

Detection Estimates and Habitat Occupancy of Two Pelagic Broadcast Spawning Cyprinds

Declining Integrity of Prairie Streams



- ❖ As groundwater becomes increasingly scarce streamflow is diverted to provide municipal and agricultural water supplies
- ❖ These weakened environments are highly susceptible to the establishment of non-native species

Introduction of the Red River Shiner



- ❖ Red River Shiner (RRS) were first detected in the Cimarron River in 1976
- ❖ Decline of the Arkansas River Shiner (ARS) began in 1983
- ❖ ARS were considered extirpated from the Cimarron in 2008

Objectives

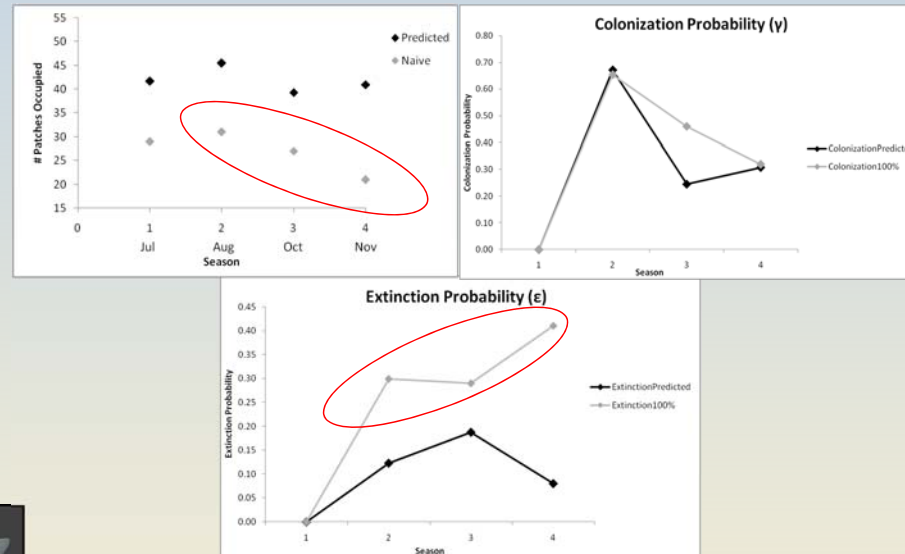
- ❖ Assess occupancy of Red River Shiner in the Cimarron River
- ❖ Determine how detection probability affects occupancy estimates

Broadcast Spawning Cyprinds

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- ❖ Occupancy (Ψ) is the # of patches occupied by the species during a season
- ❖ Naïve ($\diamond$) estimates occupancy with 100% detection
- ❖ Predicted ($\blacklozenge$) accounts for the detection probability
- ❖ Naïve occupancy shows a decrease heading into the fall and winter months when sampling becomes less effective
- ❖ By accounting for imperfect detection, occupancy is no longer underestimated and shows a consistent trend over seasons
- ❖ We can now estimate the changes from season to season for each of these patches (patch turnover)
- ❖ Patch turnover allows us to monitor populations over time, follow trends, and make future inferences for the species of interest



Imperfect Detection



- ❖ Imperfect detection can influence our understanding of the fish populations in prairie streams
- ❖ The closer to perfect detection, the better of an estimate we can make
- ❖ To be more efficient, we need to spend more time sampling a patch to ensure proper estimation of the fish assemblage

Habitat Use

- ❖ To determine habitat use of both RRS and ARS we modeled occupancy of each with applicable habitat covariates (i.e., flow profile, bedform, depth, etc.)
- ❖ Our models estimate that ARS typically occupy higher velocity main channel habitats on the backside of dunes; whereas, RRS occupy low velocity backwater habitats
- ❖ Occupancy was also effected by depth for both species

