

## **\*\*Integrating Three Scales of Analysis to Compare Spiny Softshell Turtle Nesting Habitat in Dammed Versus Undammed Rivers**

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Riverine turtles' life cycles are highly adapted to the dynamic river systems in which they live. *Apalone spinifera* (spiny softshell turtle), for example, rely on complex habitat produced through spring-flood pulse flows and minimal anthropogenic modifications for their life processes. The extent and quality of this sort of habitat appears to be increasingly limited by the effects of dams on river systems such as on the Bighorn River, located in south-eastern Montana. In comparison, the Yellowstone River is a relatively undammed river which experiences natural flood pulses. Little research has been done that focuses on how anthropogenic modifications, especially dams, affect spiny softshells' habitats and population structure. Three scales of data were utilized (ground observations of turtle nesting sites; high-resolution (~2cm) unmanned aerial system (UAS) imagery; and medium resolution (10m) Sentinel 2 imagery, to generate a viable estimate of the amount of available spiny softshell nesting habitat in 32.2 km study areas along both the Yellowstone and Bighorn rivers in Montana. Using a smaller study area of 15-hectares within the full 32.2km study as a model for differences in nesting habitat availability between UAS imagery and Sentinel imagery resulted in about 54% nesting habitat in common on the Yellowstone and almost 86% in common for the Bighorn. These percentages were used to create a corrected full study nesting habitat estimation. When run, the Yellowstone River had almost nine times more APSP nesting habitat than that of the Bighorn. From an ecological and conservation perspective, this is important to consider.