

Alagnak Rainbow Trout Investigations at the Alaska Biological Science Center

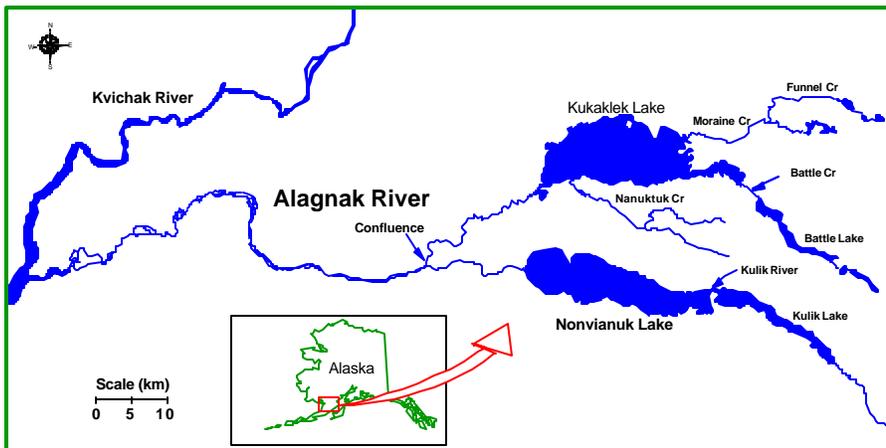
Study Area

The Alagnak National Wild River originates at the outlet of Kukaklek Lake and flows 120 km into the Kvichak River which drains into Bristol Bay. A major tributary is the Nonvianuk River which originates at Nonvianuk Lake south of Kukaklek Lake. Numerous tributaries feed into Kukaklek and Nonvianuk Lakes, the largest of which are Kulik River, Battle Creek, and Moraine

National Park. The majority of the upper watershed is within the Katmai National Preserve or Katmai National Park.

Prized Trophy Rainbow Trout Fishery

The Alagnak River rainbow trout fishery has a reputation of being a



- Arctic Grayling
- Dolly Varden
- Lake Trout
- Sockeye Salmon
- Chinook Salmon

Vital Concerns

Increased Angler Use

-Over 30,000 trout caught and released in this decade

The Alaska Department of Fish and Game reports that visitor use for fishing has increased from approximately 1,900 angler days per year (a 4-month fishing season) in 1981 to over 13,000 in 1995.

Decrease in Average Size of Trout Captured

While fishing pressure has increased dramatically over the last decade, the average size and age of rainbow trout have decreased. The degree to which sport fishing has influenced Alagnak trout abundance is presently unknown.



creeks. The Alagnak River is extensively braided downstream of the Nonvianuk River confluence and eventually becomes tidally influenced near its union with the Kvichak River. All but the downstream-most 29 km of the Alagnak River are managed by Katmai

world-class fishery and therefore attracts large numbers of anglers. It is considered to be the most popular fly-in destination in Southwest Alaska, also supporting important salmon sport fisheries.

Several lodges on the main stem Alagnak and one on the Kulik River provide guided fishing services. Together these lodges support the majority of the visitation for fishing because there are no roads to the Alagnak; all access is by air. A lesser number of parties are flown to strategic locations and then use rafts to drift the river, fishing as they go. Few natives use the river to harvest salmon and a small amount of trout for subsistence.

Multiple Sport Fisheries

Hooking Mutilations Affect Aesthetics of Fishery

-45% of rainbow trout captured in recent survey show hooking injuries

The Alaska Department of Fish and Game invoked emergency regulations preventing the retention of any Alagnak rainbow trout in 1996 and 1997. The Alaska Board of Fisheries in 1998 established permanent regulations limiting Alagnak rainbow trout sport fishing to catch and release only. Because of the high angler use of this population, it is possible that hooking mutilation and mortality are significantly affecting Alagnak rainbow trout.

USGS - ABSC Trout Research

Basic Life-History Information and Habitat Use

It is difficult to assess the relative impacts of the increasingly popular sport fisheries because knowledge of basic life history characteristics and habitat use are limited. Our research is designed partly to determine whether rainbow trout in the various rivers, lakes, and tributaries of the watershed are a single, well mixed population with interbreeding spawning groups, or whether there are discrete, independent spawning populations.

Movement and migrations

-Location of spawning aggregations

-Seasonal distribution

-Thermal refugia



Results from radio telemetry in 1997-1999 have revealed a high degree of seasonal movement but the patterns are not yet fully described. Based on preliminary data, trout may be migrating seasonally to spawn and

to take advantage of eggs and flesh provided by seasonally abundant salmon. Their movements may also be influenced by a need to find the best possible overwintering conditions. The telemetry data indicate, particularly for those fish tagged at the lake outlets, that some fish migrate to the upper or middle Alagnak main stem during the apparent spawning period of May-June. The outlet fish then return to the same area without moving from one lake, outlet reach, and tributary watershed to the other, indicating watershed fidelity and potential reproductive isolation. A GIS-based map of the drainage was digitized and river kilometers were calculated. This mapping system is used as a base reference to determine the distance and direction of movements.

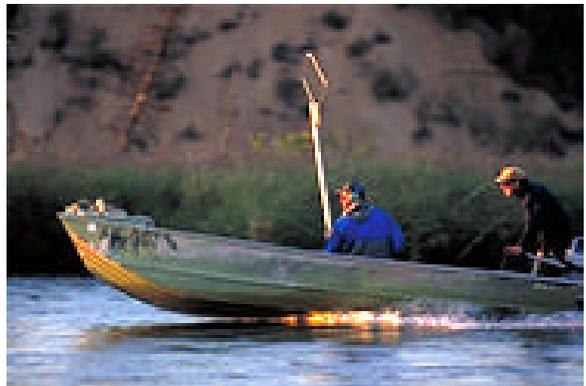
Basin-wide Population Structure

-Genetics and local adaptation

Little is known about rainbow trout population structuring in the Alagnak drainage (although work completed in 1997 indicates a likelihood of some population structuring). Past population studies utilizing allozyme variation on rainbow trout from other drainages have indicated that there is usually little genetic divergence among populations. To determine whether population structuring exists in the Alagnak River drainage, we propose to use DNA-microsatellite analysis. During May-June of 1999 and 2000, non-lethal tissue samples from spawning rainbow trout will be collected to determine whether different populations spawn in the same general location. Results from radio telemetry indicate that trout from different sections of the watershed, including the lake populations, use the middle and upper part of the Alagnak main stem during the spawning period. The final conclusion of whether the Alagnak River holds distinct rainbow trout populations will depend on the outcome of the molecular genetic analyses.

Population Health

Since fishing regulations have been changed to catch and release for rainbow trout on the



Alagnak River, the only fishing mortality should be due to direct or delayed effects of hooking and release (although some minor subsistence harvest also occurs). Hooking mutilation and mortality studies are being considered but are presently unfunded.

Abundance

Techniques for assessing rainbow trout population abundance have been developed to a certain extent in some lower 48 areas and a few other Alaskan streams, but not for the Alagnak and many other Alaskan drainages. Preliminary mark-recapture estimates were conducted in 1/4-1/2 mile sections of the Alagnak during 1997. Abundance estimates were deemed infeasible primarily because of poor recapture rates within each section. Results from 1997 indicate that mark-recapture population estimates should be made on pre-identified trout population units, rather than at specific, arbitrary locations.

These studies are designed to assist state and federal fisheries managers with improved technology for decisions to maintain healthy trout populations and sport fisheries.

