**Temporal Patterns in Chinook Salmon Migration Across Western Alaska Watersheds**

**Introduction:**

Chinook salmon populations are experiencing unprecedented declines across much of their range. This trend is especially severe in Western Alaska watersheds, which contain some of the world's last pristine Chinook habitat but have seen steep declines in returning Chinook and Chum salmon in recent years. Salmon from this region support lucrative commercial fisheries and contribute billions of dollars to regional and global economies. In addition, these fisheries have historically supported subsistence harvests for dozens of communities in the region and hold deep cultural importance for upstream native communities, many of which have voluntarily reduced or ceased subsistence fishing amidst the decreasing returns. As a result, the collapse of Chinook salmon has triggered a region-wide crisis, marked by rising food insecurity, cultural loss, and the potential disappearance of a critical economic resource.

Fisheries managers face the difficult task of balancing harvest opportunities with the urgent need to rebuild salmon populations and enhance their resilience to long-term environmental change. This challenge is compounded by the mixed-stock nature of salmon fisheries, in which total returns comprise multiple subpopulations, each with distinct habitat use and run timing. Increasingly, research has highlighted the importance of this biological complexity in preserving life history and genetic diversity in both aquatic and terrestrial ecosystems. By spreading life history strategies across space and time, salmon populations maintain diversity through locally adapted subpopulations rather than relying on a single dominant life history or stock. This so called “portfolio effect” serves to decrease overall population variance and increase ecosystem resilience by distributing risk and buffering against short term or local perturbations. This pattern has been shown to buffer salmon ecosystems from … etc. (read portfolio effect literature again). In addition to distributing life histories to different relative timing within a given run, there has been attention to the interannual variability in relative strength of various stocks which serves to further distribute diversity over longer timesteps.

An added challenge to fishery managers is to maintain the maximum genetic and life history diversity

In addition to balancing the the needs of several tribal stakeholders and an international agreement with Canada, there is an increased understanding of the

* There have been recent rapid declines in the health of Chinook salmon in western Alaska.
* To manage this fishery requires balancing the needs of multi-stakeholder, including multinational and tribal communities.
* In addition, there is an increased understanding of the role of biological, life history, and genetic diversity in maintaining population level stability despite changing short term or local environmental conditions.
* This is the so called “portfolio effect”
* As such, management efforts aim to maximize available yield while maintaining basin wide genetic diversity.
* However, both the spatial and temporal scale at which we understand the ecology of Chinook salmon is a limiting factor in implementing this.

Methods:

Results:

Discussion: