

District Efforts

In an effort to improve the environmental quality of Kings Bay, the District has the following partnerships and programs that actively pursue projects and activities to reduce pollutants to the bay.

- The **Kings Bay Working Group** includes agencies, local governments, nongovernmental organizations and private citizens. The group meets twice a year and serves as a valuable forum to exchange information relevant to the management of Kings Bay.
- The **Kings Bay Surface Water Improvement and Management (SWIM) Plan** includes provisions to diagnose and remedy water quality problems in Kings Bay. The SWIM Plan is updated approximately every five years.
- The **Crystal River/Kings Bay Watershed Education Campaign** provides information to educate the public about best practices to improve water quality within Kings Bay.
- A minimum flow for **Crystal River/Kings Bay** is under development and is scheduled to be completed in 2011. Florida law requires establishment of minimum flows and levels of water bodies to prevent significant harm associated with water withdrawals.
- **Watershed management plans** are being used for incorporated and unincorporated portions of Crystal River. These plans are developed in cooperation with the City of Crystal River, Citrus County and the Florida Department of Transportation to identify prioritized projects that will improve the quality of water entering Kings Bay.
- In cooperation with the Florida Department of Environmental Protection, there are numerous ongoing **water quality and biological monitoring programs** in Kings Bay, its springshed and estuary.

How You Can Help

If you live in a springshed, what can you do to protect the health of your spring? Water conservation and nutrient management are key strategies. In most households, outdoor water use accounts for up to 50 percent of water consumption. Reduce your use by:

- Watering grass only on your watering day and only when you see signs of wilt.
- Checking your irrigation system frequently to ensure you are watering the grass or shrubs, not paved areas.

Follow these steps to save water indoors:

- Install low-flow fixtures and water-efficient appliances.
- Wash only full loads of laundry and dishes.
- Check faucets, toilets and showerheads for leaks.
- Take shorter showers — 5 minutes or less.

The following steps can help reduce the amount of pollutants entering your springs:

- Follow application instructions on the fertilizer package — more is not better.
- Avoid application of fertilizer near roadways or water bodies.
- Inspect and maintain your septic tank regularly to reduce leaching of nutrients into groundwater.

Let others know how they can help too. For more information on Kings Bay and other spring systems, call (352) 796-7211 or 1-800-423-1476 (FL only), ext. 4286.

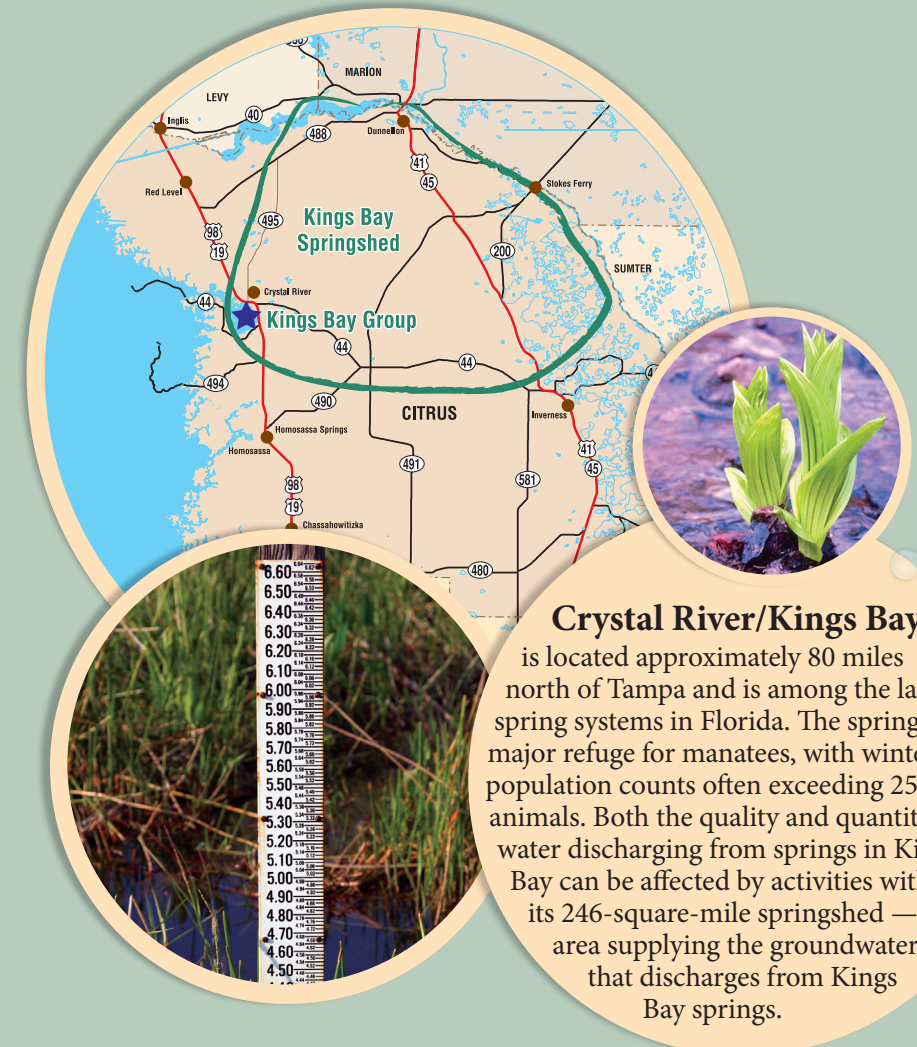


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VISKH 03/10

Crystal River/Kings Bay Spring System Summary



Crystal River/Kings Bay is located approximately 80 miles north of Tampa and is among the largest spring systems in Florida. The springs are a major refuge for manatees, with winter population counts often exceeding 250 animals. Both the quality and quantity of water discharging from springs in Kings Bay can be affected by activities within its 246-square-mile springshed — the area supplying the groundwater that discharges from Kings Bay springs.

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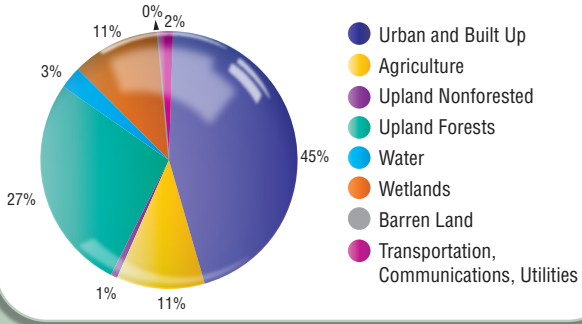
Overview

Activities that occur within urbanized and agricultural landscapes, which together cover approximately 56 percent of the Kings Bay springshed (see Figure 1), can decrease the volume of spring discharge and increase the amount of nutrients and other pollutants in Kings Bay. Among nutrients, nitrate is a particular concern because it is highly soluble in water and does not bind to soils, allowing it to easily move into groundwater. High nitrate levels in spring discharge can negatively affect spring ecosystems by causing changes in the plant community such as increases in algae, decreases in water clarity and, in some cases, toxic effects on aquatic organisms.

The Southwest Florida Water Management District (District) currently has programs that monitor the water quality of springs (in partnership with the Florida Department of Environmental Protection), surface water and springshed groundwater of Kings Bay. The U.S. Geological Survey monitors Kings Bay discharge where it empties into Crystal River. This springs summary, which will be updated annually, provides information on the status and trends of key water quality factors and discharge data for Kings Bay.



Figure 1. Kings Bay springshed land use/land cover in 2007.



Crystal River/Kings Bay’s Conditions

In Figure 2, levels of nitrate in discharge from Kings Bay springs have been trending slightly upward over time and are roughly equivalent to levels in springshed monitoring wells (see Figure 3). When compared to other large spring systems in Florida, nitrate levels in Kings Bay are low. However, the levels of nitrate are still well above background levels found in springs with undeveloped springsheds (see Figure 3).

Figure 4 shows monthly discharge estimates for Kings Bay. Between 2002 and 2008, average daily discharges were variable, ranging from a high of 835 million gallons of water per day (mgd) in December 2004 to a low of 139 mgd in July 2003. Seasonal patterns are apparent, with peak discharges generally occurring in December and January (following the end of the wet season) and minimum discharges in April and May (at the end of the dry season). Other factors can also affect discharge, including groundwater withdrawals within the springshed and long-term weather patterns such as prolonged drought.

Water clarity in Kings Bay is low compared to other large spring systems in the District and has decreased by nearly 50 percent over the last five years (see Figure 5). Decreases in clarity are directly related to increases in chlorophyll *a* concentrations — a measure of free-floating algae. In fact, approximately 52 percent of the variability in clarity can be explained by variability in chlorophyll *a* concentrations. Due to the large area of Kings Bay, water discharging from its springs moves slower than water discharged from most other large spring systems, which tend to have narrow, relatively fast-flowing spring runs. Since the water moves slower, it gives free-floating algae more time to take up nutrients and multiply before the water exits the bay, leading to lower water clarity. Consequently, nutrient levels in Kings Bay may have to be substantially lower than other large spring systems in order to achieve equivalent water clarity levels.

Figure 2. Nitrate concentrations in discharge from Hunter and Tarpon Hole springs.

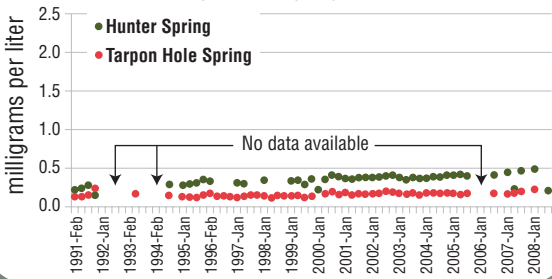


Figure 3. Kings Bay springs and springshed nitrate levels relative to other first-magnitude springs.

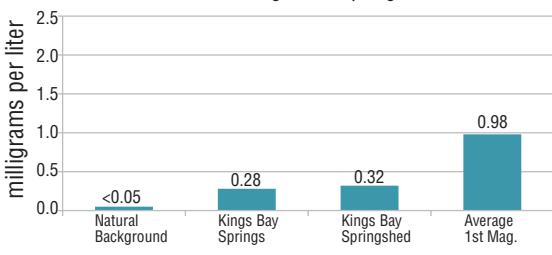


Figure 4. Kings Bay mean daily discharge by month.

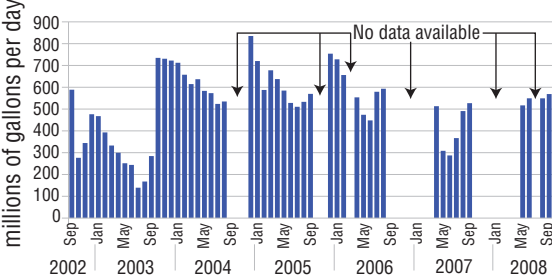


Figure 5. Chlorophyll *a* (micrograms per liter) and water clarity (meters) of Kings Bay surface water.

