

Summary of Day & Harris (2013)

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Over a 49 year period between 1960 and 2008, total commercial landings from six primary stock complexes in the Cambridge Bay area have averaged 40,900 kg round weight per year with total landings for this period equal to 2,004,062 kg round weight. Subsistence harvest is largely unknown but is estimated to be approximately half the size of the commercial harvest. The primary stock complexes are now harvested at the Ekalluk Halovik, Lauchlan, Jayco and Paliryuak rivers. The impacts of the Cambridge Bay fishery on its primary stock complexes were examined in this report. An absence of decreasing trends in mean size and age and temporal stability in strong modal age classes was evident as was an apparent increase in maturity rate throughout the history of this fishery. It is thus concluded that these geographic stocks are being harvested at or below their optimal sustainable rate of harvest. One exception is noted for the Ellice River fishery for which sampled char have demonstrated a consistent decline in age, increase in mean weight and condition and faster growth during the first five to ten years of life when compared to char from other stock complexes. This fishery is considered to have a moderate risk of over-exploitation; however this location has not been fished since 1999. Development of a Precautionary Approach model for the management of the Cambridge Bay char fishery will be challenging because the correlation of size, age and maturity is unclear and there is a lack of information on abundance and stock recruitment relationships. Until catch per unit effort data are collected routinely for this fishery, it will not be possible to estimate char abundance using advanced fisheries science models.

Future work should focus on additional weir enumerations to assess whether run sizes are temporally stable and thus whether exploitation rates have remained relatively constant over the past 15 years. It is recommended that research move forward attempting to resolve fine-scale population structure in this region and the contribution of putative populations to the mixed-stock fishery. Until that time, it is difficult to determine how many populations are being harvested and to what degree. The sustainability of increase quotas could be tested by small and conservative increases followed by the assessment of monitoring data and feedback from resource users. This approach, termed 'adaptive co-management', should be considered as an alternative approach to management of this fishery.

It is recommended that 1) consecutive weir enumerations be conducted to provide estimates of stock abundance and to assess its annual variability, 2) annual and site specific assessment of the subsistence harvest to be conducted, 3) the underlying causes of recruitment variation be determined through further field studies and or modelling, 4) the plant sampling program be expanded to procure larger sample sizes, 5) research be done on the influence of climate on the production of pre-smolt char in lakes, 6) recent advance in genetic models, which describe discrete stock contribution to mixed stock fisheries, be incorporated into the assessment of this fishery, 7) the feasibility of using surplus biomass models for the estimation limit reference points of a Precautionary Approach model be investigated, and 7) the assessment of annual and site-specific fishing effort be attempted.