



Interim Principles for Stocking Sterile Walleye in the Upper Colorado River Basin

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The U.S. Fish and Wildlife Service (USFWS), the Utah Division of Wildlife Resources (UDWR), and Colorado Parks and Wildlife (CPW) support the use of sterile walleye (*Sander vitreus*) as sport-fish because walleye fisheries are desired by the angling community and sterile versions of the species are compatible with endangered fish recovery in upper Colorado River basin¹. Stocking sterile walleye in reservoirs provides angling opportunity, recreational enjoyment, and economic benefits to local communities. Fortunately, using sterile walleye does not risk establishment of populations after stocking ceases, allowing resource agencies to easily respond to changing management goals; similarly, were any sterile walleye to escape or be illegally moved, there is no risk of a population level impacts on the receiving water.

If a sterile walleye were to escape or be moved, it could prey on endangered fish. In fact, the Upper Colorado River Endangered Fish Recovery Program has documented many instances of native and endangered fish consumed by walleye. To adequately protect endangered species from predatory impact, sterile walleye will be stocked only in reservoirs upstream of designated critical habitat which also have appropriate escapement prevention measures or are closed systems.

The illegal movement of walleye has created multiple new populations in reservoirs across the upper Colorado River basin. The USFWS, UDWR, and CPW recognize the value of using sterile walleye as a tool to suppress illegally introduced fertile walleye populations by disrupting the spawning of fertile individuals. It is important that all tools to combat illegal introductions are available to state agencies.

The USFWS, UDWR, and CPW recognize that stocking walleye at induced sterility rates less than 100% poses risks to fisheries management. Stocking waters with walleye at sterile induction rates less than 100% can lead to fertile population establishment in the reservoir. Additionally, a newly created fertile

¹ As per [Appendix C](#) of the [Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy](#), revised May 2015.

population or abundant fertile individuals could represent a new source for the illegal movement of walleye. That is, at sterility rates less than 100%, the fertile component of walleye stocked into reservoirs pose a risk of establishment across the basin. During a series of meetings in 2020, the agencies listed here attempted to quantify those risks.

Inducing 100% sterility in walleye fry is difficult for multiple reasons. First, sterility induction techniques are imperfect, even under ideal conditions. Secondly, sterility rate testing is fallible, because it relies on subsample analysis to determine the condition of the entire group. Also, testing the sterility of fry (the common age of testing) may not be accurate because maternal material may be present, contaminating the results with fertile tissue.

The USFWS, UDWR, and CPW recognize a need to effectively balance the risks of stocking at rates less than 100% sterility with the management flexibility needed when producing sterile walleye. In order to evaluate the risk of stocking at rates less than 100% sterility, CPW and UDWR performed modeling to quantitatively assess these risks. CPW performed modeling to evaluate the risks of establishing a fertile population when stocking various sterility induction rates (i.e. 80%, 90%, 95%, etc.) into a reservoir that does not contain walleye. UDWR performed modeling to evaluate the effectiveness of suppressing an illegally introduced fertile population when stocking at various rates of sterility. These models were based on the best available science concerning walleye ecology, sterility induction techniques, and conditions of upper Colorado River basin waters. As in all models, certain assumptions were made when empirical data was not present.

By performing sensitivity analysis upon the models, researchers were able to determine what demographic and management components reduced the risks of walleye establishment. The results of the CPW modeling exercises demonstrated that under all simulations and assumptions examined, a 95%+ sterility induction rate provided low risk of population establishment. Furthermore, UDWR reported that a 95%+ sterility induction rate provided highly effective suppression of illicit populations.

Based on the modeling results, the USFWS, UDWR, and CPW agree that stocking at rates 95% and higher is acceptable. A 95%+ sterility rate provides the states flexibility in stocking decisions, because all lots that exceed 95% can be stocked at any water in the upper Colorado River basin with acceptable escapement prevention.

The USFWS, UDWR, and CPW recognize that certain assumptions used in the models should be validated to further refine and support modeling results. Stocking at sterility rates 95% and above provides the agencies with time to test the ecological assumptions used in the modeling process. These ecological assumptions include the rate at which sterile males participate in spawning activities in the wild, the frequency of year class production by fertile walleye populations, and the survival disparity between fertile and sterile fish. Also, the USFWS, UDWR, and CPW recognize that further investigation into improving the accuracy of sterility testing is warranted, especially ploidy testing of fry.

In order to coordinate the development and implementation of these investigations, the USFWS, UDWR, and CPW agree to create a Sterile Walleye Advisory Team (SWAT). The SWAT will include a modeler and field biologist from each agency, who will work together and report their findings to agency leadership annually. The expectation is that by 2025 the SWAT will have adequate data to reevaluate the 95%+ induced sterility stocking rate.

In summary, the USFWS, UDWR, and CPW agree:

1. All stocking of sterile walleye in the upper Colorado River basin must be in waters outside of designated Critical Habitat equipped with fish escapement prevention devices, or that are closed systems, providing adequate protection for downstream native species;
2. All sterile walleye stocked in the upper Colorado River basin must be at 95%+ induced sterility rates, providing adequate risk mitigation under current modeling scenarios;
 - a. State agencies can prioritize stocking with 95%+ batches of walleye as they wish; and
 - b. Induced sterility rate can be measured using subsample analysis. That is, all parties recognize a subsample result of 95% may represent an overall lot rate slightly less than 95%. However, induced sterility rate results may not be rounded up. That is a 94.9% induced sterility rate may not be stocked in the upper Colorado River basin.
3. The Sterile Walleye Advisory Team (SWAT) will coordinate research and modeling efforts;
 - a. The SWAT will be comprised of at least one biologist and one modeler from each agency;
 - b. The SWAT will guide research and monitoring actions to support model refinement;
 - c. The SWAT will report to agency leadership annually.
4. All agencies agree to adhere to these principles until at least summer 2025, unless new information becomes available sooner, which provides certainty and consistency for all agencies and adequate time to advance the best available information;
 - a. The agencies will plan to revisit in summer 2025 to reevaluate the 95%+ induced sterility rate, unless all parties agree that additional time is needed to gather more information, or if new information becomes available sooner.