ducks	7	7	16	9 chicks with one female
Yellow-Rumped Warbler	1	0	0	
Yellow-Throated Vireos	2	0	1	
Turtles	25	25	30	
Alligators	0	3	2	
River Otter	1	0	0	
Dragonflies	many	many	many	
Fish - Gar, Bass, Bowfin	many	many	many	

* On endangered species list noted on Rainbow River Aquatic Preserve web site (see Appendix A)

Little Blue Heron -Immature

Tricolored Heron

White Ibis

Green Backed Heron

Limpkin

Wood Duck Pair

American Coots

Common Moorhen

Osprey

Red Shouldered Hawk

Anhinga

Double Crested Commorant

5. Comments and Conclusion

To preserve streams and wetlands, buffer areas are necessary to allow for adequate habitat. In the White Paper *Terrestrial Habitat Buffers for Wetland Preserves* **"…Audubon International recommends that terrestrial buffers of between 250 – 1000 feet be provided for wetlands that are intended to serve as habitat."** This document is included in Appendix B

Special attention should be taken to preserve the East Blue Cove at the lower end of the river. The slow flowing waters in this cove enhance its use as a nursery for fish, amphibians and birds. Marshes along its edge become shelters for the wood ducks when river traffic increases. The undisturbed trees along its banks are a source of food, shelter and nesting sites for birds and animals. Although some would think this cove would be a natural location for a boating marina, nature has already designed it a marina for all levels of animal life; fish, turtles, alligators, dragonflies and birds.

Apple Snail eggs were found on several reeds in these marshes. These snails require unpolluted water and mixed vegetation to survive and are a primary source of food for the Limpkin, designated a rare/endangered species by the State of Florida.

Apple Snail Eggs

The current land use along the river, including residential and public access use, is already 50 per cent developed. Development of the Rainbow River Ranch property must be accomplished with minimum impact on the Rainbow River in order not to adversely affect the rich diversity of wildlife that remains.

The birds that now utilize the Rainbow River not only give pleasure to people who watch them, but are an indication of the health of the river and the surrounding ecosystem. This river system should be preserved as a natural asset for the people of Dunnellon, Marion County and Florida. The reason most people delight in spending time on the river is to see the architecture of nature, not the architecture of man.

Sandra and Paul Marraffino
4/17/06

Acknowledgements

The authors wish to thank Herb and Sue Ann Reichelt for graciously sharing their boat and extensive knowledge of the Rainbow River. The aerial ortho-photography maps used in Sections 2 and 3 were downloaded from the Marion County Property Appraisers web site and proved quite useful. Photos were taken by Sandra and Paul Marraffino except were noted.

Sandra Marraffino has served on the Board of the Sound Shore Audubon Society. She developed a Pryer Manor Marsh Inventory of Birds in 2004 for the New York State Department of Environmental Conservation.

Paul Marraffino has studied water issues for several years. He has served on the Board of the Westchester County Soil and Water Conservation District and was Vice President of the Friends of Marshlands Conservancy in Rye, NY

Baby Alligators

River Otters (Rick Hancock)

Fish (Bass)

Turtles

Dragonfly

East Blue Cove Other Creatures

Appendix A Rainbow River Aquatic Preserve Web Page

Appendix B Terrestrial Habitat Buffers for Wetland Preserves:

An Assessment of the Current Literature

Audubon International 's White Paper Series on Ecological Research #010203

Contact

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Description of Site

The Rainbow Springs run is one of the largest spring runs in Florida. It averages a discharge of ove million gallons of water per day. The run is 5.7 miles long and joins the Withlacoochee River which is black water river, near the town of Dunnellon. Unlike most other major spring runs in Florida the spr discharge comes from several vents that are scattered over the first mile of the run. It is characteriz a high level of submersed aquatic plants. Ribbon or tape like plants are the most common.

Its waters stay at 72 degrees Fahrenheit year round. Because of this and the high water quality, it very popular recreational destination.

Established

Established as an Aquatic Preserve by the Florida Legislature in 1986; Florida Statute 258.39 (32)

Location

Rainbow Springs Aquatic Preserve is located in southwestern Marion County, it is near the town of Dunnellon. Highways US 40 and SR 484 run west from I-75 to the Rainbow River area. US 41 transv north and south, just to the west of the river.

Size

The river and preserve is 5.7 miles in length and approximately 125 acres in size. The river run is c about 150 feet in width with an average depth of less than ten feet.

Watershed

The Rainbow River and spring system has its own watershed and recharge area. In terms of the Na listing of watersheds it is found in the larger Withlacoochee River watershed.

Habitat

The habitat of this river is dominated by submersed plant communities common to spring runs. Oth disturbed habitats or areas dominated by the exotic species *Hydrilla* are also common.

Ecological Importance

The Rainbow River spring run is one of the largest in the state of Florida. It is an excellent example this type of system. However it is also being significantly altered by the exotic plant *Hydrilla*. Increas the levels of nutrients coming from the springs may also potentially impact the communities of plant algae in the river. This last issue is currently being investigated.

Rare / Endangered Species

Common Name	Scientific Name	State	Fede
Reptiles			
American alligator	*Alligator mississipiensis*	SSC	T (s/

Birds			
limpkin	*Aramus guarauna*	SSC	n/a
little blue heron	*Egretta caelulea*	SSC	n/a
snowy egret	*Egretta thula*	SSC	n/a
tricolor heron	*Egretta tricolor*	SSC	n/a
bald eagle	*Haliaeetus leucocephalus*	T	E
wood stork	*Mycteria americana*	E	E
Mammals			
Florida manatee	*Trichechus manatus*	E	E
Plants			
cardinal flower	*Lobelia cardinalis*	T	n/a

State listings are taken from the Florida Fish and Wildlife Conservation Commission or as with plants, Florida Department of Agriculture. Federal listings are taken from the United States Fish and Wildlife Service. E= Endangered; T= Threatened; T (s/a)= Threatened due to similarity in appearance; SSC= Species of Special Concern; UR= Under review; n/a= information not available or no designation listed

Geomorphic Features

Rainbow Springs is one of Florida's first magnitude springs.

Archaeological Features

none

Uses

The Rainbow River portion is a very popular recreational destination. It is readily accessible through the **Rainbow Springs State Park**, which surrounds the preserve, as well as public boat ramps. Tubing, boating, fishing and swimming are some of the common activities. It however has an idle speed boating restriction, and a prohibition on disposable containers.

Management Status

The Rainbow River was designated as an Aquatic Preserve in 1986. It is sovereign submerged state-owned land. The current designated manager is Jeff Sowards. Contact information is listed above.

References

Florida Department of Environmental Protection; Rainbow Springs Aquatic Preserve Management Plan (draft).

Southwest Florida Water Management District; 1994. Rainbow River Surface Water Improvement and Management (SWIM) Plan.

Southwest Florida Water Management District; 1991. Diagnostic Studies of the Rainbow River.

Terrestrial Habitat Buffers for Wetland Preserves: An Assessment of the Current Literature

Audubon International 's
White Paper Series on Ecological Research #010203

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When a water body is intended to be used as habitat, it is important that it be associated with terrestrial uplands. Many organisms use both aquatic and terrestrial habitats during the course of their normal behavior. A good example is the numerous species of frogs and salamanders that live on land but travel to ponds to lay eggs that will hatch into aquatic larvae. Even green frogs that spend the entire summer in the pond migrate some distance away for winter hibernation (Lamoureux and Madison 1999). Another example is the primarily aquatic turtles that migrate away from the water to lay eggs and hibernate on land. For these, along with many types of wildlife, a wetland without uplands or an upland preserve without wetlands will not provide suitable habitat. Indeed, the absence of amphibians from some breeding ponds maybe best explained by isolation of the pond from terrestrial habitats (Marsh and Trenham 2001).

Because of federal and state wetlands protection regulations, it is common to find situations in which property owners are required to preserve wetlands, but not adjacent uplands habitat. In some landscapes, these wetlands are not suitable as a habitat resource for wildlife. We recognize that wetlands provide a variety of other important services such as water-quality improvement, groundwater recharge, and flood control. However, when habitat is a function to be provided by a wetland, then it is important to protect adequate associated uplands as well.

How much upland habitat should be preserved in such cases?

The amount of upland habitat that should be preserved as wetland buffer is difficult to specify. In general, the answer is probably more is better. A study in the northeastern U.S. found that pond use was associated with the area of adjacent forest for seven of the nine amphibian species in the area (Guerry and Hunter 2002).

For any specific situation, the upland requirement probably depends on the movement patterns of the species intended to use the habitat. Although our knowledge of movement patterns of small vertebrates is generally poor, there are some data that allow rough estimates.

Semlitsch (1998) reviewed the literature on terrestrial habitat use by six species of pond-breeding

salamanders. He estimated that a terrestrial buffer of 534 feet from the wetland's edge would be required in order to encompass 95% of the salamanders. A study of freshwater turtles (Burke and Gibbons 1995) concluded that a terrestrial buffer would have to be 237 feet to include 90% of the nest and hibernation sites, and 894 feet to encompass 100%.

In the absence of more complete data, Audubon International recommends that terrestrial buffers of between 250 - 1000 feet be provided for wetlands that are intended to serve as habitat. In general, the larger figure should be used for wetlands that are significant features in the local or regional landscape, or that support species of special concern or interest.

What configuration of uplands is required?

Despite our best intentions, it is frequently not feasible to completely surround a wetland with a 1000 foot deep upland preserve. Other functions are required for parts of the wetland periphery or at some intermediate distance in some direction. In resolving the shape and size of the upland buffer to be used in these cases, we rely largely on basic preserve design guidelines: provide an area that is as large and unfragmented as possible. While the literature cannot give us exact minimum specifications for upland buffer preserves, two points are clear. 1) The upland habitat must be continuous and unbroken from the edge of the wetland out to the periphery of the buffer. 2) The width of the buffer cannot be allowed to become overly restricted at any point along its length.

At least throughout much of the eastern U.S. the terrestrial habitat of interest is forest. A key issue is whether that forest can be interrupted by other ecosystems such as grasslands. Rothermel and Semlitsch (2002) found that juvenile toads and salamanders moved much farther away from ponds into forested habitat than into field habitat, and they suggested that dehydration and predation were greater problems in the fields. Although there are probably species that are more and less sensitive to discontinuities in habitat, Audubon International recommends that the terrestrial habitat type (e.g., forest) extend unbroken all the way to the water's edge.

While it is possible to restrict the terrestrial habitat to only a portion of the wetland's periphery, it is important to provide as much connection as possible. On the landscape level, a study in Iowa found that the relative abundance of frogs and toads was significantly associated with the length of the wetland-forest edge (Knutson et al. 1999). In practical terms, Audubon International recommends that at least half of the periphery of the pond be contiguous with upland habitat. It is obviously preferable to have the wetland completely enclosed by habitat when possible.

It is also important to ensure that the terrestrial habitat does not become too narrow at any point along its distance. Joly et al. (2001) found that the width of the uncultivated strip of land connecting a pond to the forest in an agricultural landscape was a good indicator of newt abundance. They suggested that narrow corridors such as hedgerows are not sufficiently wide to provide meaningful connections for these species. Likewise, Dodd and Cade (1998) reported that narrow corridors did not appear to be used by striped newts and narrow-mouthed toads in Florida. Audubon International recognizes that preserve areas are likely to be under pressure for a variety of reasons. However, we recommend that a minimum width of 100 feet be maintained at all points in the preserve.

Summary of Audubon International's Recommendations:

1) Any wetland intended to function as wildlife habitat should be associated with an upland buffer/preserve.

2) Whenever possible, the upland preserve should completely surround the wetland to a distance of 1000 feet away on all sides.

3) Upland habitat should extend unbroken from the edge of the wetland to the farthest point away.

4) Minimum acceptable parameters are contiguous upland around one-half of the wetland's periphery, to a distance of 250 feet away, with no constrictions to less than 100 feet wide.

References:

Burke, V.J. and J.W. Gibbons. 1995. Terrestrial buffer zones and wetland conservation: a case study of freshwater turtles in a Carolina bay. Consv. Biol. 9:1365-1369.

Dodd, C.K. and B.S. Cade. 1998. Movement patterns and the conservation of amphibians breeding in small, temporary wetlands. Consv. Biol. 12:331-339.

Guerry, A.D. and M.L. Hunter Jr. 2002. Amphibian distributions in a landscape of forests and agriculture: an examination of landscape composition and configuration. Consv. Biol. 16:745 754.

Joly, P., C. Miaude, A. Lehmann, and O. Grolet. 2001. Habitat matrix effects on pond occupancy in newts. Consv. Biol. 15:239-248.

Knutson, M.G., J.R. Sauer, D.A. Olsen, M.J. Mossman, L.M. Hemesath, and M.J. Lannoo. 1999. Effects of landscape composition and wetland fragmentation on frog and toad abundance and species richness in Iowa and Wisconsin, U.S.A. Consv. Biol. 13:1437-1446.

Lamoureux, V.S. and D.M. Madison. 1999. Overwintering habitats of radio-implanted green frogs, *Rana clamitans*. J. Herpetology 33:430-435.

Marsh, D.M. and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. Consv. Biol. 15:40-49.

Rothermel, B.B. and R.D. Semlitsch. 2002. An experimental investigation of landscape resistance of forest versus old-field habitats to emigrating juvenile amphibians. Consv. Biol. 16:1324-1332.

Semlitsch, R.D. 1998. Biological delineation of terrestrial buffer zones for pond-breeding salamanders. Consv. Biol. 12:1113-1119.