

## **Green River of the Upper Colorado – Case Study**

### ***Razorback Sucker***

The razorback sucker, an endemic species to the Colorado River and tributaries, was once found in warm-water reaches throughout the basin from Wyoming to Mexico. Today, the razorback is a federally listed endangered species and is one of the most imperiled fishes in the Colorado basin. Wild stocks, primarily composed of older fish, continue to decline in abundance and exist only as a few distinct populations or scattered individuals. While there is evidence of reproduction, natural survival of razorback suckers beyond the larval stage appears extremely low - young razorbacks rarely mature into adults. Probable causes of these problems are reduced (on the upper Colorado River system) access to important nursery habitat for young razorbacks, and an increase in predation of early life stages by nonnative fish.

Razorback suckers of the upper Colorado River system are adapted to a variable flow regime and a variety of habitats. Adult habitat ranges from river runs, pools, and eddies, as well as seasonally flooded lowlands or backwater areas. The size, distribution, and condition of these habitats, as well as the connectivity between them, are controlled by the river's natural flow and sediment regimes.

The following section explains important life stages of the razorback and habitats associated with each life stage within the Green River in Utah:

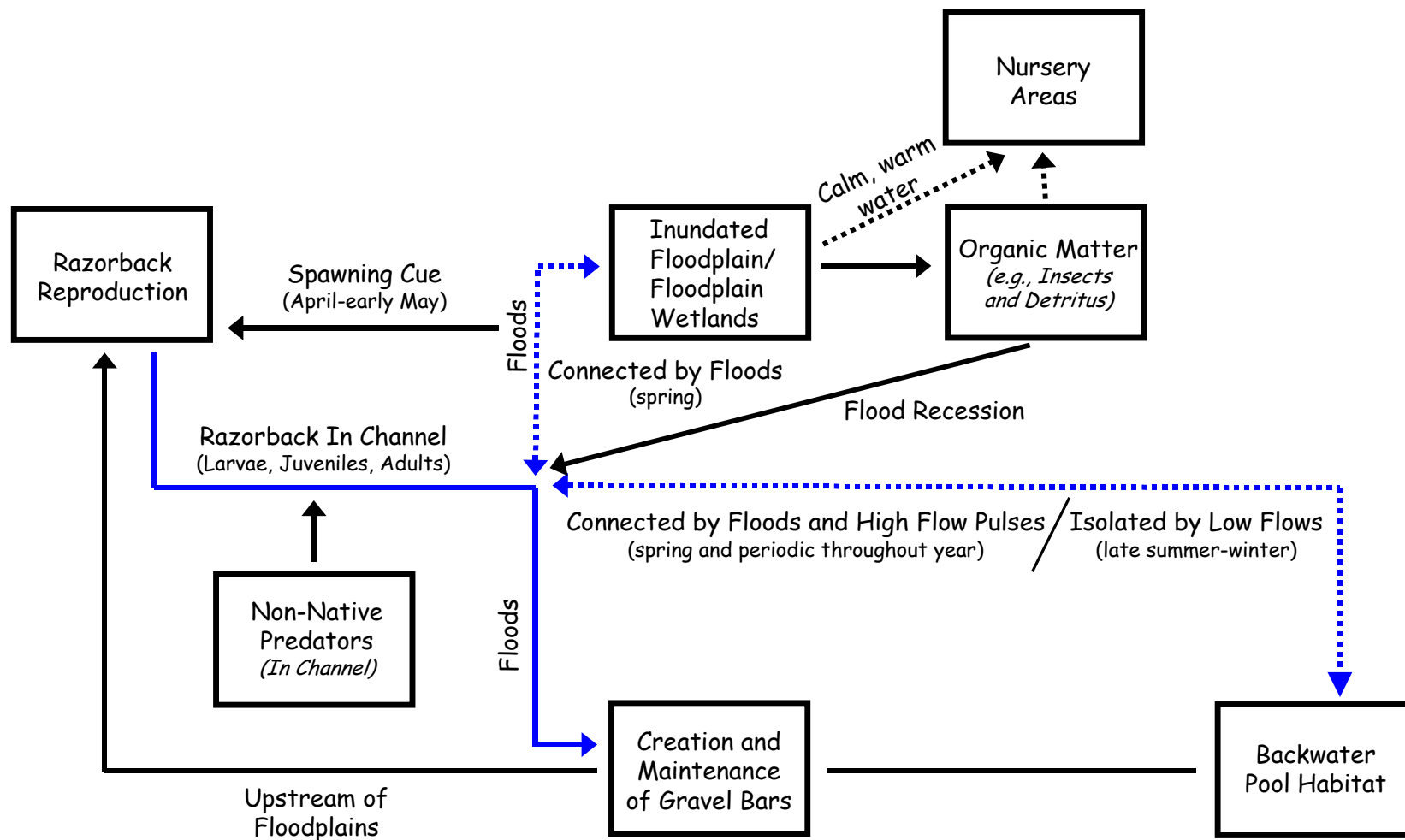
- Winter conditions for all life stages: Razorback suckers require stable, low-velocity flows in the winter. Wintertime high flow pulses or even floods disrupt the low-velocity habitats used by over-wintering suckers. These flow events, which can be human-induced or occur naturally with the build-up and transport of ice, may induce greater fish movement and stress. However, flows must not be so low that the river freezes completely, as this kills fish. Low velocity winter flows usually occur October - February.
- Staging habitat for adults: Before spawning, adult razorbacks need access to warmer, food-rich environments (called “staging areas”) where they can build energy reserves necessary for spawning. For this purpose, they move from the colder main channel into warmer backwater and floodplain areas during March-April. These flooded areas contain higher concentrations of nutrients and dissolved organic carbon and higher levels of primary productivity than the main stem Green River. Access to these staging areas begins between 3,500 cfs and 7,000 cfs.
- Migratory cue for spawning adults: Once the adult razorbacks are in the staging areas, they require a significant rise in the flow levels to trigger migration to spawning areas.
- Spawning areas for adult razorbacks: Preferred spawning areas are typically found along river reaches that are upstream of the broad floodplains that provide staging

areas for adult razorbacks. Razorbacks spawn on gravel/cobble bars that are created by large floods (>11,700 cfs) that transport huge volumes of cobbles and gravels in the Green River. As the flood begins to recede, finer-sized (sand) material continues to be flushed from the spawning bars, which optimally prepares the bars for spawning. The spawning period typically coincides with the peak of the annual flood in mid- to late-May. Spawning activity and larval production varies considerably among years and this variability is believed to correlate with differences in the timing and magnitude of the annual flood – eggs and larvae can be swept away by larger-than-average floods. .

- Hatching conditions: Razorback eggs typically hatch in two to four weeks and larvae numbers often peak by early to mid-June. Larvae begin to emerge from the spawning bar when the flood begins to recede. Larvae are carried by the receding floodwaters into backwater areas downstream of where they hatch. These backwaters provide food and protection as the larvae grow. Larvae stay in these backwaters as long as they can. However, they rely on high flow pulses to move them back into the main channel before these backwater areas become dry. However, if flood levels are too high or continue for too long, both eggs and larvae can be swept downstream, never reaching backwater areas.

Please find an ecological model diagram below that visually demonstrates the relationship between many of these life stages and various habitats to the flow regime of the Green River.

## Razorback Sucker Model



# Green River, UT

(Greendale Gauge)

