



COLLECTION AND ASSESSMENT OF EMIGRATING SNAKE RIVER STEELHEAD (Oncorhynchus mykiss) KELTS AT LOWER GRANITE DAM

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Introduction

Inland populations of anadromous steelhead in the Columbia River Basin (below) have declined in abundance, leading to ESA listing and recovery efforts. One such effort is kelt reconditioning: capturing post spawning steelhead (kelts), reconditioning fish in a captive environment and releasing fish into rivers to spawn naturally. We are implementing kelt reconditioning for Snake River Basin steelhead.



During 2012-2014, emigrating kelts were collected at Lower Granite Dam (LGR), the farthest upriver dam on the Snake River with fish passage (left).

Only kelts diverted into the Juvenile Bypass System (below) were collected, representing approximately 5.6% of the total downstream steelhead migration through LGR in 2012 (Colotelo; 2012).

Adult steelhead diverted through the Juvenile Bypass System were collected at the separator bar screen (A). Fish were netted and placed into the kelt hopper (B). From the hopper, fish traveled through the kelt delivery pipe (C) and were deposited into the kelt receiving tank (D). Fish in the receiving tank were sampled daily.



Objectives

- Assess sex, length, condition, origin (hatchery or wild), and time distribution of emigrating kelts.
- Collect female kelts for long term reconditioning.
- PIT tag fish for monitoring of the natural iteroparity rate.
- Provide fish to collaborators for acoustic tagging and other studies.

Methods

- Kelts were collected and sampled daily from April through June.
- Fish were anesthetized (Aqui-S 20E, 10% eugenol).
- Length and weight were recorded.
- Fish were injected with a PIT tag if none was present.
- A tissue sample was taken from the caudal fin for genetic analysis.
- Fish condition, the presence of an adipose clip indicating hatchery origin, and the presence of head wounds were recorded.
- Fish were either selected for long term reconditioning, released to the river, or supplied to collaborators for additional studies.

Results and Discussion

Three year summary of kelts collected from Lower Granite Dam Juvenile Bypass System (below).

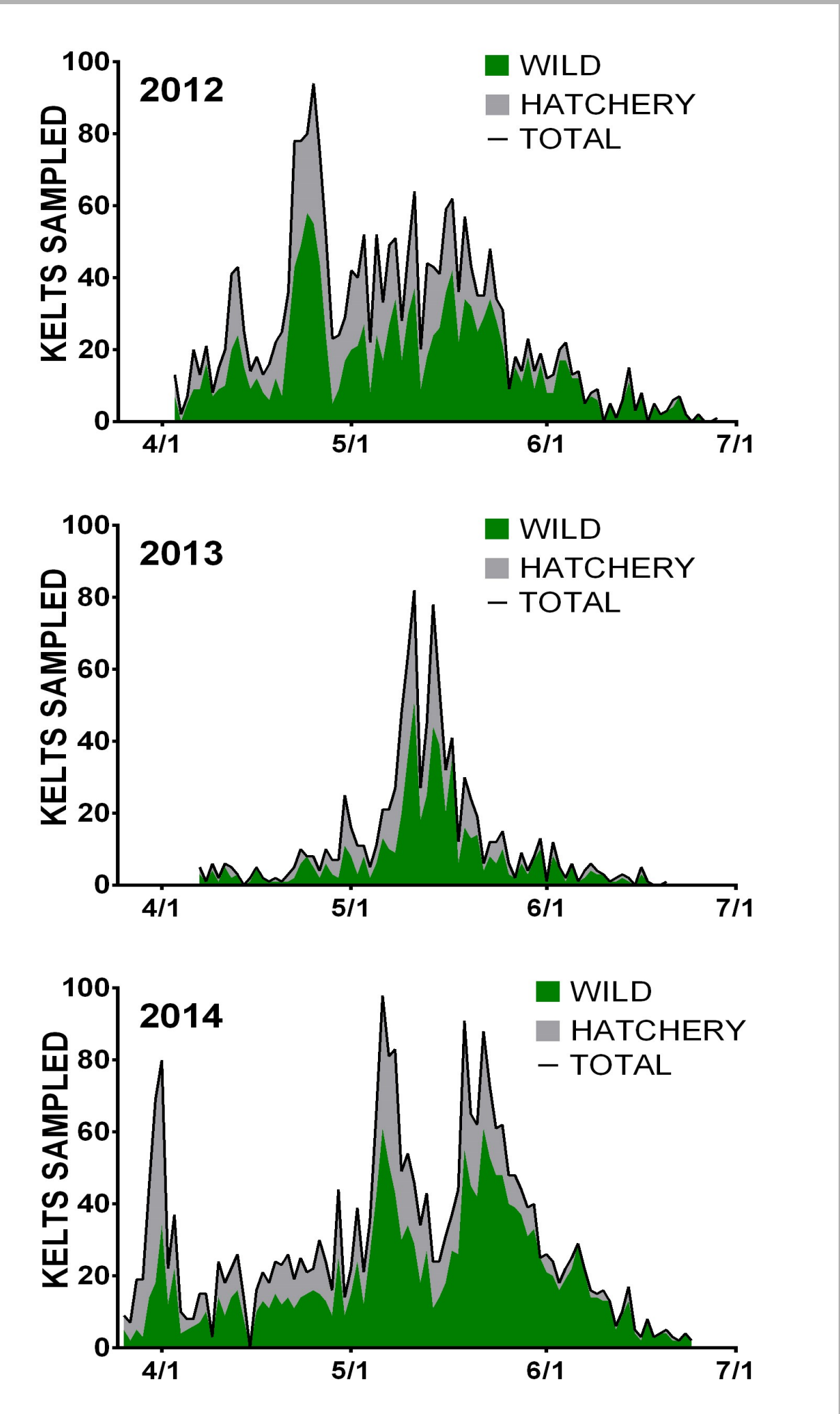
COLLECTION	2012	2013	2014
TOTAL	2251	954	2687
AD CLIP FEMALE	695	308	716
NO AD CLIP FEMALE	1006	427	1084
AD CLIP MALE	174	69	225
NO AD CLIP MALE	374	141	648
CONDITION			
VERY GOOD	25	200	424
GOOD	471	231	889
FAIR	1036	254	747
POOR	709	269	619
STATUS			
MORTALITY	41	14	13
RELEASE	1913	503	2564
ACOUSTIC TAG & RELEASE	176	319	0
RECONDITIONING	121	113	110
AVERAGE SIZE (cm)			
AD CLIP FEMALE	60.1	62.4	60.2
NO AD CLIP FEMALE	65.3	66.5	61.2
AD CLIP MALE	57.8	57.4	56.9
NO AD CLIP MALE	59.8	59.6	58.2



Example of a Very Good condition Wild (no ad clip) female kelt (above).

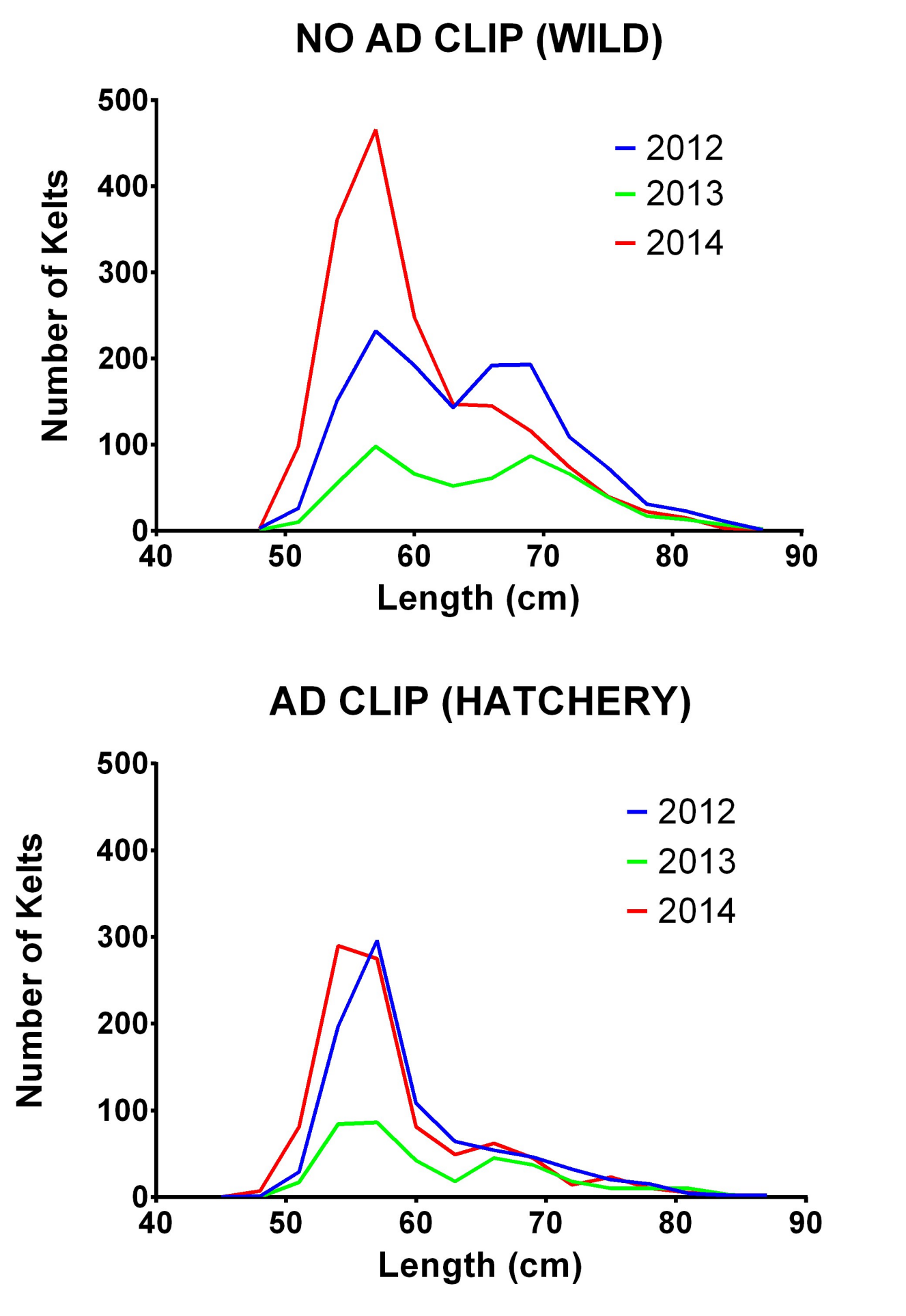


Example of a head wound found on an emigrating kelt (above). From 2012 through 2014 the average incidence of head wounds was 60%.



Example of a reconditioned steelhead kelt (above).

The emigrating kelt run (left) typically peaked in May and contained average 61.9% wild and 38.1% hatchery fish.



The length frequency distribution of steelhead kelts (right) appeared to be bimodal for both wild and hatchery origin fish, with a division between the modes at approximately 63 cm. This suggests that kelts over 63 cm may be largely 2-ocean steelhead. Snake River Basin steelhead from higher elevation tributaries tend to return as 2-ocean fish. These populations are also of the greatest conservation concern.

Conclusions

Collection, assessment, and reconditioning of steelhead kelts will assist in the recovery of ESA-listed Snake River steelhead populations. The high incidence of head wounds in the Lower Granite Dam Juvenile Bypass limits numbers of kelts available for reconditioning.

Collection of kelts 63 cm and greater in length for reconditioning may enable us to focus efforts on 2-ocean populations of the greatest conservation concern. This decrease in the length criterion presently in use would increase collection by average 97 kelts per year.

Acknowledgements

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