YELLOWSTONE CUTTHROAT TROUT

MANAGEMENT SUMMARY

Wyoming Game & Fish Department

Fish Division

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WYOMING GAME AND FISH DEPARTMENT

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Introduction

Yellowstone cutthroat trout, YSC, (*Oncorhynchus clarki bouvieri)*, including Snake River cutthroat trout (SRC), are the dominant native cutthroat trout found in Northwestern Wyoming (Figure 1). Management of YSC and SRC has been an integral aspect of wild trout management by the Wyoming Game and Fish Department since the 1950s. Specific information pertaining to the history, distribution, and management concerns in each management area has been documented in Status and Management of Yellowstone Cutthroat Trout (1999).

Wyoming Game and Fish Department YSC Management

The ultimate management of native stocks will encompass a variety of methods that address genetic integrity, habitat management, the use of select stocks for recovery projects, and special regulations. The use of such tools addresses the needs of all native stocks and the biotic community. Other native species of fish, amphibians, and the many predators that comprise these communities will also gain from such programs.

The goal of the WGFD in regard to YSC populations in waters managed by the State of Wyoming, is to assure the long term well being of YSC within their historic range according to the following objectives:

Objective 1. Sample and analyze the genetic integrity of representative stocks of YSC in Wyoming waters. DNA and/or protein electrophoretic analyses will be used to determine the purity rating and classification of existing populations of YSC.

Objective 2. Maintain the current wild trout fishery programs.

Objective 3. Maintain, protect and rehabilitate fishery habitat by working with private landowners, service organizations, and local, state, and federal agencies.

Objective 4. Maintain and monitor the status of native stocks by regularly scheduled inventory of waters to determine the distribution, abundance, habitat conditions, and general well being of YSC fisheries.

Objective 5. Restore YSC stocks in historic waters where feasible.

Objective 6. Enhance educational programs outlining the needs of all native fish.

Objective 7. Utilize passage barriers to protect populations of high purity rated populations when reasonable and feasible. Also, remove barriers to allow movement of high purity rated populations to native range where feasible.

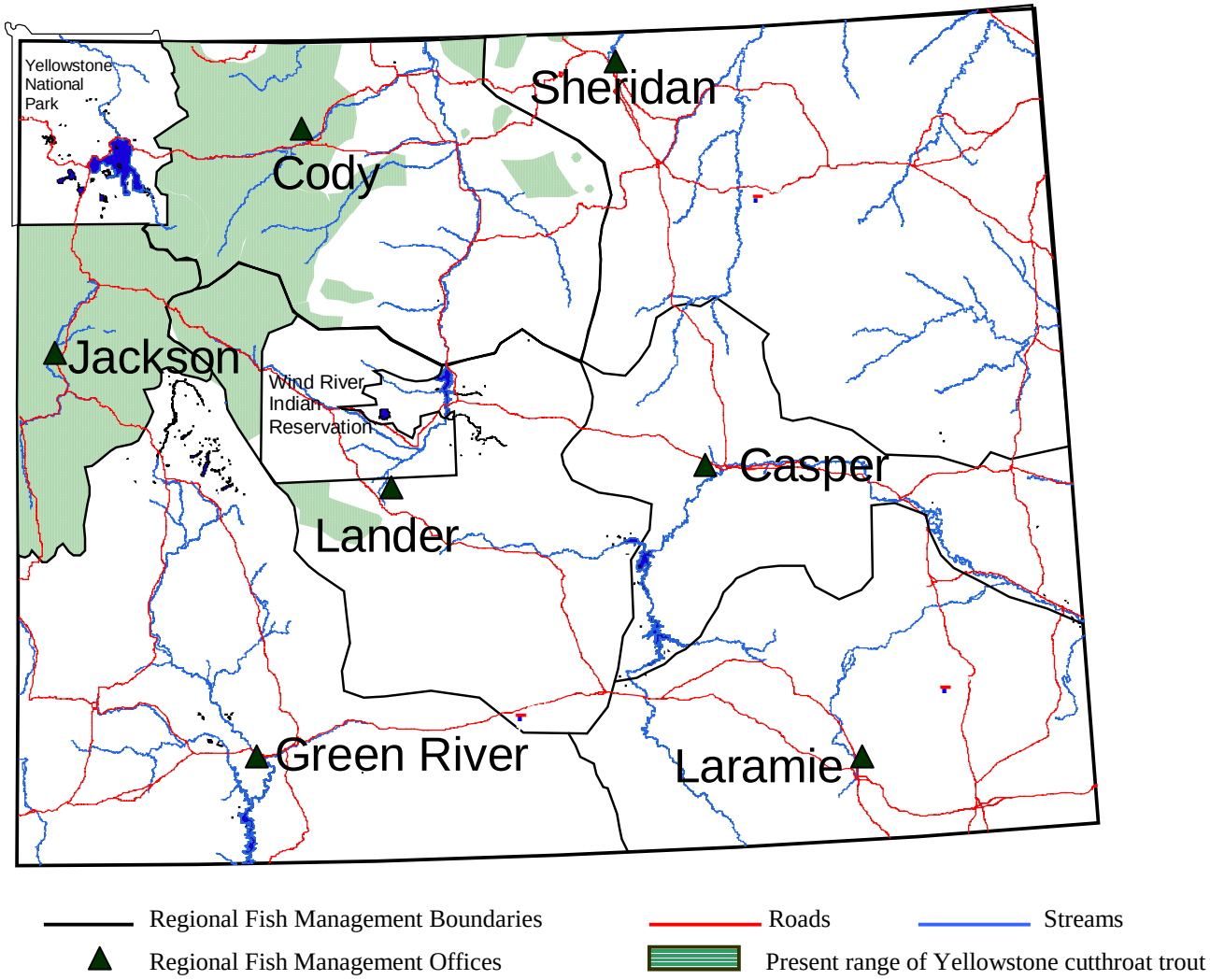

Figure 1. Present range of Yellowstone cutthroat trout in Wyoming.

Objective 8. Maintain YSC broodstocks to preserve or expand distinct populations as needed.

Objective 9. Utilize restrictive regulations to preserve and protect specific populations as needed and necessary.

Objective 10. Continue to monitor native fish populations for fish health status and concerns such as whirling disease and the presence of exotics such as New Zealand mud snails.

Distribution

The principle fish management regions dealing with native YSC stocks have field headquarters in Cody, Jackson, Lander, and Sheridan, Wyoming. Historically, the presence of YSC in these management areas was quite variable (Figure 2).

Cody Region. The Cody region is responsible for the management of the fisheries in the Big Horn drainage. The only major drainage with pure YSC is the upper Yellowstone system, which has YSC moving in and out of Yellowstone National Park (YNP). In total, approximately 30% of historical waters are presently occupied by YSC in the Cody management region. Within this region, YSC on the West slope of the Big Horn Mountains now occupy approximately 4% of the stream mileage within their historic range, with South Paintrock, Cedar, and Beaver creeks having genetically pure YSC present. The Greybull River and Upper Yellowstone systems have the best YSC stocks for future reintroduction effort and should be preserved.

Jackson Region. The Jackson fisheries region represents one of the healthiest wild trout fisheries in the United States. Of the 701 suitable waters found in the region, 653 contain native cutthroat trout populations. YSC/SRC occupy approximately 98% of their historic range. Nearly all of these populations are the more distinct Snake River variety.

Lander Region. Historical Yellowstone cutthroat presence in the Lander region is not well documented. The speculation that YSC were present in the entire Bighorn drainage has now been prefaced by accounts of early explorers who did not find this fish upstream of the Greybull and Shoshone rivers. Fish managers believe YSC were present only from the lower Wind River Basin, upstream to the upper reaches of the Wind River.

Sheridan Region. Sheridan fisheries data suggest YSC historically occupied the Little Bighorn and Tongue River drainages. YSC populations in these drainages were believed to have been isolated in the headwaters upstream of the Montana state line. The eastern most point harboring YSC was from the South Fork Tongue River and Big Goose Creek (Evermann and Cox 1894). Barriers precluded YSC from the upper reaches of Tongue River and Big Goose Creek. Less than 500 miles of streams in this region were occupied by YSC, historically. In total, YSC are believed to now occupy 24% of their historical range.

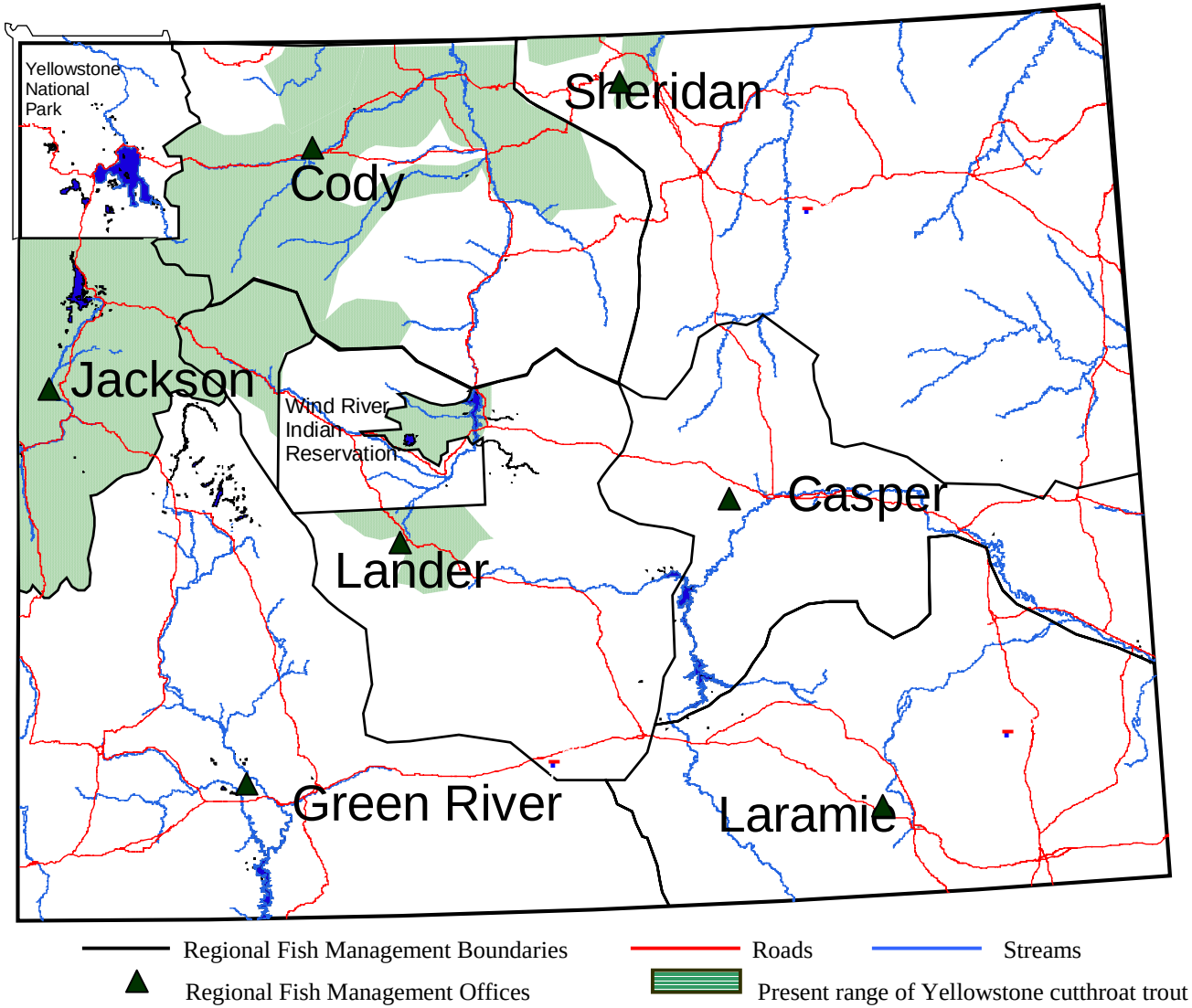

Figure 2. Historic range of Yellowstone cutthroat trout in Wyoming.

Stocking/Recovery

The use of hatchery brood stock is important in the maintenance and recovery of native stocks. To avoid using less than desirable stocks, all introductions should be accomplished to minimize the effects of hybridization with native fish stocks. As suggested by Leary (1999), although potential sources are limited, a great deal of planning should precede any action.

1. Avoid, if possible, highly homozygous (low heterozygosity) source populations.
2. For introductions within the species range, consider sources relatively close by or from adjacent drainages. Ricker (1972) also emphasizes the point as practical and logical fisheries management.
3. For introductions outside the species range, any potential source will do.
4. Make sure introductions are compatible with other programs. For example, fishless lakes often harbor unique plankton, amphibian, and other such aquatic communities.

Brood Stock History

There are currently three active brood stocks of Yellowstone cutthroat trout in the WGFD Hatchery system. The Yellowstone brood stock is managed at the Clark's Fork Hatchery, while Snake River brood stocks are found at the Auburn Hatchery and Wigwam Rearing Station.

Snake River Cutthroat. The Snake River cutthroat brood stock was first developed at the Auburn Hatchery, in Auburn Wyoming. Management use is for put-and-take, or put-grow-and-take fisheries. WGFD management policy denotes the evaluation of the use of Auburn SRC to establish self-sustaining stocks in native range (Wiley 2000).

A second Snake River cutthroat brood stock was established at the Tensleep/Wigwam Hatchery near Ten Sleep, Wyoming. This stock was established to provide late-run SRC that would spawn at the same time as their wild counterparts. In addition to being used for put-grow-and-take fisheries, eyed-eggs are used in several spring creeks in the Jackson area to restore or maintain spawning runs in association with habitat rehabilitation projects.

Yellowstone Cutthroat. The YSC brood stock located at the Clark's Fork Hatchery was first established with eggs taken in 1993. This stream-oriented strain of cutthroat was obtained from wild fish trapped at LeHardy Rapids in Yellowstone National Park. Principle use will be for maintenance or to re-establish stocks in their native range.

Strategies And Agreements

I. Yellowstone Cutthroat Trout Interstate MOU

Idaho, Montana, Nevada, Utah, Wyoming, U.S. Forest Service, Teton National Park, and Yellowstone National Park have formed an alliance to conserve, protect, and restore Yellowstone cutthroat trout populations

in their historic range. This coordinated effort to maintain native YSC populations is a major step in management direction and compliments the direction established by the State of Wyoming. A copy of this agreement follows:

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement (MOA) has been developed to define shared goals and objectives for the conservation and restoration of Yellowstone cutthroat trout within its historic range. In addition to defining shared goals for conservation of Yellowstone cutthroat trout (YCT; ***WGFD uses YSC***), this MOA also outlines a process of cooperation, coordination, and data sharing among the resource agencies with management responsibility for YCT.

Implementation of the MOA will result in enhanced and coordinated conservation efforts among the resource agencies with management responsibility for YCT.

Implementation of the MOA will result in enhanced and coordinated conservation efforts among and between resource agencies (Agencies) on behalf of Yellowstone cutthroat trout, and should result in a greater understanding of the overall status and distribution of the subspecies throughout its range. Achievement of the shared goals in this MOA should reduce or eliminate threats to YCT that warrant its status as a species of special concern by state and federal resource management agencies.

Separate Memoranda of Understanding and Conservation Agreements will be developed with other resource management agencies and additional, supporting entities as necessary to ensure implementation of specific conservation measures. In addition, interested government agencies and conservation groups will be given opportunity to review and provide input on specific actions.

INVOLVED PARTIES (Agencies)

Montana Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, MT 59602

Idaho Department of Fish and Game
600 South Walnut, Box 25
Boise, ID 83707

Wyoming Game & Fish Department
5400 Bishop Boulevard
Cheyenne, WY 82006

Nevada Division of Wildlife
P.O. Box 10678
Reno, NV 89520

Utah Division of Wildlife Resources
1594 West North Temple
Salt Lake City, UT 84114

U.S. Forest Service
Regions 1, 2, 4
C\O 200 East Broadway
Missoula, MT 59807

Grand Teton National Park
P.O. Drawer
Moose, WY 83012

Yellowstone National Park
P.O. Box 169
Yellowstone NP, WY 82190

DISTRIBUTION

YCT historically occurred in the Snake River drainage from the headwaters down to Shoshone Falls in the Columbia River basin, and in the Yellowstone drainage from the headwaters down to at least the confluence of the Big Horn River near Billings, Montana. This distribution includes large areas within Montana, Idaho, Wyoming, including Yellowstone National Park, as well as the very northeastern corner of Nevada and northwestern corner of Utah.

The exact distribution of historically occupied streams is unknown, but it is believed that most streams in the upper Snake and Yellowstone drainages were occupied by YCT. Information on current status indicates that populations have declined from historic levels largely due to historic habitat changes and influences from non-native fish species that were stocked throughout both basins. The genetic status/purity of remaining YCT populations remains largely unknown. However, the percentage of currently occupied YCYT streams occupied by genetically pure YCT is substantially less than the total due to introgression from rainbow trout and westlope cutthroat trout stocked in historic YCT drainages over many decades. Other causes of YCT decline and existing threats include loss of habitat, habitat degradation, whirling disease, New Zealand mud snails, and the introduction of non-native fish species (e.g., lake trout) that compete with or prey on YCT. Because of the decline in distribution, and threats to existing intact populations, the Agencies have classified YCT a species of concern, and have been taking management and conservation steps to reduce threats and ensure the long-term persistence within its native range.

For the purposes of this MOA, YCT outside of their historical, native range are not considered as conservation populations.

AGREEMENT

Pursuant to this MOA, the Agencies agree to the following:

Goals and Objectives: The Agencies accept the following goals and objectives, will continually strive to accomplish them, and agree to incorporate them into their respective planning and budgeting processes.

Goal: Ensure the persistence of the Yellowstone cutthroat trout subspecies within its historic range. Manage YCT to preserve genetic

integrity and provide adequate numbers and populations to provide for protection and maintenance of both intrinsic and recreational values associated with this fish.

Objective 1. Identify all existing populations

Identify all YCT populations within the historical native range of YCT and maintain database of the most current distribution.

Objective 2. Secure and enhance conservation populations

Identify genetic purity of existing populations. Prioritize populations based on genetic purity, population size, and unique characteristics. Secure and enhance all known and suspected genetically pure YCT populations, and high priority introgressed populations. These efforts might include, but are not limited to:

- Isolation of populations to prevent invasion by hybridizing and\or competing non-native fish.
- Habitat restoration where possible.
- Modification of land uses to provide for YCT habitat and population protection.
- Expansion of current populations within the context of their streams and watersheds.
- Suppression or eradication of non-native fish species that are competing with, preying on, or hybridizing with native YCT.
- Stocking of non-native trout will not be planned or carried out in drainages or portions of drainages that support pure Yellowstone cutthroat where such stocking has the possibility of negatively impacting a pure Yellowstone cutthroat population. Stocking of non-native trout would not occur in habitats selected as potential restoration sites.
- Reduced harvest regulations will be applied where angler harvest is altering population age\size structure and affecting recruitment.

Objective 3. Restore populations

Increase the number of stream populations by restoring YCT within their native range. Sources of YCT for restoration may include replication of currently identified populations, transfers from adjacent drainages, or use of a captive brood maintained in a genetically pure condition.

Objective 4. Public Outreach

A public outreach effort specifically addressing YCT conservation will be developed and implemented by the agencies having responsibility for YCT conservation. Public outreach efforts will utilize the many and varied options available to get the native trout story to the public.

Objective 5. Data Sharing

The Agencies agree to summarize existing distribution, genetics, and conservation accomplishments data in a common format to be developed to all data summaries and comparisons between and among jurisdictions.

Objective 6. Coordination

The Agencies will meet at least once annually to review accomplishments towards conservation of YCT, to share information, to identify, discuss, and solve common problems related to conservation of YCT, and to prioritize common issues that should be addressed under the purview of the MOA. Meeting minutes and assignments will be mailed to all Agency representative and interested parties shortly following the meeting. This MOA will be reviewed and modified as necessary at the annual coordination meeting.

Objective 7. Implementation

The Agencies will work towards meeting the above goals and objectives through independent activities and work programs, as well as by communicating successes and pitfalls with one another, sharing information, and working cooperatively to solve common problems and threats.

AUTHORITY

This MOA is intended to facilitate coordination and cooperation between the Agencies for conservation of YCT. All parties to this MOA recognize that they each have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of wildlife, its habitat, and the management, development, and allocation of water resources. Nothing in this MOA is intended to abrogate any of the parties’ respective responsibilities.

This MOA is subject to and is intended to be consistent with all applicable Federal and State laws and interstate compacts.

This MOA is no way restricts the parties involved from participating in similar activities with other public or private agencies, organizations, or individuals.

The State of Wyoming and the Commission do not waive sovereign immunity by entering into this MOA, and specifically retain immunity and all defenses available to them as sovereigns pursuant to Wyoming Statute 1-39-104(a) and all other state law.

Modification within the scope of the MOA shall be made by the issuance of a bilaterally executed modification prior to any changes being performed.

Nothing in this Agreement shall obligate any cooperator to expend appropriations or to enter into any contract or other obligation. This is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between the parties to this agreement will be handles in accordance with applicable laws, regulations, and procedures including those for Government procurement and printing. Such endeavors will be outlined in separate agreements that shall be made in writing and shall be independently authorized by appropriate statutory authority.

II. Interstate Introgression Standards

Recommendation: The use of allozymes and DNA analyses will be accepted at this time with the stipulation that at least 8-10 fixed markers will be used to quantify levels of interspecific hybridization. There will be no stipulation on the number of markers to quantify levels of intraspecific hybridization. However, the markers must be fixed.

Recommendation: A population sample size of at least twenty individuals will be required to quantify the degree of inter- and intraspecific hybridization. When possible, a population sample size of thirty individuals should be collected. The development of nuclear DNA markers is strongly encouraged to allow for non-lethal sampling of populations.

Recommendation: Standardized Introgression Formula:

$$\% \text{ Introgression} = \frac{(\text{Total number nonnative alleles in population}) \times 100}{(\text{Total number alleles/individual}) \times (\text{Total number individuals})}$$

As stated by the technical committee, any analysis that is scientifically sound is left to the discretion of the states.

Recommendation: The ad-hoc technical committee should reconvene after meeting its current objective to undertake the task of developing standards for tissue collection from inland cutthroat trout for the purpose of genetic analyses.

Recommendation: The ad-hoc technical committee will not recommend a specific set of markers to be used to quantify the degree of hybridization in populations at this time. Any set of markers analyzed through one technique or a combination of techniques will be acceptable with the stipulation that the markers are scientifically validated for addressing this specific question and at least 8-10 diagnostic markers are used.

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Leary, R.F. 1999. Fish Genetics, Course FIS-1102, Casper, Wyoming. USFWS, National Conservation Training Center.

Ricker, W.E. 1972. Hereditary and environmental factors affection certain salmonid populations. Pages 19-160, IN R.D. Simon and P.A. Larkin (eds.). The Stock Concept in Pacific Salmon, H.R. MacMillan Lectures in Fisheries, University of British Columbia, Vancouver, BC.

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