

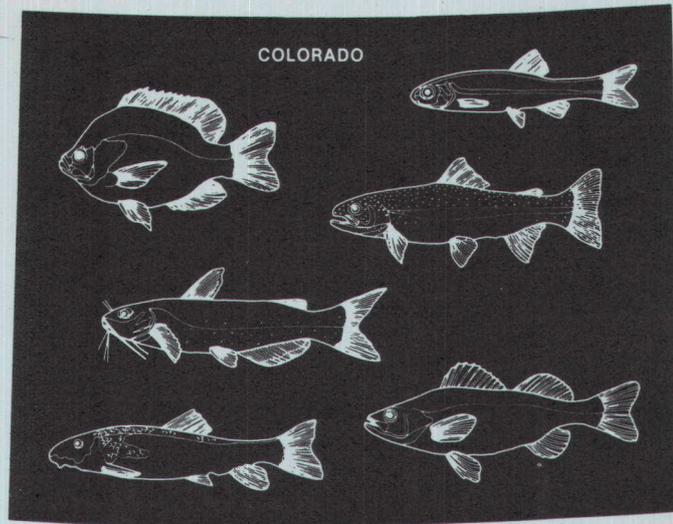
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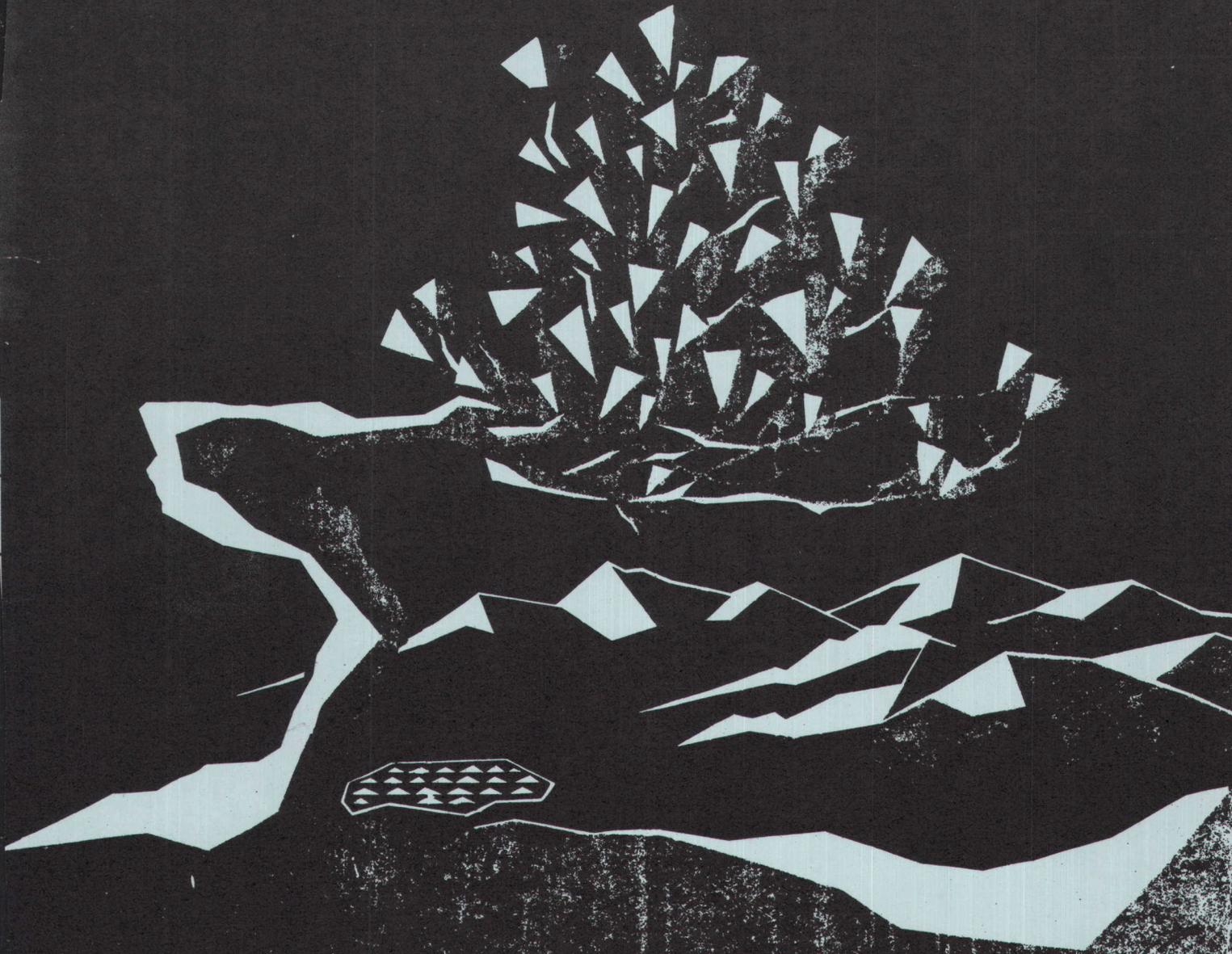
**AN ANNOTATED BIBLIOGRAPHY OF  
THE FISHES OF COLORADO**

**Charles M. Haynes  
Karen Hamilton**

Special Report Number 61



**COLORADO DIVISION OF WILDLIFE  
AQUATIC RESEARCH**



07927

# **AN ANNOTATED BIBLIOGRAPHY OF THE FISHES OF COLORADO**

**Charles M. Haynes and Karen Hamilton**



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**Colorado Division of Wildlife**

**June 1986**

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DAVID H. GETCHES, Executive Director  
Department of Natural Resources

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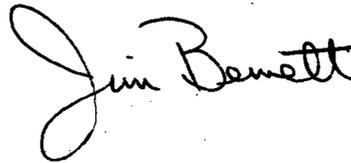
JAMES B. RUCH, Division Director

*Edited by*  
Nancy W. McEwen

## FOREWORD

To understand and properly manage any species, a basic knowledge of that species' ecology, biology, and distribution is essential. This annotated bibliography by Charles Haynes and Karen Hamilton represents the foundation of our understanding of Colorado fishes, past and present.

Though this publication stands well enough on its own merits, it was meant to precede and provide a foundation for a new Fishes in Colorado. The present two books on fishes of Colorado (Beckman 1952, Everhart and Seaman 1971) need updating and revision. Until a new text on Colorado fishes is available, this bibliography, along with recent Division of Wildlife publications by Wiltzius (1985) and Woodling (1985) will give the student, scientist, and naturalist a good springboard into the pertinent literature.

A handwritten signature in black ink that reads "Jim Bennett". The signature is written in a cursive style with a large, looping initial "J".

Jim Bennett  
Wildlife Program Specialist

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We especially thank M. Hershcopf for her sincere interest and dedicated effort to make this bibliography accurate and consistent.

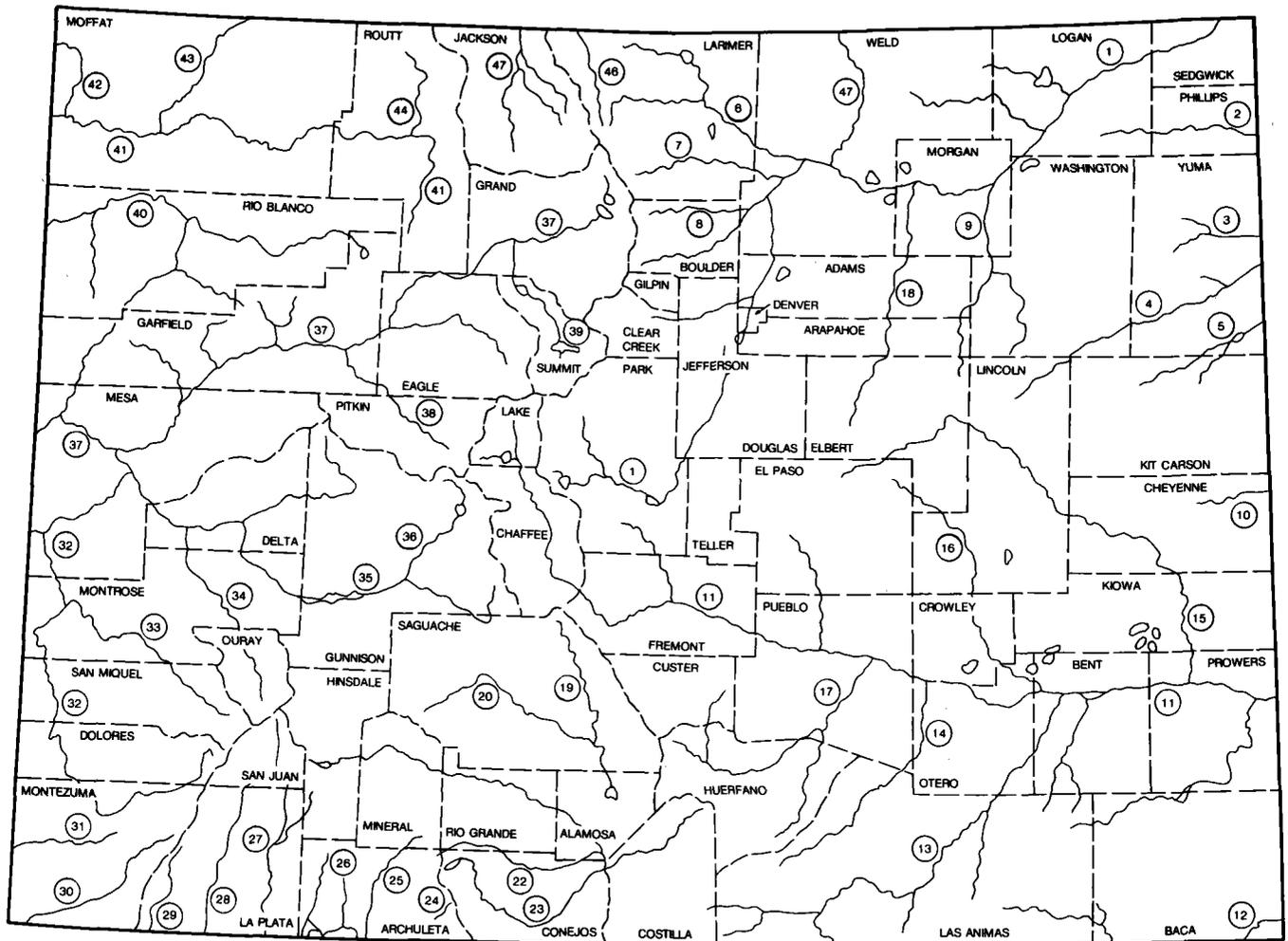


Fig. 1. Principal rivers and streams of Colorado.

- |                           |                      |                        |
|---------------------------|----------------------|------------------------|
| 1. South Platte River     | 17. Huerfano River   | 33. San Miguel River   |
| 2. Frenchman River        | 18. Box Elder Creek  | 34. Uncompahgre River  |
| 3. N. Fork, Republican R. | 19. San Luis Creek   | 35. Gunnison River     |
| 4. Arikaree River         | 20. Saguache Creek   | 36. Taylor River       |
| 5. S. Fork, Republican R. | 21. Rio Grande River | 37. Colorado River     |
| 6. Cache la Poudre River  | 22. Alamosa River    | 38. Roaring Fork River |
| 7. Big Thompson River     | 23. Conejos River    | 39. Blue River         |
| 8. Saint Vrain River      | 24. Navajo River     | 40. White River        |
| 9. Sand Creek             | 25. San Juan River   | 41. Yampa River        |
| 10. Smoky Hill River      | 26. Piedra River     | 42. Green River        |
| 11. Arkansas River        | 27. Los Pinos River  | 43. Little Snake River |
| 12. Cimarron River        | 28. Animas River     | 44. Elk River          |
| 13. Purgatoire River      | 29. La Plata River   | 45. Encampment River   |
| 14. Apishapa River        | 30. Mancos River     | 46. North Platte River |
| 15. Big Sandy Creek       | 31. McElmo Creek     | 47. Crow Creek         |
| 16. Horse Creek           | 32. Dolores River    |                        |

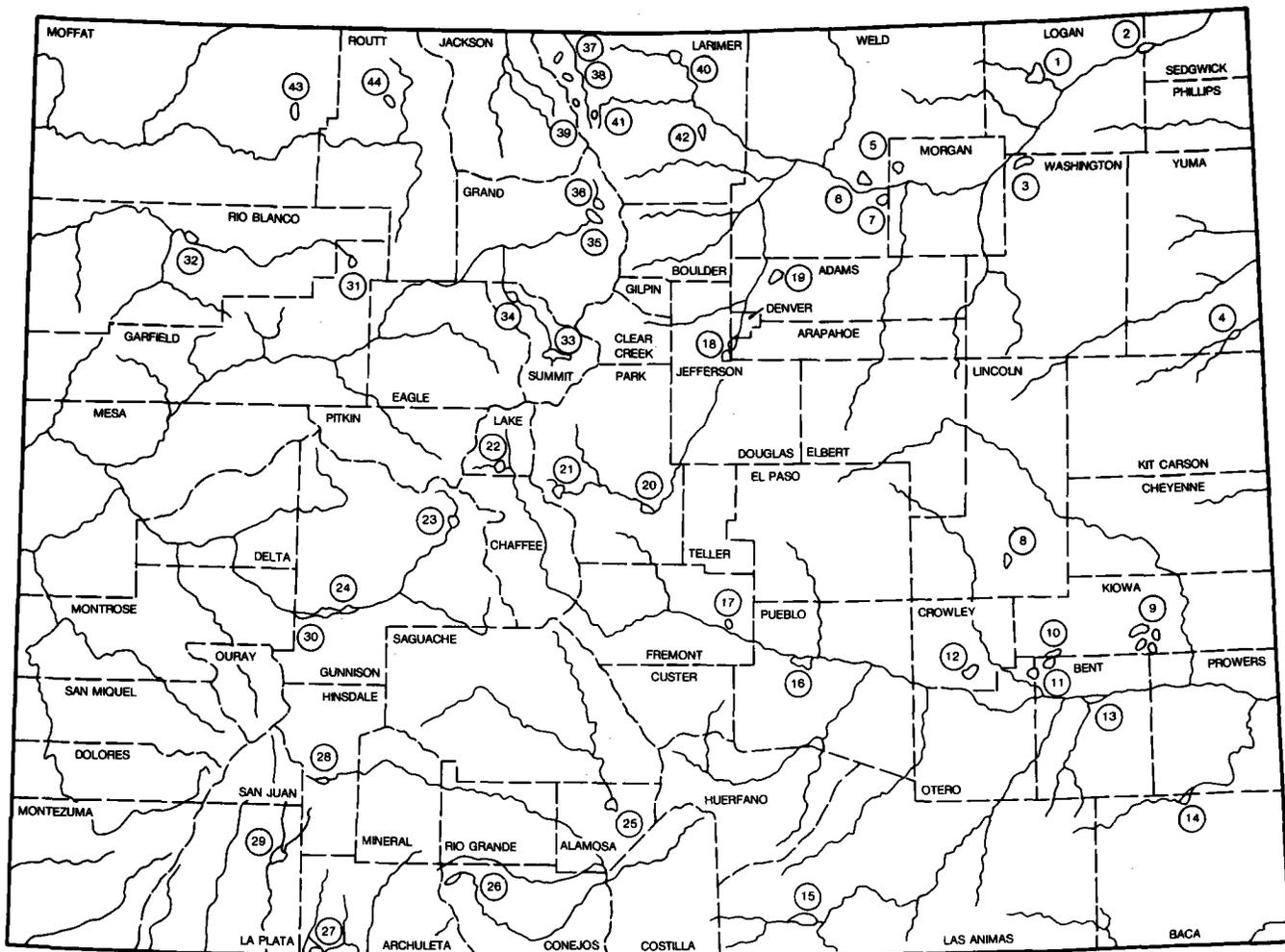


Fig. 2. Principal reservoirs and lakes of Colorado.

- |                             |                            |                           |
|-----------------------------|----------------------------|---------------------------|
| 1. Sterling Reservoir       | 16. Pueblo Reservoir       | 31. Trappers Lake         |
| 2. Julesburg Reservoir      | 17. Brush Hollow Reservoir | 32. Rio Blanco Reservoir  |
| 3. Prewitt Reservoir        | 18. Chatfield Lake         | 33. Dillon Reservoir      |
| 4. Bonny Reservoir          | 19. Barr Lake              | 34. Green Mountain Res.   |
| 5. Jackson Reservoir        | 20. Elevenmile Canyon Res. | 35. Lake Granby           |
| 6. Riverside Reservoir      | 21. Antero Reservoir       | 36. Grand Lake            |
| 7. Empire Reservoir         | 22. Twin Lakes Reservoir   | 37. Big Creek Lakes       |
| 8. Karval Reservoir         | 23. Taylor Park Reservoir  | 38. Lake John             |
| 9. Great Plains Res. System | 24. Blue Mesa Reservoir    | 39. Delaney Butte Lakes   |
| 10. Adobe Creek Reservoir   | 25. San Luis Lake          | 40. Halligan Reservoir    |
| 11. Horse Creek Reservoir   | 26. Platoro Reservoir      | 41. Chambers Lake         |
| 12. Lake Meredith           | 27. Navajo Reservoir       | 42. Horsetooth Reservoir  |
| 13. John Martin Reservoir   | 28. Rio Grande Reservoir   | 43. Ralph White Reservoir |
| 14. Two Buttes Reservoir    | 29. Vallecito Reservoir    | 44. Steamboat Lake        |
| 15. Trinidad Reservoir      | 30. Morrow Point Reservoir |                           |

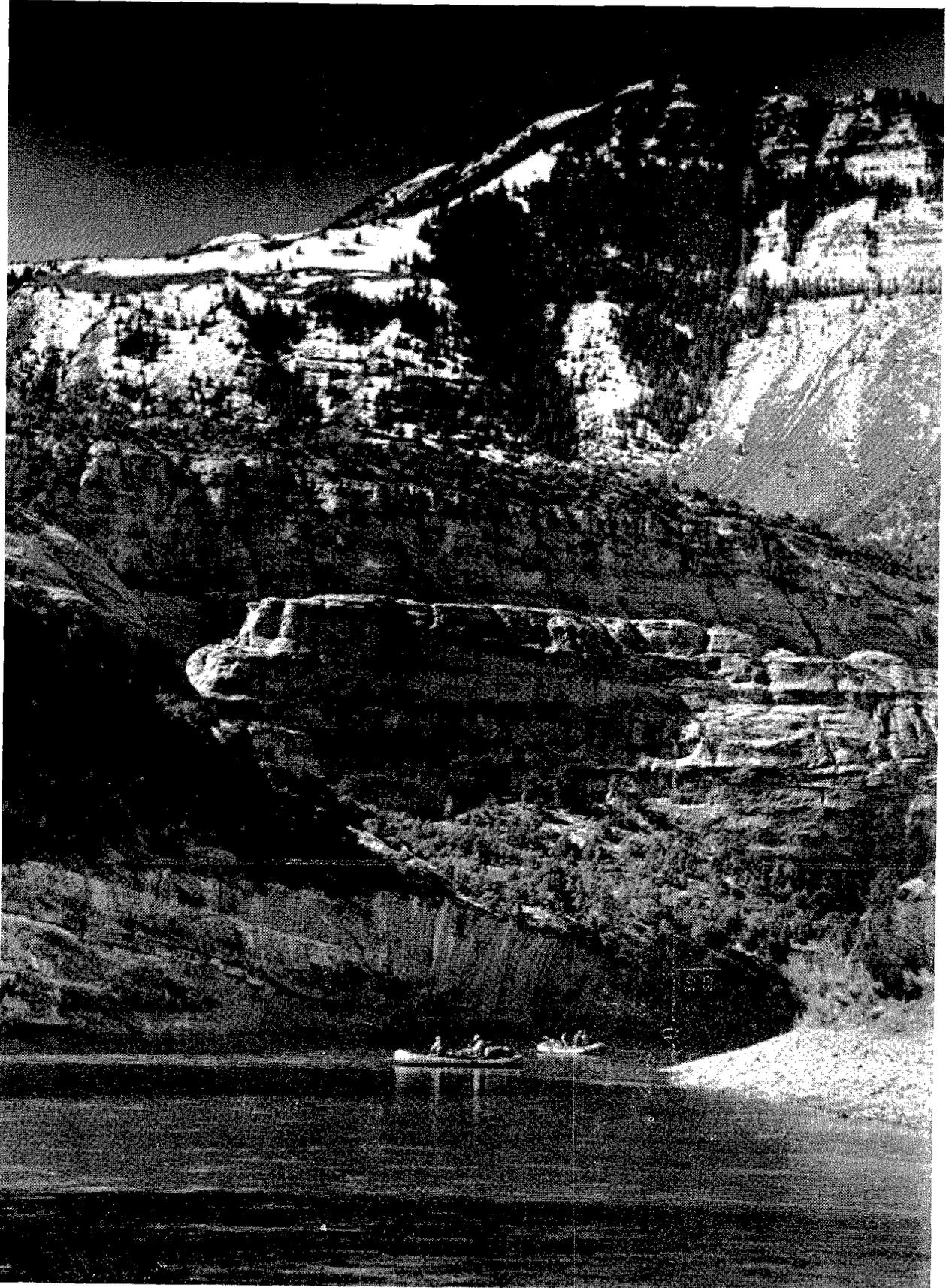


Fig. 3. Checking for squawfish on the Yampa River. (Photo by G. Tischbein)

# AN ANNOTATED BIBLIOGRAPHY OF THE FISHES OF COLORADO

## INTRODUCTION

The purpose of this project was to compile a detailed data base concerning the historic and present distribution, biology, and ecology of the fishes found in the State of Colorado. One of the products of this effort is this annotated bibliography, containing 417 selected entries. The entries, dating from the late 19th century to 1985, include reports, publications, student theses, and presented papers referring to 169 fish taxa.

This bibliography is not intended to be exhaustive. For example, literature dealing largely with fisheries techniques and methods has been omitted. Within this narrowed framework, there have undoubtedly been omissions; however, we believe that a representative portion of accessible literature has been included. Many additional state reports can be found in O. B. Cope's Index to Fishery Publications of the Colorado Division of Wildlife.

The bibliography has been indexed separately by key word, county, and species. Many key words pertain directly to fishery biology and management, but key words such as invertebrates, water quality, and limnology reference additional information

about fish ecology. Given the large number of drainage basins, rivers, streams, lakes, and reservoirs, we decided to list only the principal drainages of Colorado as key words. These drainages are the Colorado, Platte, Arkansas, Rio Grande, and San Juan. References relating to specific river reaches and other water bodies can be found by using the County Index. In some cases, principally with older (19th century) literature, judgment was required in order to determine geographic location for the County Index. Incomplete latitude-longitude information required an informed "best guess." Similarly, name changes of small streams and ponds made geographic designation and thus county assignment occasionally difficult. The Species Index contains taxonomic designations exactly as the author listed them. We made no attempt to verify or update any designations provided by the references. The inclusion of museum collections from the University of Colorado at Boulder, the University of Michigan, the U. S. Fish and Wildlife Service (Ft. Collins), and the Smithsonian Museum under the key word "Collections" is to provide information about the existence and purported contents of sizable historical collections of Colorado fishes.



Fig. 4. Seining operations on the Yampa River. (Photo by G. Tischbein)

# BIBLIOGRAPHY

1

Abbott, C. C. 1861. Descriptions of four species of North American Cyprinidae. Proc. Phila. Acad. Nat. Sci. 12(1860):473-474.

First description of the razorback sucker (Xyrauchen texanus) from the "Colorado" and "New" rivers.

COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, TAXONOMY/SYSTEMATICS

2

Allen, A. M. 1982. Developmental study of brook, brown, rainbow, and cutthroat trout larvae. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 17:91-103.

A detailed morphomeristic study of the larval stages of Salvelinus fontinalis, Salmo trutta, S. gairdneri, and S. clarki to evaluate characters of diagnostic value.

ANATOMY/MORPHOLOGY, DESCRIPTION, EARLY LIFE HISTORY, TAXONOMY/SYSTEMATICS

3

Anderson, R. M., and B. Nehring. 1982. The catch and release experience on the Frylingpan and South Platte rivers. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 17:16-32.

This study considered the effects of harvest on the standing crop of Salmo species versus the effects of catch and release on population numbers.

COLORADO RIVER DRAINAGE, FISHERY--Sport, INVENTORY, PLATTE RIVER DRAINAGE, REPRODUCTION, STANDING CROP.

4

Andrews, A. K. 1970. The distribution and life history of the fathead minnow (Pimephales promelas Rafinesque) in Colorado. Ph.D. Diss. Colo. State Univ., Ft. Collins. 131pp.

Life history characteristics of the fathead minnow in warmwater and coldwater environments were investigated. Fathead minnows were found to establish populations under diverse habitat conditions. Notable indications of success were a viable population at an elevation of 3,034 m and successful spawning at 12.8 C.

Habitat requirements include copious growths of aquatic vegetation and water velocities less than 15 cm/sec. Salmonids were generally inefficient predators and it was recommended that fatheads not be introduced as forage where cover is available throughout the year.

ABUNDANCE, AGE/GROWTH, DESCRIPTION, DISTRIBUTION, ECOLOGY--Interactions, Trophic relationships, FOOD, HABITAT, INVENTORY, MANAGEMENT, MOVEMENT, NATURAL HISTORY, PLATTE RIVER DRAINAGE, PREDATION, RECRUITMENT, REPRODUCTION, RIO GRANDE RIVER DRAINAGE, WATER QUALITY--Physical

5

Annear, T. C. 1980. A characterization of Yampa and Green River ecosystems. M.S. Thesis. Utah State Univ., Logan. 143pp.

An analysis of primary and secondary producer communities, organic energy transport, and macroinvertebrate communities at selected sites of the Green and Yampa rivers, Dinosaur National Monument, Moffat County. Data interpretation in terms of lotic continuum theory. Implications to river management for the benefit of endangered fishes.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, INVERTEBRATES--Benthos, MANAGEMENT, PRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

6

Anonymous. 1887. No title. Field and Farm. April 9:4.

An announcement of the planting of 35,000 young-of-the-year trout by the deputy state fish commissioner.

ARKANSAS RIVER DRAINAGE, FISHERY--Sport, POPULAR

7

Anonymous. 1888. The fish pond. Field and Farm. November 10:7.

A report by an angler in Durango on catching what he believes to be the first eel (Anguilla rostrata) in the area.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

8

Anonymous. 1889. Headgates. Monte Vista farmers do not take kindly to screening fish. Colo. Farmer and Livestock J. January 3.

Describes the negative reactions of San Luis Valley farmers to proposed legislation that would require screens on irrigation ditch gates to prevent fish loss to fields.

MANAGEMENT, POPULAR, RIO GRANDE RIVER DRAINAGE

9

Anonymous. 1889. The state fish hatchery. Field and Farm. December 1:4.

A discussion of the progress of the state hatchery. Brook trout (Salvelinus fontinalis) were considered a better sportfish and began to dominate the catch in the Platte River. Native trout (Salmo clarki) accounted for most of the catch in the Rio Grande.

CULTURE, FISHERY--Sport, PLATTE RIVER DRAINAGE, POPULAR, RIO GRANDE RIVER DRAINAGE

10

Anonymous. 1890. The fish pond. Field and Farm. January 1:7.

A Monte Vista farmer writes of his success rearing carp.

CULTURE, POPULAR, RIO GRANDE RIVER DRAINAGE

11

Anonymous. 1890. The fish pond. Field and Farm. January 25:7.

A discussion of the "excellent" trout fishery in the Rio Grande and its decline due to the lack of screens on irrigation ditches.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

12

Anonymous. 1890. The rod and line. Field and Farm. August 16:7.

A discussion of trout fishing in Sangre de Cristo Creek, Trinchera Creek, and Rio Grande River.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

13

Anonymous. 1890. The rod and line. Field and Farm. October 18:7.

A short article stating that 2,000 brook (Salvelinus fontinalis) and rainbow trout (Salmo gairdneri) were planted in San Francisco Creek.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

14

Anonymous. 1890. The rod and line. Field and Farm. December 16:5.

A discussion of carp (Cyprinus carpio) and tench (Tinca tinca) stocking in the lower Rio Grande.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

15

Anonymous. 1890. The rod and line. Field and Farm. December 17:7.

Notes the increased practice of stocking carp (Cyprinus carpio), tench (Tinca tinca), and bass in artesian wells for rearing. This topic is mentioned again in this column on 14 March 1891, p. 7; and 28 March 1891, p. 7.

CULTURE, POPULAR

16

Anonymous. 1890. No title. Field and Farm. March 8:6.

A discussion of trout fishing in the Arkansas River, particularly for yellowfin cutthroat trout (Salmo clarki macdonaldi).

ARKANSAS RIVER DRAINAGE, FISHERY--Sport, POPULAR

17

Anonymous. 1891. The rod and line. Field and Farm. October 17:7.

Describes the "good" trout fishing in the Rio Grande at Del Norte. Also noted in the column "Fur, Fin and Feather" July 1892, page 7.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

18

Anonymous. 1904. The sportsfolio. Field and Farm. August 20:8.

Description of record trout caught at Wagon Wheel Gap.

FISHERY--Sport, POPULAR, RIO GRANDE RIVER DRAINAGE

19

Archer, D. L., H. M. Tyus, L. R. Kaeding, C. W. McAda, and B. D. Burdick. 1984. Colorado River fishes monitoring project; Second annual report. U.S. Fish and Wildl. Serv. Salt Lake City. 32pp.

This paper describes study objectives for the endangered fishes of the Colorado River. The distribution and movement of Colorado squawfish (Ptychocheilus lucius) to and from spawning sites were studied through the use of radiotelemetry. Collections of larval and young-of-the-year (YOY) squawfish were made to evaluate spawning success and survival, and identify nursery areas. A study was also conducted in a section of the Green River in Utah to evaluate the effects of altered flows from the Flaming Gorge Dam on survival and rearing of YOY squawfish.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, MIGRATION, MOVEMENT, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Physical

20

Armantrout, N. B. 1978. Endangered fish of the Colorado. Our Public Lands 28(2):8-10.

A popular account of the factors that have led to the decline of the endemic fishes of the Colorado River system.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY, POPULAR

21

Babcock, W. H. 1967. The lake trout or mackinaw in Colorado. Colo. Dep. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet. No. 2. 2pp.

A general descriptive article concerning Salvelinus namaycush. Lakes with self-sustaining populations (as of 1967) are given.

AGE/GROWTH, DESCRIPTION, DISTRIBUTION, FISHERY--Sport, FOOD, HISTORICAL, MANAGEMENT, NATURAL HISTORY, POPULAR

22

Babcock, W. H. 1968. Cutthroat trout investigations. Colo. Dep. Game, Fish and Parks Fed. Aid Proj. F-18-R-7, Job 16, Job. Prog. Rep. 15pp.

The data presented in this report are from the first year of a 2-year study to determine the influence of a 10-inch minimum size limit on the harvest and population structure of the Trappers Lake cutthroat trout (Salmo clarki stomias) fishery.

AGE/GROWTH, COLORADO RIVER DRAINAGE, ENDANGERED, FISHERY--Sport, MIGRATION, STREAM FLOW

23

Babcock, W. H. 1971. Effect of a size limit regulation on the trout fishery in Trappers Lake, Colorado. Trans. Am. Fish. Soc. 100:50-54.

These study results indicate little effect of a size limit on the cutthroat trout (Salmo clarki stomias) population of Trappers Lake.

COLORADO RIVER DRAINAGE, ENDANGERED, FISHERY--Sport, MANAGEMENT

24

Babcock, W. H. 1982. Tenmile Creek--a study of stream relocation. Colo. Div. Wildl. Spec. Rep. 52. 22pp.

An analysis of a high-altitude stream in Summit County following the relocation of 3 stream miles during the construction of Interstate Highway 70. A pre- and postconstruction analysis of brook (Salvelinus fontinalis) and brown trout (Salmo trutta) populations, along with channel morphometry, is given.

ABUNDANCE, ALTERATION, FISHERY--Sport, HABITAT, INVERTEBRATES--Benthos, INVENTORY, PLATTE RIVER DRAINAGE, PRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

25

Baily, C., and R. Alberti. 1952. Trout stream studies. Lower Yampa River and tributaries study. Colo. Dep. Game and Fish Fed. Aid. Proj. F-3-R-1, Work Plan I, Jobs 1, 3, Job Compl. Rep. Pp. 154-159, 166-177.

A survey of the Yampa River (Moffat Co.). Includes description and/or analysis of habitat and water quality.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, INVENTORY, INVERTEBRATES--Benthos

26

Baily, C., and R. Alberti. 1952. Trout stream studies: Lower Yampa River and tributaries study. Fish population inventory. Colo. Dep. Game and Fish Fed. Aid Proj. F-3-R-1, WP I, Job 2, Job Compl. Rep. Pp. 160-165.

The purpose of this study was to inventory the distribution and abundance of fish in the Yampa River from Hayden to its confluence with the Green River. "Game" fish were not abundant. Colorado squawfish (Ptychocheilus lucius) noted as "common" between Hayden and Green River, Utah.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, INVENTORY, MANAGEMENT,

27

Baird, S. 1878. Distribution of fish by U.S. Fish Commission. U.S. Commission of Fish and Fisheries, Report of the Commissioner for 1875-1876. Part 4.

This annual report contains tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

CULTURE, DISTRIBUTION, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

28

Baird, S. 1883. Distribution of fish by U.S. Fish Commission. U.S. Commission of Fish and Fisheries, Report of the Commissioner for 1880. Part 8.

This annual report contains tables detailing distribution of fish to the states. Current topics and developments of U.S. fisheries are discussed in the text.

CULTURE, DISTRIBUTION, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

29

Banks, J. L. 1964. Fish species distribution in Dinosaur National Monument during 1961 and 1962. M.S. Thesis. Colo. State Univ., Ft. Collins. 96pp.

This study investigates the composition and distribution of the fish fauna in Dinosaur National Monument prior to the closing of the Flaming Gorge Dam, November 1962. The effects of water flow, turbidity, temperature, bottom type, food, and rotenone on species distribution were analyzed.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, FOOD, STREAM FLOW, WATER QUALITY--Chemical, Physical

30

Barnhart, R. A. 1957. Chemical factors affecting the survival of game fish in a western Colorado reservoir. M.S. Thesis. Colo. State Univ., Ft. Collins. 114pp.

A study of fish mortality in Sweitzer Lake. Investigates biological and chemical characteristics of the lake including levels of arsenic, selenium, uranium, zinc, and chemical and tissue analyses of plants, invertebrates, and fish. The possibility of toxicity through bioaccumulation is discussed.

ABUNDANCE, COLORADO RIVER DRAINAGE, FISHERY--Sport, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, MANAGEMENT, TOXICANTS, WATER QUALITY--Chemical, Physical

31

Barrows, P. T. 1956. Forest Lake marked fish studies. Colo. Dep. Game and Fish. 35pp.

A study of Forest Lake, Grand Mesa. The study consisted of five phases: creel census, food habits, age and growth of trout, a limnological survey, and a physical survey of the lake. A stocking program of 2-inch rainbow (Salmo gairdneri) and brook trout (Salvelinus fontinalis) was recommended.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, LIMNOLOGY, MANAGEMENT, WATER QUALITY--Chemical, Physical

32

Barrows, P. T. 1962. The relationship of creel-size and two-inch plants of trout in Big Eggleston and Island lakes, Grand Mesa, Colorado, 1953-1958. Colo. Dep. Game and Fish Tech. Bull. 13. 75pp.

A study to determine whether a 2-inch stocking program would adequately maintain a fishery in Big Eggleston and Island lakes, Grand Mesa. Creel census and marked fish returns were analyzed. Age/growth, food habits, and limnological characteristics of the lakes were also investigated.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY--Sport, FOOD, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, MANAGEMENT, WATER QUALITY--Chemical, Physical

33

Bassett, H. W. 1957. Further life history studies of two species of suckers in Shadow Mountain Reservoir, Grand County, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 112pp.

Aspects of the life history of longnose (Catostomus catostomus) and white suckers (C. commersoni).

AGE/GROWTH, COLORADO RIVER DRAINAGE, COMPETITION, DISTRIBUTION, ECOLOGY—Interactions, FOOD, LIMNOLOGY, REPRODUCTION

34

Bean, T. H. 1896. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries, Report of the Commissioner for 1894. Part 20.

This annual report contains tables detailing distribution of fish to the states. Current topics and developments of various U. S. fisheries are discussed in the text.

COLORADO RIVER DRAINAGE, CULTURE, DISTRIBUTION, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

35

Beckman, W. C. 1952. Guide to the fishes of Colorado. Colo. Dep. Game and Fish. 110pp.

A general guide to Colorado fishes with an emphasis on the species' contribution to sport fishing.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, FISHERY—Sport, HABITAT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

36

Behnke, R. J. 1968. Rare and endangered species: the native trouts of western North America. Proc. West. Assoc. State Game and Fish Comm. 48:530-533.

A discussion of the taxonomy of cutthroat trout subspecies (Salmo clarki subsp.) and the difficulties of distinguishing them.

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, ENDANGERED, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

37

Behnke, R. J. 1968. Stream studies. Indigenous trouts and the fishes of Colorado. Colo. Dep. Game, Fish and Parks, Fish. Res. Rev. 5:41.

A summary of the status of the Rio Grande trout (Salmo clarki virginalis).

ENDANGERED, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

38

Behnke, R. J. 1972. Rare and endangered trouts of the Southwest. Pp. 219-233 in Symposium on rare and endangered wildlife in the southwestern United States. N. Mex. Dep. Game and Fish, Santa Fe.

An overview of the status and distribution of native western trout species, including green-back cutthroat (Salmo clarki stomias) and Colorado River cutthroat (S. c. pleuriticus).

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, ENDANGERED, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

39

Behnke, R. J. 1972. The rationale of preserving genetic diversity: examples of the utilization of intraspecific races of salmonid fishes in fisheries management. Proc. West. Assoc. State Game and Fish Comm. 52:559-561.

This paper offers a scientific rationale for applying behavioral, physiological, and ecological attributes of native salmonids in fisheries management.

BEHAVIOR, ENDANGERED, FISHERY—Sport, GENETICS, MANAGEMENT

40

Behnke, R. J. 1973. Threatened and endangered fish report series. (Various titles) Colo. Coop. Fish. Res. Unit, Colo. State Univ. for U.S. Fish and Wildl. Serv. Albuquerque, N. Mex. (Unpubl.)

Bonytail (Gila elegans), 8pp; humpback chub (G. cypha), 5pp; Colorado squawfish (Ptychocheilus lucius), 9pp; razorback sucker (Xyrauchen texanus), 7pp; Colorado river cutthroat trout (Salmo clarki pleuriticus), 10pp.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, HISTORY

41

Behnke, R. J. 1976. Report on collections of cutthroat trout from Parachute Creek drainage, Garfield County, Colorado. U.S. Bur. Land Manage. Grand Junction, Colo. 7pp.

A report on the distribution and abundance of Salmo clarki in a Colorado River tributary.

ABUNDANCE, COLLECTION, COLORADO RIVER  
DRAINAGE, DISTRIBUTION, ENDANGERED

42

Behnke, R. J. 1979. Monograph of the native trouts of the genus Salmo of western North America. U.S. For. Serv., U.S. Fish and Wildl. Serv., U.S. Bur. Land Manage. 163pp.

The Rio Grande, Colorado, and greenback cutthroat trout, their past and present distributions, and preferred habitats are described. Native trout from other regions are treated similarly.

COLORADO RIVER DRAINAGE, DESCRIPTION,  
DISTRIBUTION, ENDANGERED, PLATTE RIVER  
DRAINAGE, RIO GRANDE RIVER DRAINAGE

43

Behnke, R. J. 1980. The impacts of habitat alterations on the endangered and threatened fishes of the upper Colorado River basin. Vol. 2, pp. 204-223 in W. O. Spofford Jr., A. L. Parker, and A. V. Kneese, eds. Energy development in the Southwest. Resources for the Future, Washington, D.C.

An overview of the rare native fishes of the upper Colorado River drainage, i.e. Colorado squawfish (Ptychocheilus lucius); humpback chub (Gila cypha); bonytail (G. elegans); razorback sucker (Xyrauchen texanus); and cutthroat trout subspecies (Salmo clarki).

ALTERATION, COLORADO RIVER DRAINAGE

44

Behnke, R. J. 1985. Empirical evidence and inference as a provisional basis for prediction and management of upper Colorado River basin fishes. P. 351 in Proc. 15th Annu. Symp. Desert Fishes Council 1983. (Abstr.)

A recommendation that a "water budget" be developed for the upper Colorado River drainage that takes the needs of the basin's endangered species into account. The use of the knowledge of convergent life history strategies evolved by large cyprinids in other river systems is considered.

COLORADO RIVER DRAINAGE, ENDANGERED,  
MANAGEMENT, STREAM FLOW

45

Behnke, R. J., and M. Zarn. 1976. Biology and management of threatened and endangered

Western trouts. U.S.D.A. For. Serv., Rocky Mt. For. and Range Exp. Sta. Gen. Tech. Rep. RM-28. Ft. Collins, Colo. 45pp.

A summary of knowledge on western trouts, including the Colorado River cutthroat (Salmo clarki pleuriticus) and the greenback cutthroat (S. c. stomias).

COLORADO RIVER DRAINAGE, DESCRIPTION,  
DISTRIBUTION, ENDANGERED, MANAGEMENT,  
PLATTE RIVER DRAINAGE

46

Behnke, R. J., and D. E. Benson. 1980. Endangered and threatened fishes of the upper Colorado River basin. Colo. State Univ. Coop. Ext. Serv. Bull. 503A. 34pp.

Basic information about the endangered and threatened fishes of the upper Colorado River basin, causes for their present status, and present and potential management practices to enhance their chances for survival. A map of past and present distribution for each species is included.

ABUNDANCE, COLORADO RIVER DRAINAGE,  
COMPETITION, DESCRIPTION, DISTRIBUTION,  
ENDANGERED, FISHERY--Sport, HABITAT,  
HYBRIDIZATION, MANAGEMENT, NATURAL HISTORY,  
REPRODUCTION, TAXONOMY/SYSTEMATICS

47

Behnke, R. J., and W. J. Wiltzius. 1982. The enigma of the yellowfin trout. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 17:8-15

A review of historic angling/fisheries literature on the yellowfin trout (Salmo clarki macdonaldi). The species is presumed to be extinct in the Twin Lakes area.

ARKANSAS RIVER DRAINAGE, HISTORY

48

Bennett, G. L. 1972. Fingerling returns in put-and-take lakes. M.S. Thesis. Colo. State Univ., Ft. Collins. 37pp.

A study of growth and catch of rainbow trout (Salmo gairdneri) fingerlings (2-inch) stocked in three high altitude Larimer County lakes.

AGE/GROWTH, FISHERY--Sport, PLATTE RIVER  
DRAINAGE

49

Berry, C. R., Jr. 1984. Hematology of four rare Colorado River fishes. Copeia 1984(3):790-793.

A study of hematological characteristics of bonytail (G. elegans), humpback chub (G. cypha), razorback sucker (Xyrauchen texanus), and Colorado squawfish (Ptychocheilus lucius) as a guide to fish health for culture considerations.

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, CULTURE, ENDANGERED, GENETICS

50

Binns, N. A., F. Eiserman, F. W. Jackson, A. F. Regenthal, and R. Stone. 1963. The planning, operation, and analysis of the Green River fish control project. Joint Rep. Utah State Dep. Fish and Game, Salt Lake City, and Wyo. Dep. Game and Fish, Cheyenne. 83pp.

A description of rotenone poisoning of Green River, parts of which are in Moffat County, Colorado, before filling Flaming Gorge Reservoir. A species list includes present-day endangered native species.

ALTERATION, COLLECTION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, INVENTORY, LIMNOLOGY, MANAGEMENT, TOXICANTS

51

Bishop, A. B., and D. B. Porcella. 1980. Physical and ecological aspects of the upper Colorado River basin. Vol. 1, pp. 17-56 in W. O. Spofford, Jr., A. L. Parker, and A. V. Kneese, eds. Energy development in the Southwest. Resources for the Future, Washington, D.C.

Thorough evaluation of past and anticipated alterations in the Colorado River system, with observations on effects of habitat changes upon native fishes.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, WATER QUALITY--Chemical, Physical

52

Black, T., and R. V. Bulkley. 1985. Preferred temperature of yearling Colorado squawfish. Southwest. Nat. 30(1):95-100.

Temperature preference of yearling squawfish (Ptychocheilus lucius) was determined in a horizontal gradient trough. Acute preferenda were 21.9, 27.6, and 23.7 C for 14, 20, and 26 C-acclimated fish, respectively. Final preferendum was estimated as 25 C.

BEHAVIOR, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ENDANGERED, HABITAT, WATER QUALITY--Physical

53

Bohanon, T., B. Boydston, T. Lytle, and E. Wagner. 1980. Colorado River cutthroat inventory. Colo. Div. Wildl. Fed. Aid SE-3-3, Work Plan 1, Job 5, Job Prog. Rep.

An inventory of pure Colorado cutthroat trout (Salmo clarki pleuriticus) in streams and lakes of western Colorado. A combination of meristic characters was used to determine the degree of purity. Several streams were rated for "purity" of the subspecies.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, HYBRIDIZATION, INVENTORY, STREAM FLOW, TAXONOMY/SYSTEMATICS

54

Boland, R. 1960. Comparisons of selected systems of partial creel censuses with the complete creel census from Parvin Lake. M.S. Thesis. Colo. State Univ., Ft. Collins. 132pp.

A survey of various aspects concerning sport fishing: fishermen, time, position, fishing pressure. Selected systems of partial creel census were compared with complete creel census from Parvin Lakes.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

55

Bourgeois. 1884. Conejos Creek, Colorado. Am. Angler 6(19):297.

Description of the abundance and size of trout in the Conejos River.

FISHERY--Sport, HISTORY, POPULAR, RIO GRANDE RIVER DRAINAGE

56

Bourgeois. 1884. Running away to go fishing in the Rockies. Am. Angler 6:193-195.

A description of the excellent trout fishing in the Gunnison, Taylor, and East rivers.

COLORADO RIVER DRAINAGE, FISHERY--Sport, HISTORICAL, POPULAR

57

Bourgeois. 1885. The so-called Colorado grayling. Am. Angler 8:408.

Major Foley sent a specimen of a "whitefish" or "grayling" to the National Museum where it

was identified as Coregonus williamsoni or Rocky Mountain whitefish. A flurry of letters followed the article concerning the confusion over names and distribution of mountain herring, grayling, whitefish, and squawfish.

COLORADO RIVER DRAINAGE, HISTORICAL, POPULAR, TAXONOMY/SYSTEMATICS

58

Bourgeois. 1886. The question of whitefish-- an outing on Colorado Waters. Am. Angler 10:308-309.

Description of the abundance and size of trout in western Colorado.

ABUNDANCE, COLORADO RIVER DRAINAGE, FISHERY--Sport, HISTORICAL, POPULAR

59

Boyd, J., and C. N. Feast. 1952. High Lake experimental improvement. Investigations of high lakes reportedly containing undesirable fish populations. Colo. Dep. Game and Fish Fed. Aid F-1-R-1, Work Plan IV, Job 1, Job Compl. Rep. Pp. 22-46.

The fishing history, fish population, and invertebrate fauna were investigated in nine high mountain lakes that showed little sport fishing value. Management recommendations are included in the report.

ABUNDANCE, COLORADO RIVER DRAINAGE, FISHERY--Sport, HABITAT, HISTORY, INVERTEBRATES--Plankton, MANAGEMENT, PLATTE RIVER DRAINAGE, WATER QUALITY--Physical

60

Branson, B. A. 1961. Observations on the distribution of nuptual tubercles in some catostomid fishes. Trans. Kans. Acad. Sci. 64:360-372.

A description of the nuptual tubercles on some members of the sucker family, including the razorback sucker (Xyrauchen texanus).

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, ENDANGERED

61

Branson, B. A. 1966. Some rare and vanishing fishes. Bioscience 16:611-613.

Contains photographs of Colorado squawfish (Ptychocheilus lucius) and flannelmouth suckers (Catostomus latipinnis).

COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED

62

Branson, B. A. 1973. Fishes of our arid lands. Natl. Parks Conserv. Mag. 47(11):22-24.

A semi-popular treatment of the decline of native fishes in the Southwest.

ALTERATION, COLORADO RIVER DRAINAGE, HABITAT, ENDANGERED, POPULAR

63

Branson, B. A. 1977. Changing bowls. Where are the 60-pound minnows? Environment 19(3):25-30.

A popular article describing the deleterious impacts that have resulted from the introduction of exotic fish species in various parts of the country. The article includes discussion of the situation with the Colorado squawfish, Ptychocheilus lucius.

COLORADO RIVER DRAINAGE, COMPETITION, ENDANGERED, HABITAT, POPULAR, PREDATION

64

Branson, B. A., and C. J. McCoy, Jr. 1966. Observations on breeding tubercles in Xyrauchen texanus (Abbott). Southwest. Nat. 11:301.

Descriptions of nuptual tubercles on a male razorback sucker from Dinosaur National Monument, Moffat County, Colorado.

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED

65

Bucklin, F. E., and G. N. Hunter. 1941. A stream census of the South and Middle Saint Vrain creeks 1940. Colo. Game and Fish Comm. 19pp.

The purpose of this study was to devise a management plan that would enhance the fishing potential, e.g., the development of a good stocking program for typical mountain streams of Colorado. The South and Middle Saint Vrain creeks are treated as one stream through the report.

DISEASE, DISTRIBUTION, FISHERY--Sport, FOOD, INVENTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

66

Bucklin, F. E., and O. E. Parsons. 1942. A stream census of the Cache la Poudre River 1941. Colo. Game and Fish Comm. 18pp.

The Colorado Game and Fish Department conducted an extensive stream census survey of

the Cache la Poudre River. The goals were to develop a good stocking program for typical mountain streams and to determine the type and number of species to be planted.

FOOD, INVENTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

67

Bulkley, R. V., and R. Pimentel. 1983. Temperature preference and avoidance by adult razorback suckers. *Trans. Am. Fish. Soc.* 112:601-607.

A study designed to determine temperature preference of adult Xyrauchen texanus.

BEHAVIOR, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT

68

Bulkley, R. V., C. R. Berry, R. Pimentel, and T. Black. 1982. Tolerance and preferences of Colorado River endangered fishes to selected habitat parameters. Pp. 185-241 in Colorado River Fishery Project. Part 3. Final Report. Contracted studies. U.S. Fish and Wildl. Serv. and Bur. Reclam., Salt Lake City. 324pp.

Laboratory evaluation of temperature preferences of adult Colorado squawfish (Ptychocheilus lucius), razorback suckers (Xyrauchen texanus), and humpback chubs (Gila cypha).

BEHAVIOR, COLORADO RIVER DRAINAGE, ENDANGERED, WATER QUALITY--Physical

69

Burdick, R. D., and L. R. Kaeding. 1984. Preliminary observations on reproductive ecology of the humpback chub and the roundtail chub in the upper Colorado River. *Proc. Colo.-Wyo. Chap. Am. Fish. Soc.* 19:142. (Abstr.)

An analysis of reproductive timing for the native endangered humpback chub (Gila cypha) and the sympatric G. robusta. The use of radiotelemetry and gonadosomatic indices is discussed.

COLORADO RIVER DRAINAGE, ENDANGERED, GENETICS, HABITAT, REPRODUCTION, TAXONOMY/SYSTEMATICS

70

Burkhard, W. T. 1964. Stream fishery studies. Stream survey crew. Colo. Dep. Game, Fish and Parks Fed. Aid F-26-R-1, Job 1, Job Compl. Rep. 54pp.

Information on fish populations and their environment was gathered at 11 survey stations on 4 streams and rivers.

COLORADO RIVER DRAINAGE, INVENTORY, INVERTEBRATES--Benthos, PLATTE RIVER DRAINAGE, STREAM FLOW, WATER QUALITY--Chemical, Physical

71

Burkhard, W. T. 1966. Stream fishery studies. State-wide stream surveys. Colo. Dep. Game, Fish and Parks Fed. Aid Proj. F-26-R-3, Job 1, Job Compl. Rep. 166pp.

Twenty-five rivers affected by pollution, channelization, or water development were surveyed to provide information to aid in habitat improvement and evaluation of water projects. Data presented includes water chemistry and flow, benthic invertebrate samples, habitat analyses, and electrofishing results.

ABUNDANCE, COLORADO RIVER DRAINAGE, FISHERY--Sport, HABITAT, INVENTORY, INVERTEBRATES--Benthos, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE, STREAM FLOW, WATER QUALITY--Chemical, Physical

72

Burkhard, W. T. 1977. Taylor River flow investigations. Colo. Div. Wildl. Fed. Aid F-51-R-4, Job 1. Job Interim Rep. 49pp.

A baseline description of specific biological and physical parameters in the Taylor River, Gunnison County, with observations on a brown trout (Salmo trutta) population.

ABUNDANCE, COLORADO RIVER DRAINAGE, HABITAT, INVENTORY, INVERTEBRATES--Benthos, STREAM FLOW, WATER QUALITY--Chemical, Physical

73

Burkhard, W. T., and T. A. Lytle. 1978. Final report for fish and wildlife resource analysis of the West Divide Project. Colo. Div. Wildl. 310pp.

The West Divide Project is a multipurpose water development in Garfield, Mesa, and Pitkin counties. This study was a baseline inventory of fish and wildlife in the proposed area. It also discusses the effects of water development in the West Divide Project and possible mitigation for such losses.

COLORADO RIVER DRAINAGE, HABITAT, HYBRIDIZATION, INVENTORY, INVERTEBRATES--Benthos, STANDING CROP, STREAM FLOW, WATER QUALITY--Chemical, Physical

74

Burkhard, W. T., T. A. Lytle, R. B. Nehring, and N. F. Smith. 1978. Literature review relating to fish and wildlife of the Grand Mesa Project. Colo. Div. Wildl. for U.S. Bur. Reclam. 88pp. + Appen.

The Grand Mesa Project is a potential multi-purpose water development in Delta and Gunnison counties. It would develop water of the Gunnison River and North Fork River tributaries. This literature review compiles the existing records of fish and wildlife within the Grand Mesa area. Information within the review includes species lists, stocking and harvest histories, winterkill problems, fisherman use trends, and stream flow data.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, FOOD, HABITAT, HISTORY, INVERTEBRATES—Benthos, Plankton, LIMNOLOGY, MANAGEMENT, STREAM FLOW

75

Byers, W. N. 1878. Grayling of Colorado. Forest and Stream 11:300.

Description of the abundance of "grayling" (most likely the whitefish, Prosopium williamsoni) in the Yampa drainage.

ABUNDANCE, COLORADO RIVER DRAINAGE, HISTORY, POPULAR

76

Callicotte, W. R. 1894. Biennial report of the State Fish Commissioner and Game Warden. Denver, Colo. 28pp.

This report describes the activities of the Fish Commissioner and progress made in culturing desirable species. It tabulates the distribution of fish, but only in terms of "trout", not by species. This report also outlines needs, recommendations, and difficulties in enforcing fish and game laws.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE,

77

Cancalosi, J. J. 1980. Fishes of the Republican River basin in Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 87pp.

This study consisted of three phases: to determine the fish species in the Republican River tributaries, to determine their distribution and abundance, and to statistically analyze habitat and species associations of more abundant species. Intended to provide information for future management decisions. Maps are included.

AGE/GROWTH, DISTRIBUTION, ECOLOGY—Interactions, Trophic relationships, INVENTORY, PLATTE RIVER DRAINAGE

78

Cancalosi, J. 1982. Fishes of the Republican River. Colo. Outdoors 31(3):20-21.

A popular treatment of a graduate research study of the fishes of a Platte River tributary. Includes an account of the stonecat (Noturus flavus).

DISTRIBUTION, NATURAL HISTORY, PLATTE RIVER DRAINAGE, POPULAR

79

Carl, L. M. 1979. Annual report of scientific collections, Permit No. 79-1. Colo. Div. Wildl.

A list of fish species collected under a state wildlife collection permit.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DISTRIBUTION, SAN JUAN RIVER DRAINAGE

80

Carlson, C. A., C. G. Prewitt, D. E. Snyder, E. J. Wick, E. L. Ames, W. D. Fronk. 1979. Fishes and macroinvertebrates of the White and Yampa rivers, Colorado. U.S. Bur. Land Manage. Biological Sci. Series No. 1. 276pp.

This survey preceded the onset of coal strip mining in northwestern Colorado. Distribution, abundance, and diversity of fish and macroinvertebrates; age/growth, condition, and food habits of common fishes; and habitat quality for fish and macroinvertebrate communities were investigated.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, FOOD, HABITAT, HISTORY, HYBRIDIZATION, INVENTORY, INVERTEBRATES—Benthos, STREAM FLOW, WATER QUALITY—Chemical, Physical

81

Chamberlain, T. K. 1946. Fishes, particularly the suckers, Catostomidae, of the Colorado River drainage and of the Arkansas drainage, in relation to the Gunnison-Arkansas transmountain diversion. U.S. Fish and Wildl. Serv. Ms., College Station, Texas. 8pp. (Unpubl.)

Discusses the impact upon salmonids of the introduction of suckers into reservoirs.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, COMPETITION, INVENTORY, MANAGEMENT

82

Clark, J. H. 1975. Management evaluation of stocked northern pike in Colorado's

small plains reservoirs. M.S. Thesis. Colo. State Univ., Ft. Collins. 66pp.

An evaluation of the management of stocking 50-mm fingerlings and 377-mm Esox lucius yearlings in several Colorado plains reservoirs. Evaluation criteria included: cost, survival, growth of stocked fish, and the impact on resident fish.

AGE/GROWTH, PLATTE RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

83  
Cockerell, T. D. A. 1908. Fishes of the Rocky Mountain region. Univ. Colo. Studies 5(3):159-178.

A review of the literature and studies of fish collected by Juday at the University of Colorado. Includes records of fossil fish and taxonomic keys to living fish of Montana, Wyoming, Colorado, and New Mexico.

ARCHAEOLOGY, ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

84  
Colborn, L. G. 1965. An ecological study of cutthroat trout (Salmo clarki) in Trappers Lake, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 68pp.

Investigates the limnological characteristics of Trappers Lake, and the size, age, and food habits of the cutthroat trout population.

AGE/GROWTH, COLORADO RIVER DRAINAGE, FOOD, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, WATER QUALITY--Chemical, Physical

85  
Colborn, L. G. 1966. The limnology and cutthroat trout fishery of Trappers Lake, Colorado. Colo. Dep. Game, Fish and Parks Spec. Rep. No. 9. 26pp.

A limnological study. Data collected during 1962 and 1963 include temperature, alkalinity, pH, CO<sub>2</sub>, O<sub>2</sub>, morphometry, aquatic vegetation, quantitative studies of plankton and benthos, and age and growth statistics of juvenile cutthroat trout (Salmo clarki subspp.).

AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, HABITAT, HYBRIDIZATION, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, WATER QUALITY--Chemical, Physical

86  
Colorado Division of Wildlife. 1973. Fish and wildlife analysis of the Interstate 70 highway corridor, Rifle to Plateau Creek. Colo. Div. Wildl. 124pp.

The purpose of this study was to evaluate the impacts of several alternative plans to enlarge Interstate 70 on existing wildlife and aquatic resources. Appendices include distribution, life history, and management recommendations for Colorado squawfish, (Ptychocheilus lucius), bonytail (Gila elegans), razorback sucker, (Xyrauchen texanus), and humpback chub (G. cypha).

ABUNDANCE, ALTERATION, ENDANGERED, COLORADO RIVER DRAINAGE, FISHERY--Sport, HABITAT, INVENTORY, POLLUTION, WATER QUALITY--Physical

87  
Colorado Division of Wildlife. 1974-75. Analysis of fish and wildlife resources: Dallas Creek Project area. Colo. Div. Wildl. 225pp.

This report documents baseline inventory data of fish and wildlife resources and their habitats in the Upper Uncompahgre River drainage. Diversity indices were calculated for aquatic macroinvertebrates. The potential impact of the Dallas Creek Project on aquatic resources is discussed.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, FISHERY--Sport, HABITAT, INVENTORY, INVERTEBRATES--Benthos, POLLUTION, STREAM FLOW, TOXICANTS, WATER QUALITY--Chemical, Physical

88  
Colorado Division of Wildlife. 1978. Essential habitat for threatened or endangered wildlife in Colorado. Wildl. Manage. Sec., Colo. Div. Wildl., Denver. 84pp.

An analysis of "essential habitat" (i.e., any geographic area that is essential for the maintenance or recovery of a threatened or endangered species) for particular wildlife species, including 11 fish species or subspecies.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

89  
Colorado Division of Wildlife. No date. Lake creel census and stocking records, 1952-1972. Colo. Div. Wildl., Grand Junction. (Unpubl.)

Records of creel census and stocking data.

CREEL CENSUS, COLORADO RIVER DRAINAGE,  
FISHERY—Sport, MANAGEMENT,  
PLATTE RIVER DRAINAGE

90

Colorado Division of Wildlife. No date. Lake  
creel census data, 1952-1971. San Juan  
and Rio Grande drainages. Colo. Div.  
Wildl., Montrose. (Unpubl.)

Records of creel census and stocking data.

CREEL CENSUS, COLORADO RIVER DRAINAGE,  
FISHERY—Sport, MANAGEMENT

91

Colorado Division of Wildlife. No date. Lake  
creel census, 1972-1973. San Juan and  
Rio Grande drainages. Colo. Div. Wildl.,  
Montrose. (Unpubl.)

Records of creel census and stocking data.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, RIO  
GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

92

Colorado Division of Wildlife. No date.  
Stream creel census and stocking records.  
Colo. Div. Wildl., Grand Junction. (Unpubl.)

Records of creel census and stocking data.

CREEL CENSUS, COLORADO RIVER DRAINAGE,  
FISHERY—Sport, MANAGEMENT

93

Colorado Division of Wildlife. No date.  
Stream creel census and stocking records,  
1952-1972. Colo. Div. Wildl., Grand  
Junction.

Unpublished records of creel census and  
stocking data by the Colorado Division of  
Wildlife.

CREEL CENSUS, COLORADO RIVER DRAINAGE,  
FISHERIES—Sport, MANAGEMENT

94

Colorado Division of Wildlife. No date.  
Stream creel census, A-Z, 1972-1973. San  
Juan and Rio Grande drainages. Colo. Div.  
Wildl., Grand Junction.

Unpublished records of creel census and  
stocking data by the Colorado Division of  
Wildlife.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, RIO  
GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

95

Colorado Division of Wildlife. No date.  
Stream creel census, 1952-1971. San Juan  
and Rio Grande drainages. Colo. Div.  
Wildl., Montrose. (Unpubl.)

Records of creel census and stocking data.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, RIO  
GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

96

Colorado Division of Wildlife. No date.  
Warden contact creel census 1943-1945.  
Colo. Dep. Game and Fish, Fort Collins.

A list of 219 trout lakes and streams surveyed  
for catch by warden contact in 1943-1945 and  
divided into east or west slope locations.  
Some of the information is found in the formal  
creel census records of these years.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER  
DRAINAGE, CREEL CENSUS, FISHERY—Sport,  
MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE  
RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

97

Colorado River Fishes Recovery Team. 1978.  
Colorado squawfish recovery plan. U.S.  
Fish and Wildl. Serv. 31pp.

This report describes the Colorado squawfish  
(*Ptychocheilus lucius*), its status, distribu-  
tion, and the presumed habitat changes that  
have resulted in its endangered status. Re-  
search and management objectives are given for  
its eventual recovery and delisting. Comments  
from agencies and individuals are appended.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO  
RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION,  
ENDANGERED, ECOLOGY--Interactions, FOOD,  
HISTORY, MOVEMENT, NATURAL HISTORY

98

Colorado River Fishes Recovery Team. 1979.  
Humpback Chub recovery plan. U.S. Fish and  
Wildl. Serv., 70pp.

This report describes the humpback chub (*Gila  
cypha*), its status, distribution, and the pre-  
sumed habitat changes that have resulted in its  
endangered status. Research and management ob-  
jectives are given for its eventual recovery and  
delisting. Comments from agencies and individ-  
uals are appended.

ABUNDANCE, AGE/GROWTH, ARCHAEOLOGY, ALTERATION,  
COLORADO RIVER DRAINAGE, DESCRIPTION,  
DISTRIBUTION, ECOLOGY--Interactions,  
ENDANGERED, FOOD, HISTORY, NATURAL HISTORY

99

Colorado River Wildlife Council. 1977.  
Endemic fishes of the Colorado River system.  
A status report. Prepared by the Endemic  
Species Comm., Colo. River Wildlife Council.  
16pp.

An overview of the status of the endemic  
species of the Colorado River drainage with  
general comments regarding their status and  
causes of their endangerment.

ALTERATION, COLORADO RIVER DRAINAGE,  
DISTRIBUTION, ENDANGERED, HABITAT

100

Cook, E. P. 1952. A survey of parasites of  
warm-water fish from four northeastern  
Colorado reservoirs. M.S. Thesis. Colo.  
Agriculture and Mechanical College,  
Ft. Collins. 117pp.

A survey of parasites in largemouth bass  
(Micropterus salmoides), black crappie (Pomoxis  
nigromaculatus), fathead minnow (Pimephales  
promelas), black bullhead (Ictalurus melas),  
longnose sucker (Catostomus catostomus), and  
carp (Cyprinus carpio).

DISEASE, PLATTE RIVER DRAINAGE

101

Cope, E. D. 1871. Recent reptiles and fishes.  
Report on the reptiles and fishes obtained  
by the naturalists of the expedition. U.S.  
Geol. Surv. of Wyoming and portions of con-  
tiguous territories. Second Annu. Rep. of  
Prog. Pp. 432-442.

Each fish species collected during the expe-  
dition is described, including a location of  
collection.

DESCRIPTION, HISTORY, INVENTORY,  
TAXONOMY/SYSTEMATICS

102

Cope, E. D. 1872. Report on the recent  
reptiles and fishes of the Hayden survey  
collected by Campbell Carrington and  
C. M. Dawes. U.S. Geol. Surv. of Montana  
and portions of adjacent territories. Fifth  
Annu. Rep. of Prog. Pp. 467-476.

Each fish species collected during the Hayden  
survey is described, including locations of  
collection.

COLORADO RIVER DRAINAGE, DESCRIPTION,  
HISTORY, INVENTORY, TAXONOMY/SYSTEMATICS

103

Cope, E. D., and H. C. Yarrow. 1875. Report  
upon the collections of fishes made in  
portions of Nevada, Utah, California,  
Colorado, New Mexico, and Arizona during the  
years 1871, 1872, 1873, and 1874. Report  
Geographic Geologic Exploration Survey W  
100th Meridian (Wheeler survey) 5(Zool.):  
635-703.

An early taxonomic description of fishes of the  
southwestern United States, including Colorado  
River cyprinids.

COLORADO RIVER DRAINAGE, HISTORY, INVENTORY,  
TAXONOMY/SYSTEMATICS

104

Cope, O. B. 1964. Revised bibliography on  
the cutthroat trout. U.S. Fish and Wildl.  
Serv., Bur. Sport Fish. and Wildl., Res.  
Rep. 65. 43pp.

A bibliography dealing with Salmo clarki bio-  
logy, culture, management, and distribution.  
Includes citations through mid-1963.

BIBLIOGRAPHY

105

Cope, O. B. (ed.). 1976. Colorado fisheries  
research review, 1972-1975. Colo. Div.  
Wildl. Review No. 8. 104pp.

A review of ongoing fishery research in the  
Colorado Division of Wildlife for the years  
1972-1975.

REVIEW ARTICLE

106

Cope, O. B. 1977. Index to fishery publica-  
tions of the Colorado Division of Wildlife,  
1941-1975. Colo. Div. Wildl. Div. Rep. 8.  
100pp.

A bibliography consisting of 1,105 references  
of Colorado Division of Wildlife published and  
unpublished reports for the years 1941-1975.

BIBLIOGRAPHY

107

Cope, O. B. (ed.). 1978. Colorado fisheries  
research review 1976-1977. Colo. Div. Wildl.  
Review No. 9. 64pp.

A review of fishery research in the Colorado Division of Wildlife for the years 1976-1977.

REVIEW ARTICLE

108

Davis, J. A., and C. A. Carlson. 1983. The brown trout fishery in Dillon Reservoir, Colorado, 1979-1980. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 18:36-47.

An evaluation of the Salmo trutta fishery in Lake Dillon and the Blue River, Summit County.

ABUNDANCE, AGE/GROWTH, FISHERY--Sport, PLATTE RIVER DRAINAGE

109

Deacon, J. E., G. Kobetich, J. D. Williams, and S. Contreras. 1979. Fishes of North America--Endangered, threatened, or of special concern: 1979. Fisheries 4(2):29-44.

A list of endangered, threatened, and special concern North American fishes, including Colorado subspecies of Salmo clarki, the humpback chub (Gila cypha), bonytail (G. elegans), Chihuahua chub (G. nigrescens), and razorback sucker (Xyrauchen texanus). Descriptions of threats and distribution by states are given. Color photographs.

COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

110

Dieffenbach, W. H. 1965. Taxonomy and selected life history of the cutthroat trout (Salmo clarki Richardson) of the South Platte drainage, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 49pp.

Distribution and taxonomy of the cutthroat trout in the South Platte drainage. Limiting factors of extant distribution are discussed.

AGE/GROWTH, DESCRIPTION, DISTRIBUTION, HISTORY, PLATTE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

111

Drummond, R. A. 1965. Reproduction and harvest of cutthroat trout at Trappers Lake, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 68pp.

Trappers Lake supports a naturally reproducing pure population of cutthroat trout (Salmo clarki). This study describes the spawning population of cutthroat trout, identifies environmental factors critical to spawning

success and recruitment in Cabin Creek and Trappers Lake, and measures the annual harvest at Trappers Lake. Also printed under same title by the Colorado Division of Wildlife, Special Report No. 10.

ABUNDANCE, COLORADO RIVER DRAINAGE, FISHERY--Sport, MANAGEMENT, MIGRATION, PRODUCTION, RECRUITMENT, REPRODUCTION, STREAM FLOW

112

Drummond, R. A., and L. G. Colborn. 1962. Cutthroat trout investigations at Trappers Lake. Colo. Dep. Game, Fish and Parks Fed. Aid Proj. F-18-R-3. Job Prog. Rep. 71pp.

The objectives of this study were to enumerate upstream trout spawners, estimate annual recruitment of fry to Trappers Lake, measure harvest of trout (Salmo clarki) by fishermen, determine the population structure of trout in Trappers Lake, and describe the limnological characteristics of the lake.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, MIGRATION, PRODUCTION, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

113

Drummond, R. A., and L. G. Colborn. 1965. Cutthroat trout investigations at Trappers Lake. Colo. Game, Fish and Parks, Fed. Aid Proj. F-18-R-4, Job Compl. Rep. 64pp.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, MIGRATION, PRODUCTION, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

114

Drummond, R. A., and T. D. McKinney. 1965. Predicting the recruitment of cutthroat trout fry in Trappers Lake, Colorado. Trans. Am. Fish. Soc. 94:389-393.

Discusses estimations of fry recruitment and year-class abundance of Salmo clarki in Trappers Lake.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, MIGRATION, PRODUCTION, RECRUITMENT, REPRODUCTION, STREAM FLOW

115

Earnest, R. D. 1971. The effect of paraquat on fish in a Colorado farm pond. Prog. Fish-Cult. 33(1):27-31.

A report on the toxicity of the pesticide 1,1-dimethyl-4,4-dipridylium dimethyl sulfate on green sunfish (Lepomis cyanellus), rainbow trout (Salmo gairdneri), bluegills (L. macrochirus) and channel catfish (Ictalurus punctatus) in a Jefferson County pond.

#### TOXICANTS

116

Eastman, J. T. 1977. The pharyngeal bones and teeth of catostomid fishes. *Am. Midl. Nat.* 97(1):68-88.

An anatomical evaluation of 22 species of catostomid fishes, including Colorado collected razorback suckers (Xyrauchen texanus). An analytical key based on pharyngeal bone and teeth characteristics is provided.

#### ANATOMY/MORPHOLOGY, ENDANGERED

117

Ecology Consultants, Inc. 1977. An indexed, annotated bibliography of the endangered and threatened fishes of the Upper Colorado River system. U.S. Fish and Wildl. Serv., Office of Biol. Serv. FWS/OBS 77/61. 169pp.

An extensive annotated bibliography indexed by subject, drainage, and species. 382 entries.

#### BIBLIOGRAPHY, COLORADO RIVER DRAINAGE, ENDANGERED

118

Ecology Consultants, Inc. 1977. Annotated bibliography of natural resource information: northwestern Colorado. U.S. Fish and Wildl. Serv., Office of Biol. Serv. FWS/OBS 77/35. 185pp.

An annotated bibliography containing 688 abstracts of published and unpublished natural resource citations for northwestern Colorado, including fishes.

#### BIBLIOGRAPHY, COLORADO RIVER DRAINAGE

119

Ecology Consultants, Inc. 1978. Capture locations of rare fish in the Upper Colorado River system. U.S. Fish and Wildl. Serv., Office of Biol. Serv. FWS/OBS 78/32. 44pp.

This report is a compilation of information regarding the distribution of 6 rare Upper Colorado River fishes, i.e., Salmo clarki pleuriticus, Rhinichthys osculus thermalis, Ptychocheilus lucius, Xyrauchen texanus, Gila elegans, and G. cypha.

#### COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HISTORY, SAN JUAN RIVER DRAINAGE

120

Elder, S., and C. A. Carlson. 1977. Food habits of carp and white suckers in the South Platte and St. Vrain Rivers and Goosequill Pond, Weld County, Colorado. *Trans. Am. Fish. Soc.* 106(4):339-346.

The food habits of Cyprinus and Catostomus commersoni were studied to determine their impact on game fish populations in conjunction with an ecological impact analysis of the Fort St. Vrain Nuclear Generating Station.

#### FOOD, MANAGEMENT, PLATTE RIVER DRAINAGE, POLLUTION, PREDATION, STREAM FLOW, WATER QUALITY—Chemical, Physical

121

Elliot, R. 1977. Statewide conservation officers creel census on lakes and streams. N. Mex. Dep. Game and Fish Fed. Aid Proj. F-22-R-18, Job K-1, Job Perform. Rep.

Reports trends in fisherman catch with recommendations to increase data collection in areas of increased use. Calculates catch-per-man-hour for each species.

#### CREEL CENSUS, FISHERY—Sport, MANAGEMENT, SAN JUAN RIVER DRAINAGE

122

Ellis, M. M. 1914. *Fishes of Colorado*. University of Colorado Studies. Vol. 11. No. 1. Univ. of Colo., Boulder. 136pp.

This review of Colorado fish fauna was based primarily on collections made in 1912-1913. However, specimens from other collections were also used. Keys to species, history of taxonomic synonyms for each species, and extensive descriptions are presented. Distribution of species in terms of major river systems and altitude is also discussed.

#### ABUNDANCE, ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

123

Erickson, J. G. 1975. Annual report of scientific collections, Permit No. 75-90. Colo. Div. Wildl., Denver.

A list of fish species collected under a state wildlife collection permit.

#### DISTRIBUTION

124

Erickson, J. G. 1976. Annual report of scientific collections, Permit No. 76-102. Colo. Div. Wildl., Denver.

A list of fish species collected under a state wildlife collection permit.

DISTRIBUTION, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

125

Everhart, W. H., and W. R. Seaman. 1971. Fishes of Colorado. Colo. Div. Game, Fish and Parks. 75pp.

A general guide to Colorado fishes with an emphasis on the species' contribution to sport fishing.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, PLATTE RIVER DRAINAGE

126

Evermann, B. W. 1892. Description of a new sucker, Pantosteus jordani, from the Upper Missouri basin. U.S. Fish Comm. Bull. 12:51-56.

The newly described fish is synonymous with Catostomus platyrhynchus. It was not captured in Colorado, but the author compared the fish to other suckers from Colorado.

DISTRIBUTION, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

127

Evermann, B. W., and W. C. Kendall. 1892. The fishes of Texas and the Rio Grande basin, considered chiefly with reference to their geographic distribution. U.S. Fish. Comm. Bull. 12:57-126.

The authors have compiled all previous collections including their most recent studies in Texas, to enumerate and describe the fishes of Texas and the Rio Grande basin. Plates of both fresh- and salt-water fish are included.

COLORADO RIVER DRAINAGE, DISTRIBUTION, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

128

Evermann, B. W., and C. Rutter. 1895. The fishes of the Colorado basin. U.S. Fish. Comm. Bull. (1894)14:473-486.

A compilation of previous publications including surveys by Cope, Girard, and Jordan.

Includes an annotated bibliography of 17 publications.

ARKANSAS RIVER DRAINAGE, BIBLIOGRAPHY, COLORADO RIVER DRAINAGE, DISTRIBUTION

129

Feast, C. N., Jr. 1938. A preliminary study of the proposed whitefish transplanting in western Colorado waters. U.S. For. Serv. Denver. 15pp. (Unpubl.)

An evaluation of proposed transplants of Prosopium williamsoni from the White River (Rio Blanco County) to the upper Colorado and Eagle rivers (Eagle County).

COLORADO RIVER DRAINAGE, FISHERIES--Sport, MANAGEMENT

130

Feast, C. N., Jr. 1954. Project report: Grand Lake, Shadow Mountain Reservoir and Granby Reservoir fish management investigations. 1953. Colo. Dep. Game and Fish. 23pp.

This study includes an analysis of lures used by fishermen, locations of fishermen, fish stomach contents, and tagged fish returns. Water temperatures, zooplankton numbers, and secchi disk readings were monitored.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, INVERTEBRATES--Plankton, LIMNOLOGY, MANAGEMENT, MOVEMENT, WATER QUALITY--Physical

131

Finnell, L. M. 1977. Fryingpan-Arkansas fish research investigations. Colo. Div. Wildl., Ft. Collins. Final Report. 96pp.

Investigates the effects of construction and operation of the Fryingpan-Arkansas Project on the stream fishery. A 4-year study was undertaken prior to construction to provide a base for comparison.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, FISHERY--Sport, INVERTEBRATES--Benthos, LIMNOLOGY, RECRUITMENT, STREAM FLOW, WATER QUALITY--Chemical, Physical

132

Finnell, L. M. 1979. Annual report of scientific collections, permit no. 79-67. Colo. Div. Wildl., Denver.

A list of fish species collected under a state wildlife collection permit.

DISTRIBUTION, PLATTE RIVER DRAINAGE,  
SAN JUAN RIVER DRAINAGE

133

Finnell, L. M. 1984. Northern pike studies.  
Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:11.  
(Abstr.)

A presentation of methodology and preliminary  
results of studies of Esox lucius in Eleven-  
mile Reservoir, Park County.

FISHERY--Sport, MANAGEMENT, PLATTE RIVER  
DRAINAGE

134

Finnell, L. M., and E. B. Reed. 1969. The  
diel vertical movements of kokanee salmon,  
Oncorhynchus nerka, in Granby Reservoir,  
Colorado. Trans. Am. Fish. Soc. 98:245-252.

The salmon concentrated above 9 m during the  
day, and from 9 to 18 m at night. Diel migra-  
tions were not observed for zooplankton, the  
major food of salmon. The authors suggest that  
the fish move to deeper water to rest and  
assimilate food.

COLORADO RIVER DRAINAGE, FOOD HABITS,  
INVERTEBRATES--Plankton, LIMNOLOGY, MOVEMENT,  
WATER QUALITY--Physical

135

Finnell, L. M., and G. L. Bennett. 1973.  
Fryingpan-Arkansas fish research investiga-  
tions. Colo. Div. Wildl., Ft. Collins. U.S.  
Bur. Reclamation Proj. Rep. No. 2. 60pp.

Survey of Fryingpan River from Ruedi Reservoir  
to its confluence with the Roaring Fork. A  
"pure" strain of Colorado River cutthroat  
(Salmo clarki pleuriticus) was identified from  
North Cunningham Creek.

COLORADO RIVER DRAINAGE, LIMNOLOGY,  
TAXONOMY/SYSTEMATICS

136

Flickinger, S. A. 1969. Determination of  
sexes in the fathead minnow. Trans. Am.  
Fish. Soc. 98(3):526-527.

A description, with photographs, of a rapid  
and accurate method of sex determination for  
Pimephales promelas.

ANATOMY/MORPHOLOGY, DESCRIPTION

137

Gagnon, J. G. 1974. Greenback cutthroat  
trout--museum pieces won't do. Natl. Parks  
Conserv. Mag. 48(10):21-23.

A semi-popular article describing the decline  
of Salmo clarki stomias in Colorado and  
recovery efforts in its behalf.

ENDANGERED, PLATTE RIVER DRAINAGE, POPULAR

138

Gagnon, J. G. 1974. The greenback trout.  
Colo. Outdoors 23(2):38-42.

A popular article describing recovery efforts  
for the endangered Salmo clarki stomias.

COMPETITION, DESCRIPTION, ENDANGERED,  
FISHERY--Sport, HISTORY, PLATTE RIVER  
DRAINAGE, POPULAR

139

Girard, C. 1856. Researches upon the cyprinid  
fishes inhabiting the fresh water of the  
United States of America, west of the  
Mississippi Valley, from specimens in the  
museum of the Smithsonian Institution. Proc.  
Acad. Nat. Sci. Philadelphia 8:165-213.

A description and classification of fishes  
collected during various surveys of the 1850's.

COLLECTION, HISTORY

140

Goebel, P. 1983. Guide to metro fishing,  
1983-1984. Colo. Div. Wildl. n.p.

This guide states Colorado fishing regulations,  
gives a brief description of fish in the Denver  
metro lakes, how to catch and prepare them, and  
a list of fish species found in 68 metro lakes.

FISHERY--Sport, INVENTORY, PLATTE RIVER  
DRAINAGE, URBAN

141

Goettl, J. P., Jr. 1966. The vertical  
distribution, food and feeding habits of  
yellow perch in Horsetooth Reservoir,  
Colorado. M.S. Thesis. Colo. State Univ.,  
Ft. Collins. 41pp.

A study of depth distribution of Perca  
flavescens in a large eastern slope foothills  
reservoir (Larimer County). Laboratory feed-  
ing observations supplemented field data.

BEHAVIOR, FISHERY--Sport, FOOD, PLATTE RIVER  
DRAINAGE

142

Goettl, J. P., Jr. 1982. Evaluation of sport fisheries potential in fluctuating plains streams. Colo. Div. Wildl. Fed. Aid Proj. F-77-R-1. Final Rep. 181pp.

Fish species distribution in the foothills and plains sections of the Cache la Poudre, South Platte, and Arkansas Rivers was analyzed to determine sport fishing potential in correlation with water quality and water flow. The most appropriate and desirable sport fish species were determined from the accumulated data.

ARKANSAS RIVER DRAINAGE, DISTRIBUTION, FISHERY--Sport, HABITAT, INVENTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, STREAM FLOW, URBAN, WATER QUALITY--Chemical, Physical

143

Goettl, J. P., J. R. Sinley, and P. H. Davies. 1971. Water pollution studies; study of the effects of mineral mining and milling operations on high mountain streams. Colo. Div. Game, Fish and Parks Fed. Aid Proj. F-33-R-6, Job 1. Pp. 1-48.

Effects of hard rock mining and milling was evaluated on water quality, fishes, and macro-invertebrates. Streams studied included Willow Creek, Rio Grande River, Animas River, Gunnison River, Ten Mile Creek, and North Fork Ten Mile Creek.

COLORADO RIVER DRAINAGE, DISTRIBUTION, INVENTORY, INVERTEBRATES--Benthos, PLATTE RIVER DRAINAGE, POLLUTION, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

144

Gold, J. R., W. J. Karel, and M. R. Strand. 1980. Chromosome formulae of North American fishes. Prog. Fish-Cult. 42(1):10-23.

Chromosome formulae (diploid chromosome and chromosome arm number) are listed for 309 North American fish species.

GENETICS

145

Graves, E., and B. Haines. 1968. Fishery surveys of the Navajo Reservoir and tail-water. N. Mex. Dep. Game and Fish Job. Compl. Rep. Proj. No. Sec. 8, Job No. A-S(a).

An extensive limnological study and fishery survey. The pH, temperature, alkalinity, oxygen, carbon dioxide, and turbidity of the

reservoir were analyzed. Fishes and fishery data were collected by rotenone, gillnets, and creel census. The results of these methods were averaged and then game fish weight-length and catch-per-hour were calculated.

ABUNDANCE, COLORADO RIVER DRAINAGE, LIMNOLOGY, MANAGEMENT, SAN JUAN RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

146

Gregory, R. W. 1968. Notes on the life history of the striped bass (Roccus saxatilis). Colo. Dep. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet No. 10. 1p.

A general descriptive article relating to the striped bass, Morone saxatilis (as Roccus). A note that Colorado was to receive its first stock of striped bass in the spring of 1968 is made.

AGE/GROWTH, DESCRIPTION, DISTRIBUTION, FISHERY--Sport, HABITAT, POPULAR

147

Gregory, R. W. 1968. A simple technique for distinguishing between silver and kokanee salmon. Colo. Dep. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet No. 8. 1p.

A general descriptive article providing distinguishing gill raker characteristics for Oncorhynchus nerka and O. kisutch

ANATOMY/MORPHOLOGY, DESCRIPTION

148

Gregory, R. W., and W. C. Nelson (eds.). 1966. Fisheries research in Colorado. Fish. Res. Rev. No. 3. Colo. Dep. Game, Fish and Parks. 30pp.

A review of ongoing fishery research in the Colorado Department of Game, Fish and Parks.

REVIEW ARTICLE

149

Gregory, R. W., and R. L. Hoover (eds.). 1967. Colorado fisheries research review, 1967. Fish. Res. Rev. No. 4. Colo. Dep. Game, Fish, and Parks. 40pp.

A review of ongoing fishery research in the Colorado Department of Game, Fish, and Parks

REVIEW ARTICLE

150

Griess, L. J. 1975. Annual report of scientific collections, Permit No. 75-46. Colo. Div. Wildl., Denver.

A list of fish species collected under a state wildlife collection permit.

DISTRIBUTION, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

151

Griest, J. R. 1976. The lake trout of Twin Lakes, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 68pp.

The purpose of this research was to gather baseline data for future comparison on the biology of the lake trout (e.g. growth, survival, and population dynamics) before the completion of a 200-megawatt power plant under construction on the lake.

AGE/GROWTH, ARKANSAS RIVER DRAINAGE, FOOD, RECRUITMENT, REPRODUCTION, WATER QUALITY—Chemical, Physical

152

Hagen, H. K., and J. E. Banks. 1963. An ecological and limnological study of the Green River in Dinosaur National Monument. Colo. State Univ., Ft. Collins. 31pp.

Descriptions of fishes and macroinvertebrates in the Green River collected during summers of 1961 and 1962.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, INVERTEBRATES—Benthos

153

Hamman, R. L. 1981. Hybridization of three species of chub in a hatchery. Prog. Fish-Cult. 43(3):140-141.

A description of cultural conditions and the results of attempts to produce bonytail x roundtail chub (*Gila elegans* x *G. robusta*) and bonytail x humpback chub (*G. elegans* x *G. cypha*) hybrids at Willow Beach National Fish Hatchery, Arizona. Humpback chub and roundtail chub brood stock were collected from the Colorado River, Mesa County, Colorado.

COLORADO RIVER DRAINAGE, CULTURE, EARLY LIFE HISTORY, ENDANGERED, GENETICS, HYBRIDIZATION, REPRODUCTION

154

Hamman, R. L. 1981. Spawning and culture of Colorado squawfish in raceways. Prog. Fish-Cult. 43(4):173-177.

This report details cultural conditions for the spawning of Colorado squawfish at Willow Beach National Fish Hatchery, Arizona.

COLORADO RIVER DRAINAGE, CULTURE, EARLY LIFE HISTORY, ENDANGERED, REPRODUCTION

155

Hamman, R. L. 1982. Induced spawning and culture of bonytail chub. Prog. Fish-Cult. 44(4):201-203.

A description of spawning and culture of endangered *Gila elegans* at Willow Beach National Fish Hatchery, Arizona.

COLORADO RIVER DRAINAGE, CULTURE, EARLY LIFE HISTORY, ENDANGERED, REPRODUCTION

156

Hamman, R. L. 1982. Spawning and culture of humpback chub. Prog. Fish-Cult. 44(4): 213-216.

A description of spawning and culture of endangered *Gila cypha* at Willow Beach National Fish Hatchery, Arizona. A population of the brood stock was collected from the Colorado River, Mesa County, Colorado.

COLORADO RIVER DRAINAGE, CULTURE, EARLY LIFE HISTORY, ENDANGERED, REPRODUCTION

157

Hayes, M. L. 1956. Life history studies of two species of suckers in Shadow Mountain Reservoir, Grand County, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 126pp.

This study investigates the relationship of the sucker population to the trout population of Shadow Mountain Reservoir. Characteristics of the reservoir are described, and the behavioral characteristics, age/growth, food and feeding habits, and migration and movement patterns of the suckers are studied. States recommendations for the control of the sucker population as part of a trout management program.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, ECOLOGY—Interactions, FISHERY—Commercial, Sport, FOOD, HABITAT, LIMNOLOGY, MANAGEMENT, MIGRATION, MOVEMENT, NATURAL HISTORY, WATER QUALITY—Physical

158

Haynes, C. M. 1980. Endangered humpback chub range extension documented. U.S. Fish. Wildl. Serv., Endangered Species Tech. Bull. 5(10):3.

The capture of a single humpback chub (*Gila cypha*) in Cross Mountain Canyon (Aug 1982) is described. This was the first report of this rare endangered species in the Yampa River since 1962 and the most upstream capture record. The capture of a Colorado squawfish (*Ptychocheilus lucius*) is also reported.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED

159

Haynes, C. M. 1980. Saving Colorado's big-river fish. *Colo. Outdoors* 29(1):26-29.

A popular summarization of the past distribution and present status of the Colorado squawfish, humpback chub, bonytail chub, and razorback sucker.

ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, FISHERY—Sport, MIGRATION, POPULAR

160

Haynes, C. M. 1985. "The Humpback Chub: What good is it?"...revisited. Further reflections on nongame wildlife. *Colo. Outdoors* 34(4):1-4.

General treatment of endangered species values.

ENDANGERED, POPULAR

161

Haynes, C. M., and R. T. Muth. 1985. Lordosis in *Gila*, Yampa River, Colorado. Pp. 83-84 in *Proc. 13th Annu. Symp. Desert Fishes Council* 1981.

Some (10-16.5%) of young-of-year *Gila robusta* collected from Yampa River in 1980 and 1981 exhibited dorsoventral spinal curvature (lordosis). Speculations about causative factors are discussed.

COLORADO RIVER DRAINAGE, DISEASE, EARLY LIFE HISTORY, GENETICS, POLLUTION, TOXICANTS, WATER QUALITY—Chemical

162

Haynes, C., and R. Muth. 1982. Identification of habitat requirements and limiting factors for Colorado squawfish and humpback chubs. *Colo. Div. Wildl., Endangered Wildlife Investigations*, SE-3-4, Work Plan 1, Job 1. *Wildl. Res. Rep.*, Jan.:1-43.

Fish were collected in the lower Yampa Canyon of the Yampa River and near the Colorado-Utah

border on the Colorado River in 1981 and 1982. More introduced species than native species were collected, and redbreast shiners and fathead minnows were the predominate species in the samples. Colorado squawfish young-of-the-year were collected at both sites.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISEASE, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, HABITAT, INVENTORY, TAXONOMY/SYSTEMATICS

163

Haynes, C. M., and R. T. Muth. 1985. Reproduction of Colorado squawfish, *Ptychocheilus lucius*, in the Yampa River, Colorado (1980-83). P. 297 in *Proc. 15th Annu. Symp. Desert Fishes Council* 1983. (Abstr.)

Results and interpretation of research in the lower Yampa River are presented. Age-0 catch, habitat associations, seine and drift-net sampling and spawning date estimates are given for Colorado squawfish.

ABUNDANCE, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ENDANGERED, HABITAT, PRODUCTION, RECRUITMENT, REPRODUCTION

164

Haynes, C. M., and R. T. Muth. 1984. Identification of habitat requirements and limiting factors for Colorado squawfish and humpback chubs. *Colo. Div. Wildl., Fed. Aid Proj. N-2-R-2 (SE-3)*, Work Plan 2, Job 1, Job Prog. Rep. *Wildl. Res. Rep.* Jan.:181-202.

Describes the results of field studies conducted in the Colorado and Yampa Rivers during 1983. It further summarizes trends for age-0 Colorado squawfish (*Ptychocheilus lucius*) for the years 1979-83 in the Colorado River and 1980-83 in the Yampa River. Estimates of spawning dates and relative abundance as related to flow/temperature regimes are offered. Observations on exotic species spawning success are given.

ABUNDANCE, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ENDANGERED, HABITAT, MOVEMENT, PRODUCTION, REPRODUCTION, STREAM FLOW

165

Haynes, C. M., and J. R. Bennett. 1985. The relationship between the preservation of wilderness values and endangered species: Case study from the upper Colorado River basin, U.S.A. Paper presented at the Natl. Wilderness Res. Conf., 23-26 July, 1985, *Colo. State Univ., Ft. Collins.* (In press).

A discussion of the value of unaltered natural riverine habitat to the preservation of the endangered Colorado squawfish (Ptychocheilus lucius) with implications to the value of wilderness to endangered species generally.

ALTERATION, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ECOLOGY—Interactions, ENDANGERED, HABITAT, HISTORY, MIGRATION, STREAM FLOW

166

Haynes, C., D. Langlois, and T. Lytle. 1981. Endangered Wildlife Investigations. Colorado Squawfish propagation study. Endangered Wildl. Invest. Colo. Div. Wildl. Fed. Aid Proj. SE-3-3, Work Plan 1, Job 4, Final Rep. Wildl. Res. Rep. Jan.:1-11.

An engineering plan for a proposed Ptychocheilus lucius hatchery to be built at Rifle Falls State Fish Hatchery near Rifle (Garfield Co.).

CULTURE, ENDANGERED, MANAGEMENT

167

Haynes, C. M., R. T. Muth, and L. C. Wycoff. 1982. Range extension for the redbase shiner, Richardsonius balteatus (Richardson), in the upper Colorado River drainage. Southwest. Nat. 27:223.

A short note documenting the collection of 11 redbase shiners from the Colorado River near the Colorado-Utah border (Mesa County) in 1981.

COLORADO RIVER DRAINAGE, DISTRIBUTION, EARLY LIFE HISTORY

168

Haynes, C. M., T. A. Lytle, E. J. Wick, and R. T. Muth. 1984. Larval Colorado squawfish (Ptychocheilus lucius Girard) in the upper Colorado River basin, Colorado, 1979-1981. Southwest. Nat. 29:21-33.

A survey of the Colorado River drainage in Colorado was made during the summer-fall of 1979-1981 to determine the distribution of larval Colorado squawfish, and to relate their occurrence to the hydrological regime. The greatest abundance of adults and larvae were found in the lower Colorado and Yampa Rivers. Observations indicate that stream flow and temperature affect the reproductive success of Colorado squawfish, but other factors may also be limiting recruitment.

ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, HABITAT, REPRODUCTION, STREAM FLOW

169

Hazzard, L. K., and R. McDonald. 1981. The Snake River cutthroat trout. A new trout for Colorado. Colo. Outdoors 30(4):1-3.

A popular article describing the Snake River subspecies of Salmo clarki and its potential value as a Colorado sport fish.

FISHERY—Sport, POPULAR

170

Hekkers, J. 1980. Colorado's biggest fish. Colo. Outdoors 29(3):12-15.

A popular compilation of Colorado record game fishes.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, FISHERY—Sport, PLATTE RIVER DRAINAGE, POPULAR, SAN JUAN RIVER DRAINAGE

171

Hepworth, D. K. 1973. The results of stocking channel catfish in the South Platte River—an urban fishing program. M.S. Thesis. Colo. State Univ., Ft. Collins. 62pp.

Ictalurus punctatus were stocked in the South Platte River section running through Denver to increase the variety of fishing opportunities in an urban area. A follow-up study was conducted to determine the success of stocking in terms of recreational activity and in terms of fishing pressure on the catfish.

AGE/GROWTH, FISHERY—Sport, FOOD, MOVEMENT, PLATTE RIVER DRAINAGE, TOXICANTS, WATER QUALITY—Chemical, Physical

172

Hess, R. H., and W. D. Klein. 1946. 1946 creel census report. Colo. Dep. Game and Fish, Fish. Manage. Div. 19pp.

A summarization of warden checks of fish catch covering the years 1942-1946. The waters listed are the most heavily used and frequently checked. Statistics calculated include: catch-per-man-hour (CPMH), percentage of nonresident fishermen, and comparison of CPMH between warm- and cold-water fishes.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY—Sport, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, URBAN

173

Hickman, T. J., and T. Lytle. 1979. Colorado River cutthroat trout inventory. Colo. Div. Wildl., Fed. Aid SE-3-2, Work Plan 1, Job 5. Job Prog. Rep. 22pp.

Nine streams were examined for populations of Salmo clarki pleuriticus. Using a combination of meristic characters to determine degree of purity, the streams were rated for purity of the subspecies. Management recommendations were made based on the ratings.

ABUNDANCE, ALTERATION, ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DISTRIBUTION, HABITAT, HYBRIDIZATION, INVENTORY, MANAGEMENT, STREAM FLOW, TAXONOMY/SYSTEMATICS

174

Hill, R. R. 1964. Stream fishery studies. White River survey. Colo. Dep. Game, Fish and Parks Fed. Aid F-26-R-1, Job 2. Job Prog. Rep. 72pp.

Results of fish survey on Sweetwater Creek and White River.

COLORADO RIVER DRAINAGE, FOOD, INVENTORY, INVERTEBRATES—Benthos, STREAM FLOW, WATER QUALITY—Chemical, Physical

175

Hill, R. R. 1965. Stream fishery studies. White River survey. Colo. Dep. Game, Fish and Parks Fed. Aid F-26-R-2, Job 2. Job Compl. Rep. 53pp.

A stream survey of the North Fork, mainstem White River, and Milk Creek. Stream flow, water chemistry, fishes and macroinvertebrates were investigated.

COLORADO RIVER DRAINAGE, INVENTORY, INVERTEBRATES—Benthos, STREAM FLOW, WATER QUALITY—Chemical

176

Hill, R. R., and W. T. Burkhard. 1967. Stream fisheries studies: White River survey. Colo. Dep. Game, Fish and Parks Fed. Aid Proj. F-26-R-3, Job 2, Job Compl. Rep. 29pp.

Report of studies on 9 sites in the upper White River during 1962-63. Rainbow, brook, brown, and cutthroat trout were reported from Sweetwater Creek, and South Fork White River. This report documented the unlikelihood of pure Colorado cutthroat trout in the sites studied.

COLORADO RIVER DRAINAGE, DISTRIBUTION, HABITAT, STREAM FLOW, TAXONOMY/SYSTEMATICS

177

Holden, P. B. 1973. Distribution, abundance and life history of the fishes of the upper Colorado River basin. Ph.D. Thesis. Utah State Univ., Logan. 59pp.

An analysis of fish distribution and relative abundance in the upper basin, including the Dolores (Dolores County), Green, Yampa, and Little Snake (Moffat County), and Gunnison rivers (Mesa and Delta Counties).

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, FOOD, HABITAT, NATURAL HISTORY

178

Holden, P. B. 1979. Ecology of riverine fishes in regulated stream systems with emphasis on the Colorado River. Pp. 57-74 in J. V. Ward and J. A. Stanford, eds. The ecology of regulated streams. Plenum Press, New York. 398pp.

An overview of the recognized impacts of the riverine habitat alteration (flow reductions and flow modifications resulting from dams) upon obligate riverine fishes. Colorado River endemic fishes (Colorado squawfish—Ptychocheilus lucius, humpback chub—Gila cypha, bonytail—G. elegans, and razorback sucker—Xyrauchen texanus) are used as case studies.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY, MOVEMENT, STREAM FLOW, WATER QUALITY—Physical

179

Holden, P. B. 1980. The relationship between flows in the Yampa River and success of rare fish populations in the Green River system. PR-31-1. Draft. Submitted to Natl. Park Serv./RMR-MW. Denver. 32pp. (Unpubl.)

An evaluation of natural versus altered seasonal flows to the recruitment and perpetuation of Colorado squawfish (Ptychocheilus lucius) and humpback chubs (Gila cypha).

ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, RECRUITMENT, REPRODUCTION, STREAM FLOW

180

Holden, P. B., and C. B. Stalnaker. 1970. Systematic studies of the cyprinid genus Gila in the upper Colorado River basin. Copeia 1970(3):409-420.

A systematic analysis of the Colorado River endemic genus Gila, particularly roundtail chubs (G. robusta), bonytails (G. elegans), and humpback chubs (G. cypha).

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, TAXONOMY/SYSTEMATICS

181

Holden, P. B., and C. B. Stalnaker. 1975.  
Distribution and abundance of mainstream  
fishes of the middle and upper Colorado  
River basins, 1967-1973. *Trans. Am. Fish.  
Soc.* 104:217-231.

Fishes were collected on the Yampa, Green,  
lower Gunnison and Colorado rivers. Of the 29  
species collected, 19 had been introduced.  
The authors state that the decline of native  
species is probably due to an alteration of  
the habitat by high dams and the introduction  
of exotic fish species.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE,  
COMPETITION, DISTRIBUTION, ENDANGERED, HABITAT,  
HYBRIDIZATION, REPRODUCTION, STREAM FLOW

182

Holden, P. B., and C. B. Stalnaker. 1975.  
Distribution of fishes in the Dolores and  
Yampa River systems of the upper Colorado  
basin. *Southwest. Nat.* 19:403-412.

The abundance of fish in the Dolores and Yampa  
Rivers in relation to turbidity and water  
temperature is discussed. The Yampa River is  
determined to be an important refuge and  
spawning site for rare and endangered fish,  
whereas the Dolores may have a negative  
influence on their survival.

ABUNDANCE, COLORADO RIVER DRAINAGE, ENDANGERED,  
HABITAT, MIGRATION, MOVEMENT, POLLUTION,  
REPRODUCTION, STREAM FLOW, WATER QUALITY--  
Physical

183

Holden, P. B., and L. W. Crist. 1978.  
Documentation of changes in the macro-  
invertebrate and fish populations in the  
Green River due to inlet modification of  
Flaming Gorge Dam. Prepared for U.S. Fish  
and Wildl. Serv., Office of Biol. Serv.,  
WELUT, PR-16-2, Annu. Rep. 107pp.

In 1978 the penstock inlets of Flaming Gorge  
Dam were modified to warm the tailwaters to  
improve the trout fishery and enhance repro-  
duction of rare fish in Dinosaur National  
Monument. This study documents existing  
species composition and relative abundance of  
benthic macroinvertebrates and fish in the  
Green and Yampa Rivers. It compares composi-  
tion and relative densities of invertebrates  
before and after modifications and assesses  
changes in the distribution and reproduction  
of Green River fishes as a result of altered  
temperatures.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO  
RIVER DRAINAGE, DISTRIBUTION ENDANGERED,

FISHERY--Sport, HABITAT, HISTORY, INVENTORY,  
INVERTEBRATES--Benthos, MOVEMENT, REPRODUCTION,  
STREAM FLOW, WATER QUALITY--Physical

184

Holden, P. B., and D. A. Selby. 1979. An  
aquatic biology survey of the White River  
(Colorado) to assess potential impact of a  
proposed water withdrawal system. PR-2-1.  
Burns and McDonnell, Kansas City, Mo.

This report provides part of the biological  
baseline information needed for permits and  
completion of an environmental impact state-  
ment for a proposed coal mine near Rangely,  
Colorado. Potential impacts of water with-  
drawal and pollution are discussed.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE,  
HABITAT, INVERTEBRATES--Benthos, MOVEMENT,  
POLLUTION, REPRODUCTION, STREAM FLOW, TOXICANTS

185

Hoover, R. L., and D. L. Langlois. 1977. A  
partial review of literature on the status,  
natural history and life history of endan-  
gered and threatened fishes of the Yampa and  
Green River drainages. *Colo. Div. Wildl.*,  
Denver. 17pp. (Unpubl.)

The Colorado squawfish, bonytail, humpback  
chub, and razorback sucker, all endemic to the  
Colorado River basin, are listed by the State  
or Federal government as endangered or threat-  
ened. These fishes have been declining due to  
alterations of the Colorado River system.  
This paper reviews literature on the status  
and natural life histories of these fishes.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE,  
CULTURE, DESCRIPTION, DISTRIBUTION, ENDANGERED,  
FOOD, HABITAT, HYBRIDIZATION, INVERTEBRATES--  
Benthos, Plankton, MIGRATION, NATURAL HISTORY,  
POLLUTION, REPRODUCTION, WATER QUALITY--  
Chemical, Physical

186

Horak, D. 1961. Vertical distribution of  
fishes in Horsetooth Reservoir, Colorado.  
M.S. Thesis. *Colo. State Univ.*, Ft.  
Collins. 123pp.

A study of the physical, chemical, and biologi-  
cal characteristics of Horsetooth Reservoir to  
determine the vertical distribution of fish  
species in a reservoir environment, to aid  
management to enhance the fishery potential of  
Horsetooth, and to analyze influential environ-  
mental factors (e.g., water temperature and  
fluctuation, pH, and dissolved O<sub>2</sub>).

AGE/GROWTH, FOOD, LIMNOLOGY, PLATTE RIVER  
DRAINAGE, WATER QUALITY—Chemical, Physical

187

Horak, D. L., and H. A. Tanner. 1964. The use of vertical gillnets in studying fish depth distribution, Horsetooth Reservoir, Colorado. Trans. Am. Fish. Soc. 93(2):137-145.

An analysis of the depth distribution of Salmo gairdneri, Oncorhynchus nerka, Catostomus commersoni, Perca flavescens, Salmo trutta, and C. catostomus in an east slope foothills water storage reservoir.

DISTRIBUTION, FISHERY—Sport, LIMNOLOGY,  
MANAGEMENT, PLATTE RIVER DRAINAGE

188

Hubbs, C. L., and L. C. Hubbs. 1947. Natural hybrids between two species of catostomid fishes. Papers Mich. Acad. Sci. Arts, and Letters 31(1945):147-167.

A description of natural hybridization between flannelmouth and bluehead suckers (Catostomus latipinnis X C. discobolus).

COLORADO RIVER DRAINAGE, HYBRIDIZATION

189

Hughes, R. M. 1981. The plains killifish, Fundulus zebrinus (Cyprinodontidae), in the Colorado River basin of western North America. Southwest. Nat. 26(3):321-324.

A description of plains killifish distribution, relative abundance and habitat in New Mexico, Arizona, Utah, and Colorado. Includes collections from the Yampa (Moffat County) and Colorado rivers (Mesa County).

ABUNDANCE, COLORADO RIVER DRAINAGE,  
DISTRIBUTION, HABITAT

190

Hunter, G. N. 1942. Creel census, State of Colorado, 1942 season. Colo. Dep. Game and Fish 6pp.

A census to determine the effects of stocking on the fishery. Questionnaires were completed by a warden following direct contact with fishermen.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER  
DRAINAGE, CREEL CENSUS, FISHERY—Sport, PLATTE  
RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN  
JUAN RIVER DRAINAGE, URBAN

191

Hunter, G. N., and D. A. Parson. 1943. A stream census of the Fryingpan River, 1942-1943. Colo. Dep. Game and Fish, Denver. 15pp.

The census provided data for yields by species, movement, and growth. Suitable trout habitat and availability of food organisms were assessed.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE,  
CREEL CENSUS, FISHERY—Sport, FOOD, HABITAT,  
MANAGEMENT, MOVEMENT

192

Imler, R. L. 1973. Methods of distinguishing white bass from striped bass. Colo. Div. Wildl. Outdoor Facts, Fish. Inform. Leaflet. No. 26. 2pp.

A descriptive article providing differentiating anatomical characteristics for Morone chrysops and M. saxatilis using general body shape and palatine teeth patterns.

ANATOMY/MORPHOLOGY, DESCRIPTION

193

Imler, R. C. 1975. Annual report of scientific collections, Permit No. 75-122. Colo. Div. Wildl., Denver..

A list of fish species collected under a state wildlife collection permit.

ARKANSAS RIVER DRAINAGE, DISTRIBUTION,  
PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

194

Imler, R. 1977. Lake and reservoir research, coolwater reservoirs. Colo. Div. Wildl. Fed. Aid Proj. F-52-R, Work Plan II, Job 3, Final Rep. 56pp.

The objective of this 2-year study was to determine the extent and characteristics of the "coolwater" reservoir resource in Colorado and to devise management practices for it. Fisherman counts and statistical comparisons of fish data of previous inventories were the primary means of determining fish distribution. These results are intended to provide a basis for further investigations of the "coolwater" reservoirs of Colorado.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER  
DRAINAGE, DISTRIBUTION, FISHERY—Sport,  
INVENTORY, MANAGEMENT, PLATTE RIVER DRAINAGE,  
SAN JUAN RIVER DRAINAGE

195

Johnson, J. E. 1976. Status of endangered and threatened fish species in Colorado. U.S. Bur. Land Manage. Tech. Note No. 280. 23pp.

This report reviews the present status of threatened and endangered fish native to Colorado, reasons for their decline, and BLM's management plans to enhance their ability to survive. Includes a description for each species, existing management plans, and BLM's interest.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

196

Johnson, J. E., and J. N. Rinne. 1982. The Endangered Species Act and southwest fish. Fisheries 7(4):2-8.

A description of the history of federal endangered species legislation and recovery actions for the razorback sucker (Xyrauchen texanus). Includes color photographs of the Colorado squawfish (Ptychocheilus lucius) and humpback chub (Gila cypha).

COLORADO RIVER DRAINAGE, ENDANGERED

197

Jones, K. T. 1977. Archeological test excavations at the Blanca Wildlife Refuge in the San Luis Valley, Colorado. Laboratory of Public Archeology, Colo. State Univ., Fort Collins, Colo. Reports of the Laboratory of Public Archeology No. 12.

The primary cultural feature of excavations in the San Luis Valley was a hidden level containing profuse amounts of fish bone, mostly Gila nigrescens, and Ictiobus spp., suggesting the existence of a large lake in the early quaternary.

ARCHAEOLOGY, RIO GRANDE RIVER DRAINAGE

198

Jordan, D. S. 1891. Report of explorations in Colorado and Utah during the summer of 1889, with an account of the fishes found in each of the river basins examined. U.S. Fish Comm. Bull. (1889) 9:1-40.

Several sites in each major river basin of Colorado were investigated. Species abundance and taxonomic nomenclature are discussed.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

199

Jordan, D. S. 1920. Planted trout in the Platte drainage. Copeia 81:27.

A brief note on trout planting in the Big and Little Laramie rivers.

DISTRIBUTION, PLATTE RIVER DRAINAGE

200

Jordan, D. S. 1920. The trout of the Rio Grande. Copeia 85:72-73.

A correction of the nomenclature of western trout. Salmo clarki virginalis is the corrected name for Salmo spirulus, the Rio Grande trout.

DISTRIBUTION, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

201

Jordan, D. S., and B. W. Evermann. 1896-1898. Fishes of North and Middle America. U.S. Natl. Mus. Bull. 47. 4 vols.

A four-volume guide to fresh- and salt-water fishes of North America. Distributions are treated very broadly and the extent is often difficult to determine. A description and history of taxonomic names is presented for each species. The fourth volume includes a drawing for each species.

COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

202

Jordan, D. S., and B. W. Evermann. 1902. American food and game fishes. Doubleday Page and Co., N.Y. 572pp. (Revised by Dover Publ., Inc., N.Y., 1923)

A guide to North American freshwater and marine fish with keys.

COLORADO RIVER DRAINAGE, DISTRIBUTION, PLATTE RIVER DRAINAGE, TAXONOMY/SYSTEMATICS

203

Joseph, T. W., J. A. Sinning, R. J. Behnke, and P. B. Holden. 1977. An evaluation of the status, life history, and habitat requirements of endangered and threatened fishes of the upper Colorado River system. U.S. Fish and Wildl. Serv., Office of Biol. Serv., FWS/OBS-77/62. Ft. Collins, Colo. 182pp.

This study evaluates the present state of knowledge concerning the aquatic flora and fauna

of the Upper Colorado River basin, with an emphasis on the endangered and threatened fishes, their status, habitat requirements, and overall ecology. Abiotic and biotic components of the basin, species natural history, river basin descriptions, and major factors inducing environmental change are discussed.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISEASE, DISTRIBUTION, ENDANGERED, FOOD, HABITAT, HISTORY, HYBRIDIZATION, MIGRATION, MOVEMENT, NATURAL HISTORY, POLLUTION, PREDATION, RECRUITMENT, REPRODUCTION, SAN JUAN RIVER DRAINAGE, STREAM FLOW, TOXICANTS, WATER QUALITY--Chemical, Physical

204

Juday, C. 1904. List of fishes collected in Boulder County, Colorado, with description of a new species of Leuciscus. U.S. Fish. Comm. Bull. 24:225-227.

The author describes a new species of Leuciscus and lists other species found in Boulder Creek, St. Vrain Creek, or Culberson's Lake.

DESCRIPTION, INVENTORY, PLATTE RIVER DRAINAGE

205

Kidd, G. (1974?) Preliminary report on endangered and threatened endemic warmwater species of fish in western Colorado rivers. Colo. Div. Wildl. Fed. Aid Proj. F-30-R-11. 15pp.

Superficial overview of the protected fishes of the Yampa and Colorado Rivers.

COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY

206

Kidd, G. 1977. An investigation of endangered and threatened fish species in the upper Colorado River as related to Bureau of Reclamation projects. Northwest Fisheries Research. Final Rep. Clifton, Colo. 36pp.

Report of field investigations of the present status of endangered and threatened fishes in the Gunnison and Colorado Rivers. Macroinvertebrates were collected as part of the investigations. This study was prompted by water projects planned by the Bureau of Reclamation. Life histories of the endangered fishes are described and the potential impacts of damming major tributaries on these fishes are discussed.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, INVERTEBRATES--Benthos, MOVEMENT, STREAM FLOW, WATER QUALITY--Chemical, Physical

207

Kinnear, B. S. 1966. Fishes of Black Canyon. M.S. Thesis. Colo. State Univ., Ft. Collins. 45pp.

Baseline information concerning water temperatures, flows, river habitats, and distribution of fishes in the Black Canyon of the Gunnison River. The study took place after the closure of Blue Mesa Dam and prior to the closure of the last of the Curecanti Units.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, HABITAT, INVENTORY, STREAM FLOW, WATER QUALITY--Chemical, Physical

208

Klein, W. D. 1948. 1947 creel census report. Colo. Dep. Game and Fish, Fish Manage. Div. 29pp.

A summarization of warden checks of the fish catch covering the years 1943-1947. The waters listed are the most heavily used and frequently checked. Statistics calculated include: catch-per-man-hour (CPMH), percentage of nonresident anglers, and comparison of warm- and cold-water fisheries.

COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE,

209

Klein, W. D. 1949. 1948 creel census report. Colo. Game and Fish Dep., Fish. Manage. Div. 30pp.

A summarization of a warden-contact census of anglers' catch for 1948, but includes corrected figures for the years 1944-1947 as well. Includes catch-per-man-hour, nonresident fishermen numbers and catch, license sales, and a comparison of cold- and warm-water fisheries.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE,

210

Klein, W. D. 1952. Stocking-catch record analysis, trout lakes 1943-1950. Colo. Game and Fish Dep. (Unpubl.)

A list of lakes with their stocking and catch records sent to wardens and other interested personnel.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

211

Klein, W. D. 1952. Voluntary returns from plants of tagged trout, 1946 through 1951. Colo. Dep. Game and Fish. 92pp.

A census using returned tags to determine migration of stocked fish and their approximate growth. Rainbow and brown trout were compared for winter survival, catchability, migration, and weight on numerical returns.

AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, MIGRATION, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

212

Klein, W. D. 1957. A partial census of the whitefish and trout population in the Yampa and White Rivers and their tributaries. Colo. Dep. Game and Fish, Spec. Purp. Rep. 47. 18pp.

Results of stream census conducted during the summer of 1955. This census resulted in the recommendation that whitefish take could be liberalized and that year-round angling was reasonable.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, CREEL CENSUS, DISTRIBUTION, FISHERY--Sport, INVENTORY, MANAGEMENT

213

Klein, W. D. 1966. The summer movement of hybrid and brook trout into an inlet stream. Prog. Fish-Cult. 28(3):146-151.

This report presents observations on the summer movement of hybrid trout (Salvelinus fontinalis x S. namaycush) and brook trout (S. fontinalis) into the inlet stream of Parvin Lake (Larimer County).

FISHERY--Sport, HYBRIDIZATION, MOVEMENT, PLATTE RIVER DRAINAGE

214

Klein, W. D. 1971. Returns to the creel from plants of kokanee salmon and rainbow trout in Skaguay Reservoir, Colorado. Colo. Div. Game, Fish and Parks. 16pp.

A study to determine the existing conditions important to the survival of fish was implemented. Kokanee salmon and rainbow trout were stocked and their population numbers over a period of 5 years were noted. A high return

to the creel was sought for a game fish species able to compete with the forage species present. The use of kokanee fry appeared successful.

CREEL CENSUS, FISHERY--Sport, RECRUITMENT, WATER QUALITY--Chemical, Physical

215

Klein, W. D. 1972. Analysis of a creel-size trout plant in Parvin Lake under artificial lure fishing. Prog. Fish-Cult. 34(4):199-203.

An evaluation of special regulations upon a Salmo gairdneri fishery at a high-altitude Larimer County lake.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT

216

Klein, W. D. 1972. Influence of special regulations and stocking on fishermen and the trout population at Parvin Lake, Colorado. Colo. Div. Game, Fish and Parks Tech. Publ. 29. 22pp.

An evaluation of management approaches for a high-altitude Salmo gairdneri sport fishery (Larimer County).

CREEL CENSUS, FISHERY--Sport, MANAGEMENT

217

Klein, W. D. 1972. Splake trout. Colo. Div. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet. 18. 2pp.

A general descriptive article relating to the potential management value and problems associated with stocking Salvelinus namaycush (female) x S. fontinalis (male) in Colorado. A history of the hybrid is given.

CULTURE, DESCRIPTION, EARLY LIFE HISTORY, ECOLOGY--Interactions, FISHERY--Sport, GENETICS, HABITAT, HISTORY, HYBRIDIZATION, MANAGEMENT

218

Klein, W. D. 1974. Cache la Poudre River whitefish (Prosopium williamsoni), 1956-1974. Colo. Div. Wildl. 17pp. (Unpubl.)

Documents the introduction and present status of whitefish in the Cache la Poudre River. Reasons for greater abundance in certain areas are discussed. It is suggested that populations continue to be monitored and that studies of trout-whitefish interrelationships be conducted.

ABUNDANCE, AGE/GROWTH MANAGEMENT, PLATTE RIVER DRAINAGE

219

Klein, W. D. 1979. Kokanee in Parvin Lake, Colorado, 1972-1977. Colo. Div. Wildl. Spec. Rep. No. 47. 19pp.

An analysis of the results of a May, 1972 stocking of Oncorhynchus nerka in a small eutrophic high-altitude lake in Larimer County.

ABUNDANCE, AGE/GROWTH, FISHERY--Sport, FOOD, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY MANAGEMENT, MOVEMENT, PLATTE RIVER DRAINAGE

220

Klein, W. D. 1983. Lake DeSmet rainbow trout in Parvin Lake, Colorado, 1972-1978. Colo. Div. Wildl. Spec. Rep. No. 55. 10pp.

An analysis of Salmo gairdneri stockings in 1972 and 1973 in a small high-altitude eutrophic Larimer County lake.

ABUNDANCE, AGE/GROWTH, FISHERY--Sport, LIMNOLOGY, MANAGEMENT, MIGRATION, PLATTE RIVER DRAINAGE

221

Klein, W. D., and L. M. Finnell. 1969. Comparative study of coho salmon introductions in Parvin Lake and Granby Reservoir. Prog. Fish-Cult. 31:99-108.

Age, growth, and return to the creel of coho salmon from two physically and biologically different lakes were compared. In small, shallow lakes growth and harvest of trout were superior to salmon. In large fluctuating lakes with a low abundance of bottom fauna and a large sucker population, coho salmon provide better fishing.

AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, LIMNOLOGY, MOVEMENT, REPRODUCTION, WATER QUALITY--Physical

222

Klein, W. D., W. R. Seaman, and P. T. Barrows. 1950. 1949 creel census report. Colo. Dep. Game and Fish. 29pp.

A summarization of fisherman catch from warden-contact data for the years 1945-1949. The waters listed are the most heavily used and checked. The analysis includes catch-per-man-hour, percentage of nonresident anglers, license sales, total fishing days, and warm- and cold-water comparisons.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

223

Knox, R. F. 1981. The darters. Colo. Outdoors 30(3):1-3.

An informative popular article describing the distribution and habitat of Etheostoma spectabile, E. nigrum, and E. cragini. Excellent illustrations.

ARKANSAS RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, HABITAT, NATURAL HISTORY, PLATTE RIVER DRAINAGE, POPULAR

224

Knox, R. F. 1983. All about grass carp. Colo. Outdoors 32(2):12-14.

A popular article describing the potential value of aquatic vegetation control via import and use of the exotic Ctenopharyngedon idella.

MANAGEMENT, POPULAR

225

Knox, R., T. Hickman, D. Langlois, T. Lytle, and J. Torres. 1979. Colorado River cutthroat trout inventory. Colo. Div. Wildl. Endangered Wildlife Investigations, SE-3-2, Work Plan 1, Job 5. 22pp.

A taxonomic analysis of 53 cutthroat trout (Salmo clarki subsp.) from 10 collections from 8 streams in Garfield and Mesa Counties.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, TAXONOMY/SYSTEMATICS

226

Kobetich, G. C., and P. B. Holden. 1976. Endangered and threatened fishes of the Colorado River basin. Proc. West. Assoc. State Game and Fish Comm. 56:286-287. (Abstr.)

A summary of present knowledge on the rare native species of the Colorado River basin. It includes reasons for decline with emphasis on the status of the Colorado squawfish, bonytail, humpback chub, and razorback sucker.

ALTERATION, COLORADO RIVER DRAINAGE, GENETICS, HABITAT, HISTORY, HYBRIDIZATION, TAXONOMY/SYSTEMATICS

227

Krieger, D. A. 1980. Life histories of catostomids in Twin Lakes, Colorado, in relation to a pumped-storage powerplant. M.S. Thesis. Colo. State Univ., Ft. Collins. 116pp.

A detailed evaluation of the ecology and distribution of the Catostomidae in a high-altitude lake system.

ARKANSAS RIVER DRAINAGE, DISTRIBUTION, ECOLOGY—Interactions, ECOLOGY—Trophic relationships, FOOD, LIMNOLOGY, NATURAL HISTORY

228

Krieger, D. 1983. Evaluation of stocking yearling largemouth bass in Chatfield Reservoir, Colorado. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 18:54-59.

An evaluation of a Micropterus salmoides fishery in a 465-ha impoundment near Denver, Douglas County.

AGE/GROWTH, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, URBAN

229

Kunze, R. 1982. Comparative observations on the culture of Bear River and Colorado River cutthroat trout. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 17:211-221.

An evaluation of comparative mortality, growth, and behavioral responses of Salmo clarki pleurticus and S. c. utah under hatchery conditions.

AGE/GROWTH, BEHAVIOR, COLORADO RIVER DRAINAGE, CULTURE, MANAGEMENT

230

Labrax. 1883. The Colorado trout--the Rocky Mountain trout (Salmo virginalis). Am. Angler 3(20):406.

Describes the fine trout fishing in Colorado, particularly in the San Juan River. Notes the negative impacts of mining camps, such as Durango, on the trout fishery.

ALTERATION, COLORADO RIVER DRAINAGE, FISHERY—Sport, HABITAT, HISTORY, POPULAR, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

231

Land, G. 1890. Report of the Colorado fish commissioner of the State of Colorado for the years 1889-1890. Denver. 15pp.

This report describes the activities of the Fish Commissioner and progress made in culturing desirable species. It outlines Land's philosophy on which species to introduce into mountain lakes and streams and it reports the success of previous introductions.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

232

Land, G. 1897. Biennial report of the State fish commissioner of the State of Colorado for the years 1895 and 1896. Denver. 15pp.

This report describes the activities of the Fish Commissioner and progress made in culturing desirable species. It tabulates the distribution of fish and gives recommendations for the operation of fish hatcheries. This report also outlines needs, recommendations, and difficulties in enforcing fish and game laws.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

233

Langlois, D. 1977. Colorado's endangered fish. Colo. Outdoors 26(3):18-21.

A popular article describing the status and distribution of Colorado's endangered fishes.

COLORADO RIVER DRAINAGE, ENDANGERED, PLATTE RIVER DRAINAGE, POPULAR

234

Langlois, D. 1978. Colorado squawfish. Colo. Outdoors 27(3):front cover.

Cover drawing featuring the endangered Colorado squawfish, Ptychocheilus lucius, and brief descriptive caption.

COLORADO RIVER DRAINAGE, ENDANGERED, POPULAR

235

Langlois, D., and L. Zuckerman. 1981. Rio Grande cutthroat trout inventory, restoration, and monitoring. Colo. Div. Wildl., Montrose. Nongame Investigations FW-22-R-2, Work Plan I, Job 1, Perf. Rep. 16pp.

An inventory of Salmo clarki virginalis. All populations were monitored and recommendations given for their management.

DISTRIBUTION, ENDANGERED, MANAGEMENT, RIO GRANDE RIVER DRAINAGE

236

Lanigan, S. H., and C. R. Berry, Jr. 1981. Distribution of fishes in the White River, Utah. Southwest. Nat. 26(4):389-393.

A survey of the White River in Uintah County, Utah. Sampling sites included areas approximately 1 km west of Colorado state line (Rio Blanco Co.).

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, INVENTORY

237

Lauenstein, P. C. 1978. Intensive culture of Tilapia with geothermally heated water. Pp. 82-85 in R. O. Smitherman, W. C. Shelton, J. H. Grover, eds. Symposium on culture of exotic fishes. Am. Fish. Soc.

The article describes requirements for rearing Tilapia. Cement raceways and ponds near Alamosa were used.

AGE/GROWTH, CULTURE, RIO GRANDE RIVER DRAINAGE

238

Lee, D. S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R. Stauffer, Jr. 1980. Atlas of North American freshwater fishes. North Carolina State Museum of Natural History, North Carolina Biological Survey, Publ. No. 1980-12. 854pp.

An exhaustive treatise on the distribution of North American freshwater fishes. Maps are given for each species. A list of regional fish publications is included.

DISTRIBUTION, TAXONOMY/SYSTEMATICS

239

Leishman, J. M. 1978. Statewide conservation officers creel census on lakes and streams. New Mexico Game and Fish Dep. F-22-R-19, Job K-1. Perform. Rep.

The results of fisherman contact creel census on Navajo Reservoir.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT, SAN JUAN RIVER DRAINAGE

240

Lemons, D. G. 1954. A field survey of western Colorado streams and lakes. Colo. Dep. Game and Fish. 29pp.

A brief survey to investigate regions for sport fisheries and to provide stocking recommendations.

COLORADO RIVER DRAINAGE, DISTRIBUTION, FISHERY--Sport, HABITAT, INVENTORY, MANAGEMENT, SAN JUAN RIVER DRAINAGE

241

Lemons, D. G. 1955. Channel cat study. Colo. Dep. Game, Fish and Parks Proj. No. 121. 12pp. (Unpubl.)

The objective of this study was to transplant Ictalurus punctatus to reservoirs with heavy fishing pressure. The food habits and growth of channel catfish from five different streams were compared, and the yearly harvest and habitat was assessed for each river.

AGE/GROWTH, COLORADO RIVER DRAINAGE, FOOD, HABITAT, SAN JUAN RIVER DRAINAGE

242

Lemons, D. G. 1960. William's Creek Reservoir creel census. Colo. Dep. Game, Fish and Parks Job Prog. Rep. 8pp.

Information collected in census includes statistics on the angler, catch-per-man-hour, and average length and weight. The report also states recommendations for stocking and marking fish.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT, SAN JUAN RIVER DRAINAGE

243

Lentsch, L. D. 1984. Evaluation of reproductive habitat in the Emerald Lakes system, Colorado. (Abstr.) Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:12.

An evaluation of reproductive habitat for Salmo gairdneri x Salmo clarki hybrids. This study occurred in 1980.

AGE/GROWTH, FISHERY--Sport, HABITAT, LIMNOLOGY, REPRODUCTION, SAN JUAN RIVER DRAINAGE

244

Li, H. W. 1968. Fishes of the South Platte River basin. M.S. Thesis. Colo. State Univ., Ft. Collins. 67pp.

This study is an inventory of the fishes of the South Platte River basin in the summers of 1967 and 1968. Includes lists of native species, species thought to be extirpated, exotic species, and an account of species present historically.

DISTRIBUTION, HISTORY, INVENTORY, MOVEMENT,  
PLATTE RIVER DRAINAGE, POLLUTION

245

Loeffler, C., D. Miller, R. Shuman, D. Winters,  
and P. Nelson. 1982. Arkansas River  
threatened fish survey. Colo. Div. Wildl.,  
SE-8-1, Job 2, Perf. Rep. 8pp. + Appen.

An extensive survey of all fish found in the  
lower Arkansas River drainage of Colorado was  
completed for 1979-1981. The status and dis-  
tribution of the Arkansas darter (Etheostoma  
cragini) and speckled chub (Hybopsis aestivalis)  
were determined from the survey. The Arkansas  
darter was discovered in 5 S. E. counties and  
the speckled chub is considered extirpated from  
Colorado. This study documented the first  
sighting of the redbelly dace (Phoxinus ery-  
throgaster) in Colorado. Management guide-  
lines are presented.

ARKANSAS RIVER DRAINAGE, DISTRIBUTION,  
ENDANGERED, HABITAT, INVENTORY, MANAGEMENT

246

Lombard, J. H. 1981. Colorado's big minnow.  
Colo. Outdoors 31(2):34-39.

A popular description of the endangered Colo-  
rado squawfish (Ptychocheilus lucius) and the  
Yampa River in Moffat County. Photographs  
from the 1940's.

COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY,  
POPULAR

247

Lyall, W. A. 1938. A preliminary survey of  
some of the waters on the Rio Grande  
drainage. U.S. Forest Serv. 8pp. (Unpubl.)

This report provided a management plan to main-  
tain good fishing in the Rio Grande drainage  
based on present conditions of the reservoirs  
and streams surveyed, public sentiment, private  
land owner policy, presence of irrigation  
canals, and supply of fish for stocking.

FISHERY--Sport, INVENTORY, MANAGEMENT, RIO  
GRANDE RIVER DRAINAGE, WATER QUALITY--Chemical,  
Physical

248

Lynch, T. 1953. The white bass (Lepibema  
chrysops) in John Martin Reservoir,  
Colorado. Colo. Dep. Game and Fish, Denver.  
9pp.

The John Martin Reservoir was constructed for  
flood control and development of water resour-

ces on the Arkansas. Soon after it was filled,  
forage and rough species began to proliferate.  
The white bass was introduced as a predatory  
fish. This reservoir was completely drained  
in 1952.

ARKANSAS RIVER DRAINAGE, FISHERY--Sport,  
MANAGEMENT

249

Lynch, T. M. 1957. Compiled growth data  
on warmwater fish species. Colo. Dep. Game  
and Fish Prog. Rep., Proj. 15A. Denver.  
16pp.

Age and growth studies for 14 warmwater  
species.

AGE/GROWTH, FISHERY--Sport, MANAGEMENT

250

Lynch, T. M., and D. G. Lemons. 1956. The  
age, growth and weight relationships of  
channel catfish (Ictalurus punctatus)  
collected from Colorado waters. Colo.  
Dep. Game and Fish. 13pp.

A summary of age, growth, and weight relation-  
ships from studies in the years 1951-1955.  
Its purpose was to provide a reference for  
fish managers to compare the growth of catfish.

AGE/GROWTH, ARKANSAS RIVER DRAINAGE, COLORADO  
RIVER DRAINAGE, DISTRIBUTION, FISHERY--Sport,  
MANAGEMENT, PLATTE RIVER DRAINAGE

251

Lynch, T. M., S. Bessire, and J. Gray. 1950.  
Elementary survey of Dolores River, from  
Utah state line to Paradox Valley,  
Colorado. Colo. Div. Wildl., Denver.  
3pp. (Unpubl.)

A preliminary investigation of possible stock-  
ing habitat for channel catfish in the Dolores  
River.

COLORADO RIVER DRAINAGE, FISHERY--Sport,  
HABITAT, INVENTORY, MANAGEMENT

252

Lynch, T. M., P. A. Buscemi, and D. G. Lemons.  
1953. Limnological and fishery conditions  
of Two Buttes Reservoir, Colorado. Colo.  
Dep. Game and Fish, Fish Manage. Div. 93pp.

Two short-term studies were conducted, one  
limnological and one that concentrated on the  
fishery biology of the reservoir. Management  
recommendations, based on the accumulated data,  
focused on the reduction of excess forage and  
rough species.

AGE/GROWTH, ARKANSAS RIVER DRAINAGE, FISHERY—  
Sport, FOOD, INVENTORY, LIMNOLOGY, MANAGEMENT,  
RECRUITMENT, WATER QUALITY—Chemical, Physical

253

Lynch, T. M., E. P. Cook, and D. H. Nolting.  
1956. The environmental conditions of an  
irrigation impoundment as related to the  
maintenance of a game fish population: A  
study of Holbrook Lake Reservoir, Otero  
County, Colorado. July 1947-July 1955.  
Colo. Dep. Game and Fish. 54pp.

The Colorado Game and Fish Department investi-  
gated the fishery potentials of irrigation  
impoundments for a period of 8 years. With  
this data, a management plan was developed to  
improve sport fishing. This study focuses pri-  
marily upon a poor creel census return and the  
control of "undesirable" fish populations.

ARKANSAS RIVER DRAINAGE, CREEL CENSUS,  
FISHERY—Sport, FOOD, HISTORY, LIMNOLOGY,  
MANAGEMENT, WATER QUALITY—Chemical, Physical

254

McAda, C. W. 1977. Aspects of the life-  
history of three catostomids native to the  
upper Colorado River basin. M.S. Thesis.  
Utah State Univ., Logan. 104pp.

A detailed description of the ecology of the  
bluehead (Catostomus discobolus), flannelmouth  
(C. latipinnis) and razorback suckers (Xyrau-  
chen texanus) from the Green and Yampa rivers,  
Moffat County, and the Colorado River, Mesa  
County.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE,  
DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED,  
FOOD, HABITAT, HISTORY, MOVEMENT

255

McAda, C. W. 1983. Colorado squawfish,  
Ptychocheilus lucius (Cyprinidae), with a  
channel catfish, Ictalurus punctatus  
(Ictaluridae), lodged in its throat.  
Southwest. Nat. 28(1):119-120.

Report of the direct effect of one exotic fish  
individual upon an endangered endemic species.

COLORADO RIVER DRAINAGE, ECOLOGY—Trophic  
relationships, ENDANGERED, FOOD, PREDATION

256

McAda, C., and K. Seethaler. 1975. Movements  
and ecological requirements of the Colorado  
squawfish (Ptychocheilus lucius) in the Yampa  
and upper Green rivers. Utah Coop. Fish.  
Res. Unit, Utah State Univ., Logan. 5pp.

Discusses a study designed to locate possible  
spawning areas for two endangered native  
fishes. Observations on the native flannel-  
mouth sucker (Catostomus latipinnis) and the  
bluehead sucker (C. discobolus) are also given.

AGE/GROWTH, COLORADO RIVER DRAINAGE,  
DISTRIBUTION, ECOLOGY—Interactions,  
ENDANGERED, HABITAT, MIGRATION, MOVEMENT,  
REPRODUCTION, STREAM FLOW

257

McAda, C. W., and R. S. Wydoski. 1980. The  
razorback sucker, Xyrauchen texanus, in the  
upper Colorado River basin, 1974-1976.  
U.S. Fish and Wildl. Serv. Tech. Publ. 99.  
15pp.

Razorback suckers were found in relatively  
large concentrations at two restricted loca-  
tions, at the mouth of the Yampa river and a  
flooded gravel pit connected to the Colorado  
River near Grand Junction. Spawning occurred  
in April and May when water temperatures were  
6-15 C. Age and fecundity were estimated.  
Colorado river fish were significantly larger  
than those of the same age in the Green and  
Yampa rivers, probably because of higher water  
temperatures.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO  
RIVER DRAINAGE, DISTRIBUTION, ENDANGERED,  
FOOD, HISTORY, MOVEMENT, REPRODUCTION

258

McAda, C. W., and L. R. Kaeding. 1984.  
Current research on the ecology of the  
Colorado squawfish in the upper Colorado  
River. Proc. Colo.-Wyo. Chap. Am. Fish.  
Soc. 19:143. (Abstr.)

A status report on research concerning the  
recovery of the endangered endemic Ptycho-  
cheilus lucius in the mainstem Colorado River  
(Mesa Co.) by the U.S. Fish and Wildlife  
Service.

COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY  
ENDANGERED, MOVEMENT, REPRODUCTION

259

McAfee, M. E., and R. Imler. 1977. Lake and  
Reservoir Research. Pond and small lake  
investigations. Evaluation of urban lake  
management practices. Colo. Div. Wildl.  
Fed. Aid Proj. F-52-R-3, Work Plan III, Job  
3, Final Rep. 27pp.

Four lakes in the Denver metro area were  
studied to evaluate urban lake management  
techniques. Two lakes were completely eradi-  
cated and restocked with bass, sunfish, and

channel catfish. The other two lakes were stocked with warmwater species. Stocking costs and fishing pressure were calculated by fisherman contact and creel census reports.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RECRUITMENT, URBAN

260

McDonald, M. 1884. Distribution of carp during the season of 1882. U.S. Comm. of Fish and Fisheries. Report of the Commissioner for 1882. Part 10:915-942.

Each annual report by the U.S. Commissioner of Fish and fisheries contains tables detailing distribution of Cyprinus carpio to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, CULTURE, FISHERY—Commercial, HISTORY, PLATTE RIVER DRAINAGE

261

McDonald, M. 1889. Report of distribution of fish and eggs by the U.S. Fish Commission from January 1886 to June 30, 1887. U.S. Comm. of Fish and Fisheries. Report of the Commissioner for 1886. Part 14:833-842.

Each annual report by the U.S. Commissioner of Fish and Fisheries contains tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

CULTURE, HISTORY, PLATTE RIVER DRAINAGE

262

McFarland, J. 1975. Four fish endangered. Colo. Outdoors 24(3):12-13.

The article describes endangered fish of western Colorado and their present status. It also discusses methods of inventory and assessment.

COLORADO RIVER DRAINAGE, ENDANGERED, MANAGEMENT, POPULAR

263

McKean, W. T., and W. T. Burkhard. 1975-1978. Fish and wildlife analysis for the Yellow Jacket Project. Colo. Div. Wildl. 543pp.

This report describes the fish and wildlife resources and their habitats in the Yellow Jacket Project Area located in northwestern

Colorado. There were several water development plans to regulate flows on the North Fork of the White river, tributaries of the White River, and the Milk River to provide water for industrial, municipal, and domestic use in connection with anticipated development of coal and oil shale reserves. The data gathered was intended for use in a Bureau of Reclamation Environmental Impact Statement

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, HABITAT, INVENTORY, STREAM FLOW, WATER QUALITY—Chemical, Physical

264

Marshall, T. L. 1973. Trout populations, angler harvest, and value of stocked and unstocked fisheries of the Cache la Poudre River, Colorado. Ph.D. Diss. Colo. State Univ., Ft. Collins. 91pp.

The author evaluated self-sustaining populations of trout by angler use, harvest, and census populations. He also developed an economic valuation of non-priced resources. A "wild river" section and a river section through a campground were the test sites.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

265

May, B. E. 1970. Biota and chemistry of Piceance Creek. M.S. Thesis. Colo. State Univ., Ft. Collins. 152pp.

Physical, chemical, and biological characteristics of Piceance Creek and White River were evaluated to establish a base from which to monitor possible changes resulting from future oil shale activity in the area. Emphasis was placed on chemical parameters, and on seasonal abundance trends, habitat preference, linear distribution, and standing crops of macroinvertebrates.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, INVENTORY, INVERTEBRATES--Benthos, STREAM FLOW, WATER QUALITY—Chemical, Physical

266

Miller, D. L. 1983. Rare fishes of the Arkansas River drainage in Colorado. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 18:6-11.

An evaluation of a 3-year field study to determine the distribution of the Arkansas darter (Etheostoma cragini), speckled chub (Hybopsis aestivalis), southern redbelly dace (Phoxinus erythrogaster), big-mouthed shiner (Notropis dorsalis), and creek chub (Semotilus atromaculatus) in the Arkansas River drainage.

ABUNDANCE, ARKANSAS RIVER DRAINAGE, HABITAT,  
INVENTORY

267

Miller, D. L. 1984. Distribution, abundance,  
and habitat of the Arkansas darter,  
Etheostoma cragini, (Percidae) in Colorado.  
Southwest. Nat. 29(4):496-499.

A presentation of field research and findings  
during 1979-1981. Localities, habitat fea-  
tures, and other species associated with the  
areas are given.

ABUNDANCE, ARKANSAS RIVER DRAINAGE,  
DISTRIBUTION, HABITAT, HISTORY, INVENTORY,  
MOVEMENT

268

Miller, R. R. 1946. Gila cypha, a remarkable  
new species of cyprinid fish from the  
Colorado River, Grand Canyon, Arizona.  
J. Wash. Acad. Sci. 36(12):409-415.

The first scientific description of the humpback  
chub. The Gila complex in the Colorado River  
system is considered, including speculations  
about ecosubspeciation within the endemic  
genus.

COLORADO RIVER DRAINAGE, DESCRIPTION,  
DISTRIBUTION, ENDANGERED, TAXONOMY/SYSTEMATICS

269

Miller, R. R. 1958. Origin and affinities  
of the freshwater fish fauna of western North  
America. Pp. 187-222 in C. L. Hubbs, ed.  
Zoogeography. Am. Assoc. for the Advance-  
ment of Sci. Pub. 51. Washington, D.C.

A description of the zoographic affinities of  
North American fishes.

ARCHAEOLOGY, DISTRIBUTION, HISTORY

270

Miller, R. R. 1964. Extinct, rare, and  
endangered American freshwater fishes. Proc.  
16th Internat'l. Cong. of Zoologists 8:4-11.

This publication lists 38 species of fish that  
are rare in the United States including the  
humpback chub (Gila cypha), Colorado squawfish  
(Ptychocheilus lucius), and razorback sucker  
(Xyrauchen texanus).

ABUNDANCE, COLORADO RIVER DRAINAGE,  
DISTRIBUTION, ENDANGERED

271

Miller, R. R. 1965. Fishes of Dinosaur.  
Naturalist 15(2):24-29.

This semi-popular article presents a general  
discussion of the fishes of Dinosaur National  
Monument, Moffat County. The endangered  
Colorado squawfish (Ptychocheilus lucius),  
bonetail (Gila elegans), humpback chub (G.  
cypha), and razorback sucker are discussed.

ABUNDANCE, DISTRIBUTION, ENDANGERED,  
NATURAL HISTORY

272

Miller, R. R. 1965. Quaternary freshwater  
fishes of North America. Pp. 569-581 in  
H. E. Wright and D. G. Frey, eds. The  
Quaternary of the United States. Princeton  
Univ. Press, Princeton, N. J.

A discussion of the fishes found in the fossil  
record, particularly the late-Pliocene and  
Pleistocene.

ARCHAEOLOGY

273

Miller, R. R. March 1983. Personal communi-  
cation. Museum of Zoology. Univ. Mich.,  
Ann Arbor, Mich. (Unpubl.)

Museum listings for Colorado fishes from the  
University of Michigan.

COLLECTION, COLORADO RIVER DRAINAGE, RIO  
GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE,

274

Miller, W. H. 1966. Distribution, abundance,  
and growth of the fishes of Little Beaver  
Creek, Colorado. M.S. Thesis. Colo. State  
Univ., Ft. Collins. 62pp.

This study is a thorough investigation of the  
effects that logging, road construction, and  
other lane manipulation may have on a stream  
fishery in mountainous regions. The objective  
is to provide a base from which to measure the  
various effects on fish populations.

AGE/GROWTH, INVENTORY, MOVEMENT, PLATTE RIVER  
DRAINAGE, STREAM FLOW, WATER QUALITY--Chemical,  
Physical

275

Miller, W. H., D. L. Archer, H. M. Tyus, and  
K. C. Harper. 1982. White River fishes  
study. Colo. River Fish. Proj. Final Rep.  
U.S. Fish and Wildl. Serv., Salt Lake City.  
58pp.

Physicochemical and biological parameters of  
the White River were evaluated to determine  
the significance of the White river to endan-

gered fish. Life histories, habitat preferences, and species interactions were studied. Abundance and distribution of young Colorado squawfish and movements of adult squawfish were part of a special investigations program.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, HABITAT, HYBRIDIZATION, MANAGEMENT, MIGRATION, MOVEMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Physical

276

Miller, W. H., D. Archer, H. M. Tyus, and R. M. McNatt. 1982. Yampa River fishes study. Colo. River Fish. Proj. Final Rep., Yampa River. U.S. Fish and Wildl. Serv., Salt Lake City. 79pp. + Appen.

Because the upper Green and lower Yampa rivers have been suggested to be important habitat for endangered fishes, the Fish and Wildlife Service initiated this study to collect information for planning purposes. The major objectives of the study were to create a standardized sampling program to characterize fish habitat, abundance, and distribution; to study adult Colorado squawfish (Ptychocheilus lucius) and abundance and distribution of young squawfish through the use of radiotelemetry, and to model the physical habitats of representative and unique river stretches.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, HABITAT, HYBRIDIZATION, MIGRATION, MOVEMENT, RECRUITMENT, REPRODUCTION, STREAM FLOW, TAXONOMY/SYSTEMATICS, WATER QUALITY--Chemical, Physical

277

Miller, W. H., H. M. Tyus, C. W. McAda. 1983. Movement, migration, and habitat preference of radiotelemetered Colorado squawfish; Green, White, and Yampa rivers, Colorado and Utah. U.S. Fish. and Wildl. Serv., Colo. River Fish. Proj., Salt Lake City. 39pp.

An unpublished report of radiotelemetry studies in the Green, Yampa, and White rivers in Utah and Colorado during 1979-1981. Movement and migration of the endangered Colorado squawfish were followed on a seasonal basis throughout the study area. General and spawning habitat preferences of migrating squawfish are described.

ABUNDANCE, BEHAVIOR, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, MIGRATION, MOVEMENT, NATURAL HISTORY, REPRODUCTION,

278

Mitchell, M. 1983. The carp: a fish much maligned. Colo. Outdoors 32(6):40-44.

A popular article describing an unexplored Colorado carp commercial fishery.

FISHERY--Commercial, MANAGEMENT, POPULAR

279

Molles, M. 1980. The impacts of habitat alterations and introduced species on the native fishes of the upper Colorado River basin. Vol. 2. Pp. 163-203 in W. O. Spofford, A. L. Parker, and A. V. Kneese, eds. Energy development in the southwest: problems of water, fish, and wildlife in the upper Colorado River basin. Resources for the Future, Inc., Washington, D.C.

The inability of the native fish fauna of the Colorado River basin to compete with introduced fish species was discussed in terms of the island biogeography theory. The effects of dam construction in altering habitat and creating segmented populations was also considered.

ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, HABITAT, PREDATION, WATER QUALITY--Chemical

280

Mpoame, M., and E. J. Landers. 1981. Ophiotaenia critica (Cestoda:rotocephalidae), a parasite of the Colorado River squawfish. Great Basin Naturalist 41(4):445-448.

A description of tapeworms infesting endangered Ptychocheilus lucius at Willow Beach National Fish Hatchery, Arizona. The parasite is described as a new species.

COLORADO RIVER DRAINAGE, DISEASE, ENDANGERED

281

Mpoame, M., and J. N. Rinne. 1983. Parasites of some fishes native to Arizona and New Mexico. Southwest. Nat. 28(4):399-405.

A report of 22 parasitic species infesting 12 native fish species from the Colorado River drainage.

COLORADO RIVER DRAINAGE, DISEASE, ENDANGERED

282

Mueller, G. A. 1984. Spawning by Rhynchthys osculus (Cyprinidae), in the San Francisco River, New Mexico. Southwest. Nat. 29(3):354-356.

A description of the reproductive behavior, habitat requirements, and the environmental cues that trigger spawning of the speckled dace.

BEHAVIOR, COLORADO RIVER DRAINAGE, HABITAT,  
NATURAL HISTORY, REPRODUCTION

283

Mullan, J. W. 1973. Considerations in perpetuation of greenback cutthroat trout (Salmo clarki stomias). U.S. Fish and Wildl. Serv. Spec. Rep., Vernal, Utah.

Recommendations for the recovery and management of the greenback cutthroat trout.

ENDANGERED, FISHERY—Sport, MANAGEMENT,  
PLATTE RIVER DRAINAGE

284

Mullan, J. W. 1974. Impoundments and their effects on aquatic resources. Proc. West. Assoc. State Game and Fish Comm. 54:367-380.

A broad overview of impoundment management, attitudes, and challenges. Colorado impoundment studies are considered exemplary.

MANAGEMENT, URBAN

285

Muth, R. T., and C. M. Haynes. 1984. Plexiglass light-trap for collecting small fishes in low-velocity riverine habitats. Prog. Fish-Cult. 46(1):59-62.

An inexpensive plexiglass light-trap for the collection of age-0 and/or small fishes in low-velocity areas is described. The results of 1981 field trials is presented.

COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY

286

Muth, R. T., C. M. Haynes, and C. A. Carlson. 1985. Culture of roundtail chub, Gila robusta robusta, (Cyprinidae), through the larval period. Southwest. Nat. 30(1):152-154.

A presentation of the only reported propagation and laboratory culture of the roundtail chub (Gila robusta). Ripe adults were collected in the Yampa River (Moffatt County), eggs fertilized on site, and larvae raised in the laboratory. Significant embryological events and larval morphometrics are given.

COLORADO RIVER DRAINAGE, CULTURE, DESCRIPTION,  
EARLY LIFE HISTORY

287

Muth, R. T., C. M. Haynes, and C. A. Carlson. 1985. Reproduction and early life history of the Colorado squawfish (Ptychocheilus lucius) in the Green-Yampa River system, Utah and

Colorado: A synthesis of current knowledge. Paper presented at 9th Annu. Larval Fish Conf., Early Life History Sec., Am. Fish. Soc., Univ. Texas Marine Science Inst., Port Aransas. 21-28 February. (Abstr.)

An overview of current thought relative to the ecology of the Colorado squawfish in the upper Colorado River basin, with particular respect to the larval stages. An analysis of drift net studies is given as well as a hypothesis relating to downstream larval transport from Yampa River production areas to Green River nursery areas.

ABUNDANCE, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ECOLOGY—Interactions, ENDANGERED, MANAGEMENT, NATURAL HISTORY, REPRODUCTION, STREAM FLOW

288

Nehring, R. B. 1980. Stream fishery investigations. Job 1, Taylor River flow investigations. Job 3, Special regulations evaluations. Colo. Div. Wildl. Fed. Aid F-51-R-5, Job Prog. Rep. 161pp.

Changed patterns of stream flow were instituted in 1976 to augment spawning success of brown trout in the Taylor River. The purpose of this study was to characterize the Taylor River brown trout population and to determine if any significant changes occurred after 1973-1975. Special regulations were evaluated to determine their effects on selected reaches of 8 trout streams as compared to control streams and the degree of acceptance by fishermen.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, REPRODUCTION, STANDING CROP, STREAM FLOW

289

Nehring, R. B., and R. Anderson. 1981. Stream fishery investigations. Job 1, Taylor River flow investigations. Job 3, Special regulations evaluation. Colo. Div. Wildl. Fed. Aid F-51-R-6, Job Prog. Rep. 161pp.

Changed patterns of stream flow were instituted in 1976 to augment spawning success of brown trout in the Taylor River. The purpose of this study was to characterize the Taylor River brown trout population and to determine if any significant changes occurred after 1973-1975. Special regulations were evaluated to determine their effects on selected reaches of 8 trout streams as compared to control streams, and the degree of acceptance by fishermen.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, REPRODUCTION, STANDING CROP, STREAM FLOW

290

Nehring, R. B., and R. Anderson. 1982. Stream Fishery Investigations. Job 1, Taylor River Flow Investigations. Job 3, Special Regulations evaluation. Colo. Div. Wildl. Fed. Aid Proj. F-51-R-7, Job Prog. Rep. 185pp.

Changed patterns of stream flow were instituted in 1976 to augment spawning success of brown trout in the Taylor River. The purpose of this study was to characterize the Taylor River brown trout population and to determine if any significant changes occurred after 1973-1975. Special regulations were evaluated to determine their effects on selected reaches of 8 trout streams as compared to control streams, and the degree of acceptance by fishermen.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, REPRODUCTION, SAN JUAN RIVER DRAINAGE, STANDING CROP, STREAM FLOW

291

Nehring, R. B., and R. Anderson. 1984. Recruitment and survival of young-of-the-year (YOY) brown trout (*Salmo trutta* L.) in the South Fork of the Rio Grande River versus parent spawner density, stream discharge, and fry habitat. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:35-43.

An analysis of brown trout recruitment as correlated with stream habitat variables from research conducted during 1976-1983.

ABUNDANCE, EARLY LIFE HISTORY, FISHERY—Sport, MANAGEMENT, RECRUITMENT, RIO GRANDE RIVER DRAINAGE, STREAM FLOW

292

Nelson, W. C. 1955. Green Mountain Reservoir studies, 1949-1950. Colo. Dep. Game and Fish, Denver. 214pp.

The fisheries portions of the study analyzed age and growth, movement, productivity of trout, and fishing pressure and success. Limnological studies included morphometry and hydrography, temperature regimes, oxygen, and pH. Seasonal variations of phyto- and zooplankton populations and changes in benthic fauna relative to bottom type also were investigated.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY—Sport, FOOD, INVERTEBRATES—Benthos, Plankton, LIMNOLOGY, MANAGEMENT, MOVEMENT, PRODUCTION, STANDING CROP, WATER QUALITY—Chemical, Physical

293

Nolting, D. R. 1956. The effects of uranium mill waste disposal on the fish populations and aquatic productivity of the lower San Miguel and Dolores rivers. Colo. Dep. Game and Fish, Denver. 15pp. (Unpubl.)

The Dolores and San Miguel rivers are two of the few warmwater rivers in Colorado that support a good game fishery. Based on upstream-downstream comparisons and use of historical (1951-1956) data in letters, the author concluded that the uranium mill at Uravan produced toxic effluents which virtually depleted the rivers of aquatic life for more than 7 miles. The recovery time following cleanup, if carried out, was estimated to be 5 years. If the pollution were allowed to continue unchecked, the fishery would be completely eliminated in the lower San Miguel and Dolores rivers.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, HISTORY, INVENTORY, POLLUTION, TOXICANTS, WATER QUALITY—Physical

294

Nolting, D. 1956. The 1953 creel census for Jumbo Reservoir. Colo. Game and Fish Dep. 38pp.

The 1953 creel census uses a revised method begun in 1952. This census determines fishing pressures on various fish species and results are compared with 1952 data. Stocking to improve the yield of game fish is recommended.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RECRUITMENT

295

Nolting, D. H. 1968. The lake trout in Colorado. Colo. Dep. Game, Fish and Parks. 109pp. (Unpubl.)

The lake trout (mackinaw) is an exotic fish that was planted in Colorado as early as 1900. The author notes that very little planning went into the introduction and that little to no research was done on the species. This statewide fish investigation studied the distribution, status, and potential fishery value of lake trout in Colorado

ARKANSAS RIVER DRAINAGE, AGE/GROWTH, COLORADO RIVER DRAINAGE, DISTRIBUTION, FISHERY—Sport,

FOOD, LIMNOLOGY, MANAGEMENT, PLATTE RIVER DRAINAGE, RECRUITMENT, REPRODUCTION, WATER QUALITY--Chemical, Physical

296

O'Brien, J. S. 1984. 1983 Yampa River cobble reach morphology investigations. Final Report. Submitted to Endangered Species Office, U.S. Fish and Wildl. Serv., Salt Lake City. 79pp.

An investigation conducted in the Yampa river, Dinosaur National Monument, Moffat County, to characterize a known spawning site of the endangered endemic Colorado squawfish, Ptychocheilus lucius.

COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, REPRODUCTION, STREAM FLOW

297

O'Brien, J. S., and W. J. Miller. 1984. Yampa and Green rivers water temperature simulation. Dinosaur National Monument. Report submitted to U.S. Fish and Wildl. Serv., Colorado River Fishery Proj., Salt Lake City, and the U.S. Natl. Park Serv., Water Resources Field Support Lab., Ft. Collins. 28pp.

A report of a computer simulation to test the validity of a minimum streamflow hydrograph developed by the National Park Service for the preservation of natural conditions and processes of the Yampa River, Dinosaur National Monument (Moffat Co.).

COLORADO RIVER DRAINAGE, HABITAT, STREAM FLOW

298

Olive, J. R. 1953. A bibliography of the limnology and fishery biology of Colorado. Fish. Manage. Div., Colo. Dep. Game and Fish, Denver. 33pp.

A bibliography presenting publications and unpublished reports regarding literature of the major animal taxa, including fishes.

BIBLIOGRAPHY, LIMNOLOGY

299

Olson, H. F. 1962. A pre-impoundment study of the Navajo Reservoir, New Mexico. N. Mex. Dep. Game and Fish, Fed. Aid F-22-R-3, Work Plan 1, Job B-1, Job Compl. Rep. 29pp.

A report of a pre-impoundment study of the Navajo Reservoir (San Juan River drainage, geographically adjacent to Archuleta Co., Colo.) during 1961-62. "Undesirable species" were

collected, including Colorado squawfish (Ptychocheilus lucius) and roundtail chubs, incorrectly cited as "bonytails" (Gila robusta). Gamefish recommendations were made.

ABUNDANCE, ALTERATION, DISTRIBUTION, ENDANGERED, HISTORY, INVENTORY, INVERTEBRATES--Benthos, MANAGEMENT, SAN JUAN RIVER DRAINAGE, STREAM FLOW, WATER QUALITY--Chemical, Physical

300

Olson, H. F. 1962. State-wide rough fish control. N. Mex. Dep. Game and Fish Fed. Aid F-19-D-4, Job Compl. Rep. 6pp.

A description of a 1961-62 "trash fish" poisoning project in the San Juan River and Navajo and Pine River tributaries prior to closure of Navajo Dam (geographically adjacent to Archuleta Co., Colo.). Fourteen "trash fish" species, largely natives--including Colorado squawfish, Ptychocheilus lucius, and roundtail chubs (incorrectly listed as "bonytail chubs"), Gila robusta, were poisoned.

ABUNDANCE, ALTERATION, ENDANGERED, INVENTORY, MANAGEMENT, SAN JUAN RIVER DRAINAGE, TOXICANTS

301

Olson, H. F. 1963. Fisheries study of Navajo Reservoir. N. Mex. Dep. Game and Fish, Fed. Aid F-22-R-4, Work Plan 1, Job B-1. Job Compl. Rep. 10pp.

A fisheries survey of post-impoundment Navajo Reservoir (geographically adjacent to Archuleta Co., Colo.) during 1962-63 to determine a fisheries management program for the reservoir.

ALTERATION, ENDANGERED, INVENTORY, INVERTEBRATES--Benthos, MANAGEMENT, SAN JUAN RIVER DRAINAGE, WATER QUALITY--Chemical, Physical

302

Olson, H. F., and W. J. McNall. 1964. Fishery surveys of Navajo Reservoir and tailwaters. N. Mex. Dep. Game and Fish, Sec. 8, Job A-2(a), Job Compl. Rep. 88pp.

A detailed post-impoundment (1962-64) analysis of the fishes of Navajo Reservoir (geographically adjacent to Archuleta Co., Colo.) and its tailwaters. Changes in "undesirable species" (i.e., native species) are documented. Introduction of exotics into the reservoir is described.

ABUNDANCE, AGE/GROWTH, ALTERATION, DISTRIBUTION, ENDANGERED, FOOD, HISTORY, INVENTORY, INVERTEBRATES--Benthos, LIMNOLOGY,

MANAGEMENT, SAN JUAN RIVER DRAINAGE,  
WATER QUALITY--Chemical, Physical

303

Ono, R. D., J. D. Williams, and A. Wagner.  
1983. Vanishing fishes of North America.  
Stone Wall Press, Inc., Washington, D.C.  
257pp.

This book highlights dozens of endangered and threatened North American fishes, including the greenback cutthroat trout (Salmo clarki stomias), Colorado squawfish (Ptychocheilus lucius), humpback chub (Gila cypha), bonytail (G. elegans), and razorback sucker (Xyrauchen texanus). Photographs, maps, and artwork.

COLORADO RIVER DRAINAGE, DESCRIPTION,  
DISTRIBUTION, ECOLOGY--Interactions,  
ENDANGERED, HABITAT, PLATTE RIVER DRAINAGE

304

Parks, T. J. 1984. Overwintering grass carp in a Denver pond. Proc. Colo.-Wyo. Chap., Am. Fish. Soc. 19:140. (Abstr.)

A determination of the value of compressed oxygen application following ice cover for overwintering Ctenopharyngedon idella.

MANAGEMENT, PLATTE RIVER DRAINAGE, URBAN

305

Phippen, K. W. 1984. Important considerations about the sampling of anglers by the use of the count-interview creel survey method. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:122-129.

An evaluation of angler selection for the count-interview creel survey method.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT  
PLATTE RIVER DRAINAGE

306

Pierce, J. 1886. Report of the State Fish Commissioner of Colorado for the year 1886. Denver. 22pp.

This report describes the activities of the Fish Commissioner and progress made in culturing desirable fish species. It gives descriptions of various species of fish in Colorado and hints for their culture. This report also outlines needs, recommendations, and difficulties in enforcing fish and game laws.

ARKANSAS RIVER DRAINAGE, FISHERY--Sport,  
MANAGEMENT, PLATTE RIVER DRAINAGE

307

Pimentel, R., and R. V. Bulkley. 1983. Concentrations of total dissolved solids preferred or avoided by endangered Colorado River fishes. Trans. Am. Fish. Soc. 112: 595-600.

A laboratory determination of total dissolved solids tolerances of Colorado squawfish (Ptychocheilus lucius), bonytail (Gila elegans), humpback chub (G. cypha), and razorback sucker (Xyrauchen texanus).

COLORADO RIVER DRAINAGE, ENDANGERED, POLLUTION,  
TOXICANTS, WATER QUALITY--Chemical

308

Pimentel, R., and R. V. Bulkley. 1983. The response of Colorado squawfish to channel catfish as prey in an aquarium. Utah Coop. Fish. Unit., Utah State Univ., Logan. 14pp.

Channel catfish (Ictalurus punctatus) were presented to Ptychocheilus lucius in aquaria as prey to evaluate potential choking.

COLORADO RIVER DRAINAGE, ECOLOGY--Trophic relationships, ENDANGERED, PREDATION

309

Pimentel, R., R. V. Bulkley, and H. M. Tyus. 1985. Choking of Colorado squawfish, Ptychocheilus lucius (Cyprinidae), on channel catfish, Ictalurus punctatus (Ictaluridae), as a cause of mortality. Southwest. Nat. 30(1):154-158.

Report of laboratory study to evaluate likelihood of choking upon exotic channel catfish as a mortality factor for endangered Colorado squawfish.

BEHAVIOR, COLORADO RIVER DRAINAGE,  
ECOLOGY--Interactions, ENDANGERED, FOOD,  
PREDATION

310

Policky, G. A., and D. M. Kelly. 1984. Infectious hematopoietic necrosis at a Colorado hatchery before, during, and after infection. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:78-83.

A report of an infectious hematopoietic necrosis outbreak at a Colorado rainbow trout (Salmo gairdneri) hatchery, control methods, and guidelines for future prevention.

CULTURE, DISEASE

311

Powell, G. C. 1958. Evaluation of the effects of a power dam release pattern upon the downstream fishery. M.S. Thesis. Colo. State Univ., Ft. Collins. 149pp.

Investigates the effects of the operation of Green Mountain power dam on the trout population and sport fishery of Blue River. Water level fluctuations were great, severely affecting the stream habitat below the dam by altering temperature and turbidity, scouring, and bank erosion. Insect production and trout condition were poorer below the dam. Weight gain of trout near the dam was also lower than that of trout in other sections.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, HABITAT, INVERTEBRATES--Benthos, Plankton, PRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

312

Powell, T. G. 1972. The northern pike in Colorado. Colo. Div. Wildl., Outdoor Facts, Fish. Inform. Leaflet 19. 2pp.

A semi-popular description of the biology and ecology of Esox lucius in Colorado.

DESCRIPTION, FISHERY--Sport, HABITAT, NATURAL HISTORY, POPULAR

313

Powell, T. G. 1976. Lake and reservoir research. New lake survey. Colo. Div. Wildl. Fed. Aid F-52-R-2, Work Plan III, Job 1, Final Rep. 5pp.

This project acquired the general biological survey data on urban lakes as part of a plan for fishery management practices. The urban lakes were classified as potential new public fishing waters in/or near the urban centers of the front range. Thirty-five lakes were surveyed in the course of a 4-year project.

FISHERY--Sport, INVERTEBRATES--Plankton, PLATTE RIVER DRAINAGE, URBAN, WATER QUALITY--Chemical, Physical

314

Pratt, H. 1936. Population studies of the trout of the Gunnison River. Univ. Colo. Studies 24:107-116.

The relative abundance of rainbow, brown, cutthroat, and brook trout were assessed by angling. Scarcity of brook and cutthroat trout is attributed to high water temperatures and stocking practices.

ABUNDANCE, COLORADO RIVER DRAINAGE, REPRODUCTION, WATER QUALITY--Chemical

315

Pratt, H. P. 1938. Ecology of the trout of the Gunnison River, Colorado. Ph.D. Diss. Univ. Colo., Boulder. 197pp.

A survey of the fauna of the Gunnison River above Sapinero, Colorado, with an emphasis on trout. The food habits and relative abundances of trout species are discussed.

ABUNDANCE, COLORADO RIVER DRAINAGE, ECOLOGY--Trophic relationships, FOOD, INVERTEBRATES--Benthos, Plankton, STREAM FLOW, WATER QUALITY--Chemical, Physical

316

Prewitt, C. G. 1977. Catostomid fishes of the Yampa and White Rivers, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 122pp.

The distribution of pure and hybrid suckers in the White and Yampa rivers was analyzed with respect to introduced fish species and physical lotic conditions. Differentiation and reproductive success of hybrid complexes are discussed. Morphological differences in populations of the bluehead sucker are related to hydraulic conditions.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, ECOLOGY--Interactions, GENETICS, HABITAT, HYBRIDIZATION, REPRODUCTION, STREAM FLOW, TAXONOMY/SYSTEMATICS, WATER QUALITY--Chemical, Physical

317

Prewitt, C. G., D. E. Snyder, E. J. Wick, C. A. Carlson, E. Ames, and W. D. Fronk. 1977. Baseline survey of aquatic macroinvertebrates and fishes of the Yampa and White rivers, Colorado. Dep. Fish. and Wildl. Biol. Annu. Rep. Colo. State Univ., Ft. Collins.

The occurrence and distribution of fish and non-insect macroinvertebrates, and age/growth of Catostomus latipinnis and C. discobolus are discussed. Data from electroshocking, seining, and dipnetting from several stations on the White and Yampa rivers are presented.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, HABITAT, HYBRIDIZATION, INVENTORY, INVERTEBRATES--Benthos, REPRODUCTION, TAXONOMY/SYSTEMATICS, WATER QUALITY--Chemical, Physical

318

Prewitt, C. G., E. J. Wick, D. E. Snyder, and D. Langlois. 1978. Colorado squawfish and humpback chub population and habitat monitoring program. Colo. Div. Wildl., Fed. Aid SE-3-1, Work Plan 1, Job 1, Job Prog. Rep. 57pp.

The purpose of the program was to monitor reproductive success and year class abundance of Ptychocheilus lucius and Gila cypha, to develop identification keys, and to monitor habitat status in selected areas known to contain these two species.

ABUNDANCE, DISTRIBUTION, ENDANGERED, HABITAT, HYBRIDIZATION, INVENTORY, REPRODUCTION, TAXONOMY/SYSTEMATICS

319

Propst, D. L. 1982. Performance of creek chub and white sucker habitat models in central Colorado. Unpublished Report to U.S. Fish and Wildl. Serv., Habitat Evaluation Procedures Group, Ft. Collins, Colorado. 120pp.

An experimental evaluation of habitat suitability index (HSI) models for Semotilus atromaculatus and Catostomus commersoni.

ECOLOGY—Interactions, HABITAT, REPRODUCTION

320

Propst, D. L. 1982. Warmwater fishes of the Platte River basin, Colorado; distribution, ecology, and community dynamics. Ph.D. Diss. Colo. State Univ., Ft. Collins. 283pp.

A detailed evaluation of Colorado's Platte River system ichthyofauna with ecological observations concerning 33 fish species.

ABUNDANCE, DISTRIBUTION, ECOLOGY—Interactions, ENDANGERED, HABITAT, HISTORY, INVENTORY, PLATTE RIVER DRAINAGE, STREAM FLOW, WATER QUALITY—Chemical, Physical

321

Propst, D. L. 1982. The warmwater fishes of the Platte River system, Colorado: 1978-1980. Prepared for the Colo. Div. Wildl. Dep. Fish. and Wildl. Biol., Colo. State Univ., Ft. Collins. 161pp.

The purpose of this study was to document the warmwater species inhabiting the Platte River system and to estimate their distribution and abundance. Irrigation, flood control, and agriculture have modified the entire Platte River system. This study provides information

about species inhabiting this system which may aid future management decisions to improve their living conditions.

ABUNDANCE, DISTRIBUTION, ECOLOGY—Interactions, ENDANGERED, HABITAT, HISTORY, INVENTORY, PLATTE RIVER DRAINAGE, STREAM FLOW, TAXONOMY/SYSTEMATICS, WATER QUALITY—Chemical, Physical

322

Puttmann, S. J., and D. T. Weber. 1980. Variable walleye fry stocking rates in Boyd Reservoir, Colorado. Colo. Div. Wildl. Tech. Pub. 33. 47pp.

A detailed report of a 1969-1977 sport fishery investigation at an eastern plains (Larimer Co.) reservoir to evaluate fry stocking rates.

AGE/GROWTH, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

323

Ravenel, W. de C.. 1896. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1895. Part 21:6-72.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

CULTURE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

324

Ravenel, W. de C. 1898. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1896. Part 22:11-92.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY—Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE

325

Ravenel, W. de C. 1898. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1897. Part 23:xviii-xc.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY--Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE

326

Ravenel, W. de C. 1899. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1898. Part 24:xxxix-cxxii.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY--Sport, HISTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

327

Ravenel, W. de C. 1900. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1899. Part 25:xxxv-cxxviii.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

328

Ravenel, W. de C. 1901. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1900. Part 26:25-118.

Annual report contains tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY--Sport, MANAGEMENT, RIO GRANDE RIVER DRAINAGE

329

Ravenel, W. de C. 1902. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1901. Part 27:21-110.

Annual report contains tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

330

Reed, E. B. 1975. Limnological characteristics of strip-mine ponds in northwestern Colorado, U.S.A. Verh. Intern. Verein. Limnol. 19:856-865.

Excavation pits from strip-mining activity provide sport fishing possibilities in an area of few lakes. Limnological parameters of two ponds were evaluated for their suitability for fish life. Rainbow trout were thriving in one pond.

COLORADO RIVER DRAINAGE, ECOLOGY--Trophic relationships, INVERTEBRATES--Benthos, LIMNOLOGY, WATER QUALITY--Chemical, Physical

331

Reiger, G. 1977. Native fish in troubled waters. Audubon 79(1):18-41.

A popular article describing the results of river alterations on the Colorado squawfish (Ptychocheilus lucius), humpback chub (Gila cypha), bonytail (G. elegans), and razorback sucker (Xyrauchen texanus).

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, POPULAR

332

Reiser, D. W., M. W. Vitter, and J. Todd. 1982. Reclamation of a Colorado stream impacted by acid mine drainage. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 17:120-132.

An evaluation of a heavy metals treatment plant in the reclamation of a high altitude Gunnison County stream impacted by acid mine drainage.

COLORADO RIVER DRAINAGE, POLLUTION, WATER QUALITY--Chemical

333

Roscoe, J. W. 1974. Systematics of the west-slope cutthroat trout. M.S. Thesis. Colo. State Univ., Ft. Collins. 74pp.

A systematic analysis of upper Colorado River basin cutthroat trout to determine its taxonomic position and possible affinities with Salmo clarki lewisi.

COLORADO RIVER DRAINAGE, DISTRIBUTION, TAXONOMY/SYSTEMATICS

334

Roselund, B. D. 1984. Use of antimycin in the restoration of the greenback cutthroat trout, Rocky Mountain National Park, Colorado. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:93. (Abstr.)

A report of methods and results in the use of this fish toxicant to remove non-native species to benefit the reintroduction of Salmo clarki stomias in the Hidden Valley area of Rocky Mountain National Park (Larimer Co.).

MANAGEMENT, PLATTE RIVER DRAINAGE, TOXICANTS

335

Rosenfeld, M. J. 1983. The use of chromosomes in fisheries biology: Population species discrimination in chubs (genus Gila). Proc. Bonneville Chap. Am. Fish. Soc. 1983:9-17.

A study to karyotype chromosomes from round-tail chubs (Gila robusta), bonytails (G. elegans), and humpback chubs (G. cypha) and to stain chromosomes for determination of intra-chromosomal differences for the three species.

COLORADO RIVER DRAINAGE, ENDANGERED, GENETICS, TAXONOMY/SYSTEMATICS

336

Satterfield, J. R., Jr. 1984. Development of stocking procedures to produce sport fishing in Colorado's small warmwater impoundments. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:94-95. (Abstr.)

Stocking combinations of largemouth bass (Micropterus salmoides), black crappie (Pomoxis nigromaculatus), walleye (Stizostedion vitreum), and bluegill (Lepomis macrochirus) with fathead minnows (Pimephales promelas) to benefit sport fishing in small ponds.

AGE/GROWTH, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, STANDING CROP

337

Seethaler, K. H. 1978. Life-history and ecology of the Colorado squawfish (Ptychocheilus lucius) in the upper Colorado River basin. M.S. Thesis. Utah State Univ., Logan. 156pp.

This account reviews the historical abundance and decline of the Colorado squawfish throughout the Colorado River basin. The project focuses on systematics, larval description, age/growth, and movement. Habitat preferences, diseases, and competition with exotic species are also discussed. Management recommendations

include artificial propagation, public education, and a moratorium on the development of the Colorado River.

AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISEASE, DISTRIBUTION, ENDANGERED, FOOD, HABITAT, HISTORY, MANAGEMENT, MIGRATION, MOVEMENT, NATURAL HISTORY, PREDATION, REPRODUCTION, STREAM FLOW, TAXONOMY/SYSTEMATICS, WATER QUALITY—Chemical, Physical

338

Seethaler, K. H., C. W. McAda, and R. S. Wydoski. 1976. Endangered and threatened fish in the Yampa and Green rivers of Dinosaur National Monument. Utah Coop. Fish. Res. Unit, Logan. 22pp.

A summary of the current status of threatened and endangered fish inhabiting Dinosaur National Monument based on literature review and research by the Utah Cooperative Fishery Unit.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISEASE, ENDANGERED, DISTRIBUTION, HABITAT, HYBRIDIZATION, POLLUTION, PREDATION, REPRODUCTION, STREAM FLOW, WATER QUALITY—Chemical, Physical

339

Sinning, J. A., and J. W. Andrew. 1979. Habitat enhancement for Colorado squawfish in the Yampa River in conjunction with railroad construction. Pp. 553-555 in G. A. Swanson (Tech. Coord.). The mitigation symposium: a national workshop on mitigating losses of fish and wildlife habitats. U.S. For. Serv. Gen. Tech. Rep. RM-65.

A description of the proposed construction of an artificial backwater in the Yampa River (Moffat Co.) to benefit Ptychocheilus lucius.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, MANAGEMENT

340

Sisty, W. E. 1874-1884. Biennial reports of the State Game and Fish Commissioner of the State of Colorado. Denver.

These six reports describe the activities of the fish commission and progress made in culturing desirable species. They tabulate the distribution of fish, but usually only in terms of "trout," not species. These reports also outline needs, recommendations, and difficulties in enforcing fish and game laws.

CULTURE, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

341

Smith, G. R. 1966. Distribution and evaluation of the North American catostomid fishes of the subgenus Pantosteus, genus Catostomus. Univ. Mich. Mus. Zool. Misc. Publ. 129. 133pp.

A comprehensive investigation of the taxonomy, morphology, natural history, and evaluation of six species of Catostomus.

AGE/GROWTH, DESCRIPTION, DISTRIBUTION, FOOD, HABITAT, HISTORY, HYBRIDIZATION, NATURAL HISTORY, REPRODUCTION, TAXONOMY/SYSTEMATICS

342

Smith, G. R., R. R. Miller, and W. D. Sable. 1979. Species relationships among fishes of the genus Gila in the upper Colorado River drainage. Proc. First Conf. on Scientific Research in the National Parks. U.S. Natl. Park Serv. Trans. and Proc. Series No. 5. V. 1:613-623.

A systematic morphomeristic analysis of features characterizing and distinguishing Gila cypha, G. elegans, and G. robusta.

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, ENDANGERED, HYBRIDIZATION, TAXONOMY/SYSTEMATICS

343

Smith, N. F., 1976. Aquatic inventory: Animas-La Plata project. Colo. Div. Wildl. Final Rep. 316pp.

A survey to provide baseline information on the Animas-La Plata-Mancos drainages. Information includes water quality, invertebrate collections, creel census and stocking records from 1952, and fish population estimates.

ABUNDANCE, DISTRIBUTION, FISHERY--Sport, HABITAT, INVENTORY, INVERTEBRATES--Benthos, SAN JUAN RIVER DRAINAGE, STANDING CROP, STREAM FLOW, WATER QUALITY--Chemical, Physical

344

Smith, N. F. 1977. Aquatic inventory: San Miguel Project. Colo. Div. Wildl. Final Rep. 193pp.

An inventory of the San Miguel Project area and the surrounding area. The study included all San Miguel River sections and tributaries from Telluride to confluence with the Dolores River. Lake surveys were conducted in the four principal reservoirs in the area.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, FISHERY--Sport, INVENTORY, INVERTEBRATES--Benthos, STREAM FLOW, WATER QUALITY--Chemical, Physical

345

Smith, N. F. 1979. Aquatic inventory: McElmo Creek Project, Colorado. Final Rep. Colo. Div. Wildl. 92pp.

A survey to provide baseline information on the McElmo Creek drainage. Information includes water quality, invertebrate collections, creel census and stocking records from 1952, and fish population estimates.

ABUNDANCE, CREEL CENSUS, DISTRIBUTION, HABITAT, INVENTORY, INVERTEBRATES--Benthos, MOVEMENT, SAN JUAN RIVER DRAINAGE, STANDING CROP, STREAM FLOW, WATER QUALITY--Chemical, Physical

346

Snyder, D. E., M. B. M. Snyder, and S. C. Douglas. 1977. Identification of golden shiner, Notemigonus crysoleucas, spotfin shiner, Notropis spilopterus, and fathead minnow, Pimephales promelas, larvae. J. Fish. Res. Bd. Canada 34(9):1397-1409.

Morphomeristic description of the cyprinid larvae.

ANATOMY/MORPHOLOGY, DESCRIPTION, EARLY LIFE HISTORY, TAXONOMY/SYSTEMATICS

347

Snyder, D. E. 1981. Contributions to a guide to the Cypriniform fish larvae of the upper Colorado River system in Colorado. U.S. Bur. Land Manage. Biol. Sci. Ser. 3. Denver. 81pp.

This study is a compilation of prepared information on larval fish identification, and the cypriniform larvae of the upper Colorado River system. The study includes: ecosystem analysis, species list, and a note on the necessary life requisites for all life stages.

ABUNDANCE, ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, COMPETITION, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, HISTORY, NATURAL HISTORY

348

Snyder, G. R., and R. A. Tanner. 1960. Cutthroat trout reproduction in the inlets to Trappers Lake. Colo. Dep. Game and Fish Tech. Bull. No. 7. 86pp.

The objectives of the study were to estimate the number of spawning Salmo clarki stomias entering the inlet streams of Trappers Lake, and to gather information about size, age, sex ratios, and egg production of migrating cut-throat trout.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ENDANGERED, MANAGEMENT, MIGRATION, PRODUCTION, RECRUITMENT, REPRODUCTION

349

Stalnaker, C. B., and P. B. Holden. 1973. Changes in native fish distribution in the Green River system, Utah-Colorado. Utah Acad. Sci. Proc. 50(Pt. 1):25-32.

A discussion of the changes in abundance and distribution of seven cyprinids and catostomids indigenous to the Green River basin following the closure of Flaming Gorge Dam.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, REPRODUCTION, STREAM FLOW

350

Stroud, R. H. 1963. Green River humpbacks. Sport Fish. Inst. Bull. 141:7.

It had been predicted that the construction of Flaming Gorge Dam would eliminate Gila cypha above the Yampa River confluence with the Green River. For a short time, however, the regulated flows permitted the collection of these fish, which had previously not been possible.

ALTERATION, COLORADO RIVER DRAINAGE, ENDANGERED, STREAM FLOW

351

Stuber, R. J. 1979. An evaluation of two strains of rainbow trout in Dillon Reservoir, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 65pp.

Growth, harvest, and survival of two strains of fingerling Salmo gairdneri were evaluated. Fair growth and low harvest were attributed to competition with kokanee (Onchorhynchus nerka). Stunted kokanee comprised the majority of fisherman harvest. The small size was surmised to be due to a change in the composition of the zooplankton forage base.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, MANAGEMENT, PREDATION, WATER QUALITY--Chemical

352

Sutton, R. J. 1976. The humpback chub. Colo. Outdoors 25(4):20-21.

A popular account of the native endangered Gila cypha.

COLORADO RIVER DRAINAGE, ENDANGERED, POPULAR

353

Swanson, R. 1984. Largemouth bass propagation. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:62-68.

A presentation of research designed to evaluate methods for the culture of Micropterus salmoides to a length of greater than 6 inches in a single growing season.

CULTURE, EARLY LIFE HISTORY

354

Taliaferro, R. 1953. The 1952 creel census for Jumbo Reservoir. Colo. Dep. Game and Fish. 36pp.

A revised method of creel census was begun in 1952 using IBM computers to obtain a detailed analysis of creel census data. Fishing pressures on various species were determined.

CREEL CENSUS, FISHERY--Sport, MANAGEMENT, PLATTE RIVER DRAINAGE, RECRUITMENT

355

Taliaferro, R. 1953. 1952 warm-water fish research on Jumbo Reservoir. Colo. Dep. Game and Fish. Denver. 23pp.

The 1952 fishery research program included: a continuation of the fishery biological survey, experimental trout stocking, and fish salvage. At the time of this research program, the perch and crappie grew to considerable sizes. Another objective of the program was to determine the cause of this growth and to incorporate this knowledge with a recovery program for warmwater fish in other lakes and impoundments.

AGE/GROWTH, FOOD, INVENTORY, MANAGEMENT, PLATTE RIVER DRAINAGE, RECRUITMENT, WATER QUALITY--Chemical, Physical

356

Taliaferro, R. 1955. Warm-water fish research on Jumbo Reservoir, 1951-1953. Colo. Dep. Game and Fish. Denver. 135pp.

The 1952 fishery research program continued through 1953. It became apparent that the

perch/crappie populations were diminishing. A fishing experiment was conducted to determine methods to improve the catch. The fishery biological survey, experimental trout stocking, and fish salvage programs continued. Management plans were developed using 1952 and 1953 data.

AGE/GROWTH, FOOD, INVENTORY, MANAGEMENT,  
PLATTE RIVER DRAINAGE, RECRUITMENT,  
WATER QUALITY—Chemical, Physical

357

Taliaferro, R. 1955. The 1954 creel census of Sterling Reservoir. Colo. Dep. Game and Fish. 30pp.

The Colorado Game and Fish Department conducted an extensive creel census to obtain information on which to base future management plans for warmwater impoundments. Primary objectives were to determine the proper size, species, percent composition of potential stocking fish, the total fishing pressure, and the most successful time, position, and method to catch the various species.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT,  
PLATTE RIVER DRAINAGE

358

Thorne, G. R. 1978. Stocking catchable rainbow trout in Navajo Lake. N. Mex. Dep. Game and Fish F-22-R-19, Job c-19, Perf. Rep.

An analysis showed that fish caught-per-hour improved with stocking catchable-size rainbow trout, probably due to better survival. Continuation of stocking catchables was recommended.

CREEL CENSUS, FISHERY—Sport, MANAGEMENT,  
SAN JUAN RIVER DRAINAGE

359

Titcomb, J. W. 1904. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for the year 1902. Part 28:22-110.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various fisheries are discussed in the text.

COLORADO RIVER DRAINAGE, CULTURE, FISHERY—  
Sport, MANAGEMENT, PLATTE RIVER DRAINAGE,  
RIO GRANDE RIVER DRAINAGE,

360

Titcomb, J. W. 1905. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1903. Part 24.

Annual report containing tables detailing distribution of fish to the states. Current topics and developments of various fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER  
DRAINAGE, CULTURE, FISHERY—Sport, MANAGEMENT,  
PLATTE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

361

Toney, D. P. 1974. Observations on the propagation and rearing of two endangered fish species in a hatchery environment. Proc. West. Assoc. State Game and Fish. Comm. 54:252-259.

Description of successful hatchery procedures for the propagation of Colorado squawfish (Ptychocheilus lucius) and razorback suckers (Xyrauchen Texanus).

COLORADO RIVER DRAINAGE, CULTURE, ENDANGERED

362

Torres, J. 1978. Essential habitat for threatened or endangered wildlife in Colorado. Colo. Div. Wildl., Denver. 84pp.

The habitat requirements, limiting factors, and historical and present range of threatened or endangered species are considered for 11 fish species in addition to birds and mammals. Reasons for a species' population decline are discussed as well as recommendations for restoration sites.

ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, HYBRIDIZATION, NATURAL HISTORY, PLATTE RIVER DRAINAGE

363

Trojnar, J. R., and R. J. Behnke. 1974. Management implications of ecological segregation between two introduced populations of cutthroat trout in a small Colorado lake. Trans. Am. Fish. Soc. 103(3):423-430.

Feeding habits of Pikes Peak and Snake River Salmo clarki were investigated as well as angling vulnerability.

ARKANSAS RIVER DRAINAGE, ECOLOGY—  
Interactions, FISHERY—Sport, FOOD, GENETICS,  
TAXONOMY/SYSTEMATICS

Tunberg, L. D. 1967. Stream orientation of western longnose suckers. M.S. Thesis. Colo. State Univ., Ft. Collins. 41pp.

A section of the Cache la Poudre River was electrofished periodically for 9 years to determine the movements of Catostomus catostomus. The data on territoriality, homing, and home range is intended to be used in the management of other fish populations in both lakes and streams. In the spring of 1965 a disease was noted in some trout and whitefish. By fall 1965, few fish of any species were captured.

DISEASE, INVERTEBRATE--Benthos, MOVEMENT, PLATTE RIVER DRAINAGE, STREAM FLOW

## 365

Tyus, H. M. 1984. Colorado squawfish spawning study, Yampa River, 1983. U.S. Fish and Wildl. Serv., Colorado River Fish. Proj., Vernal, Utah. Final Rep. 34pp.

The movement and migration of Colorado squawfish in the Yampa, White, and Green rivers were studied through the use of radiotelemetry. Two major spawning sites were identified and characteristics of spawning habitat were described. The paper discusses a drift theory explaining the small number of young-of-the-year (YOY) squawfish in the Yampa River and probable causes for poor survivorship of YOY squawfish in the Green River. Recommendations are given for the maintenance of squawfish in these rivers.

ALTERATION, BEHAVIOR, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, MANAGEMENT, MIGRATION, MOVEMENT, REPRODUCTION, WATER QUALITY--Physical

## 366

Tyus, H. M. 1984. Life strategies in the evaluation of the Colorado squawfish (Ptychocheilus lucius). Paper presented at "Utah's water--a biological symposium," Univ. Utah, Salt Lake City. 14pp.

Speculations on the evolution of life-cycle patterns in Ptychocheilus lucius.

ARCHAEOLOGY, BEHAVIOR, COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY, MIGRATION, NATURAL HISTORY, REPRODUCTION

## 367

Tyus, H. M. 1985. Homing behavior noted for Colorado squawfish. *Copeia* 1985(1):213-215.

Migratory behavior of Ptychocheilus lucius in the Green-Yampa River system (Utah-Colorado)

is hypothetically related to homing with an unknown olfactory stimulus.

BEHAVIOR, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, NATURAL HISTORY, REPRODUCTION

## 368

Tyus, H. M., and C. W. McAda. 1984. Migration, movements and habitat preferences of Colorado squawfish, Ptychocheilus lucius, in the Green, White and Yampa rivers, Colorado and Utah. *Southwest. Nat.* 29(3):289-299.

A presentation of observations and analysis of radiotelemetry studies in the upper Colorado River basin during 1980 and 1981. Movements, spawning activity, habitat requirements, and migration hypotheses are given.

BEHAVIOR, COLORADO RIVER DRAINAGE, EARLY LIFE HISTORY, ENDANGERED, HABITAT, MIGRATION, MOVEMENT, REPRODUCTION, STREAM FLOW

## 369

Tyus, H. M., B. D. Burdick, R. A. Valdez, C. M. Haynes, T. A. Lytle, and C. R. Berry. 1982. Fishes of the upper Colorado River basin: distribution, abundance, and status. Pp. 12-71 in W. H. Miller, H. M. Tyus, and C. A. Carlson, eds. *Fishes of the upper Colorado River system: present and future*. West. Div. Am. Fish. Soc. 131pp.

The distribution and relative abundance of fishes from the upper Colorado River basin are presented by major tributary and reservoir. Each species' distribution is documented on separate maps. This study provides a base for documenting past/future changes of the Colorado River system.

ABUNDANCE, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, NATURAL HISTORY

## 370

Tyus, H. M., E. J. Wick, and D. L. Skates. 1985. Spawning migration of Colorado squawfish (Ptychocheilus lucius) in the Yampa and Green Rivers, Colorado and Utah, 1981. Pp. 102-108 in *Proc. 13th Annu. Desert Fishes Council* 1982.

Radiotelemetry of Colorado squawfish permitted tracking of 8 squawfish to spawning grounds in the lower Yampa River. The movement of each fish is graphically portrayed. Authors state that protection of spawning migrations may be important to the preservation of the squawfish.

COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, MIGRATION, MOVEMENT, REPRODUCTION

371

U.S. Bureau of Land Management. 1980.  
Intensive wilderness inventory. Proposed  
wilderness study areas. U.S. Bur. Land  
Manage. CO-931 8510.

An evaluation of areas proposed as wilderness  
study areas in the BLM land use planning  
program. Fishing opportunities and features  
of scientific value (e.g., endangered fish)  
enhance the resource value.

COLORADO RIVER DRAINAGE, ENDANGERED, INVENTORY

372

U. S. Fish and Wildlife Service. 1955.  
A report on fish and wildlife resources in  
relation to the San Juan-Chama project and  
related developments. Colorado, Rio Grande,  
and Arkansas River basins, Colorado and New  
Mexico. U.S. Fish and Wildl. Serv.,  
Albuquerque.

An evaluation of the effects of the Pagosa, Rio  
Chama, Rio Arraba, Rio Medio, and Rio Abajo  
Divisions of the San Juan-Chama Diversion  
Project. This project called for water diver-  
sions from the San Juan drainage to the Rio  
Grande to replace irrigation water into New  
Mexico as provided by the Upper Colorado River  
Basin Compact--1949. Diversions of water from  
the Rio Grande basin to the Arkansas Basin in  
New Mexico were also in the plan. The evalu-  
ation includes purpose, location, engineering  
data, water storage and release schedules,  
watershed description, fisheries and habitat  
description, and wildlife resource information.

ALTERATION, FISHERY--Sport, HABITAT, SAN JUAN  
DRAINAGE, STREAM FLOW

373

U.S. Fish and Wildlife Service. 1967. Green  
River fishes and invertebrates. U.S. Fish  
and Wildl. Serv., Utah Coop. Fish Unit, and  
U.S. Natl. Park. Serv. Spec. Rep. 124pp.

A questionable analysis of the impacts result-  
ing from the massive 1962 rotenone poisoning  
of the Green River in and above Dinosaur  
National Monument.

ALTERATION, COLORADO RIVER DRAINAGE,  
ENDANGERED, REPRODUCTION, TOXICANTS

374

U. S. Fish and Wildlife Service. 1982.  
Colorado River Fishery Project. Part 2.  
Final Report. Field investigations. U.S.  
Fish and Wildl. Serv. and Bur. Reclam., Salt  
Lake City. 365pp.

The objectives of the study were to evaluate  
the status, life history, and habitat require-  
ments of Colorado squawfish (Ptychocheilus  
lucius), humpback chub, (Gila cypha), bonytail  
chub (G. elegans), and razorback sucker (Xyra-  
uchen texanus) in the upper Colorado, Green,  
Little Colorado, Gunnison, and Dolores rivers.  
Adult, juvenile, and spawning habitat require-  
ments; migration and movement patterns; and  
interspecific competition were investigated as  
part of the primary objectives.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE,  
COMPETITION, DISEASE, DISTRIBUTION, EARLY LIFE  
HISTORY, ECOLOGY--Interactions, ENDANGERED,  
FOOD, HABITAT, HYBRIDIZATION, INVENTORY,  
MIGRATION, MOVEMENT, NATURAL HISTORY, RECRUIT-  
MENT, REPRODUCTION, STREAM FLOW, TAXONOMY/  
SYSTEMATICS, WATER QUALITY--Chemical, Physical

375

U. S. Fish and Wildlife Service. 1984.  
Upper Colorado River basin catalog of fish  
studies. Unpublished. U.S. Fish and Wildl.  
Serv., Reg. 6, Denver. 70pp.

An unpublished catalog of 70 biological and  
physical studies that are recent or ongoing in  
the upper Colorado River basin. Particularly  
useful as a reference of state and federal  
agency activities.

COLORADO RIVER DRAINAGE, BIBLIOGRAPHY,  
ENDANGERED

376

U.S. Fish and Wildlife Service. No date.  
Catalog of Colorado fishes. (Unpubl.).  
Div. Res., Ft. Collins Museum. G. Clemmer,  
pers. commun.

COLLECTION, COLORADO RIVER DRAINAGE, PLATTE  
RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

377

U.S. Geological Survey. 1977. Rio Blanco  
oil shale project: progress report,  
A--summary, Tract C--a oil shale development,  
to area oil shale supervisor.

A general progress report of oil shale studies,  
including a listing of White River fishes  
captured in 1976.

COLORADO RIVER DRAINAGE, INVENTORY

378

U.S. National Museum of Natural History.  
Smithsonian Institution. No date.  
Catalog of Colorado holdings. Unpubl. list  
of serials. J. Gomon, pers. commun.

A list of 43 species and subspecies collected in Colorado. Holdings include specimens dating from mid-19th century.

ARKANSAS RIVER DRAINAGE, COLLECTION, COLORADO RIVER DRAINAGE, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

379

U.S. National Park Service. 1979. Draft Wild and Scenic River study and draft environmental statement, Green and Yampa rivers. 331pp.

This study recommends that 91 miles of the Green River and 47 miles of the Yampa River be included in the Wild and Scenic Rivers System and that FERC licenses to construct several dams not be issued. Reasons for the inclusion in the Wild and Scenic Rivers System and possible impacts of several proposals are discussed.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, PREDATION, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

380

Uyeno, T. 1960. Osteology and phylogeny of the American cyprinid fishes allied to the genus Gila. Ph.D. Diss. Univ. Mich., Ann Arbor. 174pp.

A comparative osteological/systematic analysis of several species of the genera Gila, Ptychocheilus, and Richardsonius.

ANATOMY/MORPHOLOGY, COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, GENETICS

381

Valdez, R. A. 1980. Status of the distribution and taxonomy of Gila cypha in the upper Colorado River. Pp. 53-60 in 12th Annu. Proc. Desert Fishes Council 1975.

A description of the location and critical habitat of newly discovered Gila cypha populations in the Colorado River. Taxonomic problems in the Gila complex are discussed.

ABUNDANCE, COLORADO RIVER DRAINAGE, DESCRIPTION, DISTRIBUTION, ENDANGERED, HABITAT, HYBRIDIZATION, MOVEMENT, STREAM FLOW, TAXONOMY/SYSTEMATICS

382

Valdez, R., P. Mangan, M. McInery, and R. Smith. 1982. Tributary report: Fishery investigations of the Gunnison and Dolores rivers. Pp. 321-365 in Colorado River fishery project. Part 2. Final

Report. Field investigations. U.S. Fish and Wildl. Serv. and Bur. Reclam., Salt Lake City.

This report deals with the status of endangered fishes in the Dolores and Gunnison rivers, two major tributaries of the Upper Colorado River drainage.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISTRIBUTION, ENDANGERED, ECOLOGY--Interactions, HABITAT, MIGRATION, MOVEMENT

383

Vanicek, C. D. 1967. Ecological studies of native Green River fishes below Flaming Gorge Dam, 1964-1966. Ph.D. Diss., Utah State Univ., Logan. 124pp.

Reports composition of species, abundance, and distribution of Green River fishes. The author also compares present abundances with pre-impoundment years; studies the growth, reproduction, and food habits of native fishes; and discusses environmental requirements of selected species.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISTRIBUTION, ENDANGERED, FOOD, HABITAT, MOVEMENT, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

384

Vanicek, C. D., and R. H. Kramer. 1969. Life history of the Colorado squawfish, Ptychocheilus lucius, and the Colorado chub, Gila robusta, in the Green River in Dinosaur National Monument, 1964-1966. Trans. Am. Fish. Soc. 98(2):193-208.

Fish were collected from the Green River in Dinosaur National Monument for 2 years. The operation of Flaming Gorge Reservoir reduced the range of the Colorado squawfish and the Colorado chub. Both species grew slower after dam closure; time of spawning varied according to water temperature and receding water level. Significantly different length-weight relationships between Gila robusta and Gila elegans improved the distinction between these species.

AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISTRIBUTION, ENDANGERED, FOOD, HABITAT, HYBRIDIZATION, INVERTEBRATES--Benthos, Plankton, NATURAL HISTORY, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

385

Vanicek, C. D., R. H. Kramer, and D. R. Franklin. 1970. Distribution of Green

River fishes in Utah and Colorado following closure of Flaming Gorge Dam. Southwest. Nat. 14:297-315.

Studies of fish populations in the Green River were conducted from 1963 to 1966 to determine changes in the river environment associated with closure of Flaming Gorge Dam; to determine species composition, abundance, and distribution of fishes; and to compare fish distribution with pre-impoundment collections. Following closure, native fish populations below the dam were replaced by rainbow trout (Salmo gairdneri) and no reproduction of natives was found above the Yampa River confluence. Below the confluence, fish populations were similar to pre-impoundment years.

ABUNDANCE, ALTERATION, COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, HISTORY, RECRUITMENT, REPRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

386

Velarde, R., and L. Hazzard. 1977. A new home for an old native. Colo. Outdoors 26(2):17-19.

A popular account of Colorado Division of Wildlife efforts to recover the Rio Grande cutthroat trout (Salmo clarki virginalis).

DESCRIPTION, HABITAT, HISTORY, POPULAR, RIO GRANDE RIVER DRAINAGE

387

Wagner, E. J. 1982. The Colorado River cutthroat. Colo. Outdoors 31(4):1-3.

A popular article describing the status of Salmo clarki pleuriticus and Division of Wildlife activities to secure pure self-sustaining populations.

COLORADO RIVER DRAINAGE, DESCRIPTIONS, FISHERY--Sport, HABITAT, POPULAR

388

Walker, C. 1984. Big city bass. Colo. Outdoors 33(4):4-6.

A popular article describing largemouth bass sport fishing in the Denver urban area. Contains a listing of metropolitan bass waters.

FISHERY--Sport, PLATTE RIVER DRAINAGE, POPULAR, URBAN

389

Walters, C. J., and R. E. Vincent. 1973. Potential productivity of an alpine lake as

indicated by removal and reintroduction of fish. Trans. Am. Fish. Soc. 102(4):675-697.

An analysis of changes in major invertebrate populations and periphyton in an alpine lake following removal of Salvelinus fontinalis and stocking with Salmo clarki. (Emmaline Lake, Larimer Co.).

ECOLOGY--Interactions, FOOD, INVERTEBRATES--Benthos, Plankton, LIMNOLOGY, PLATTE RIVER DRAINAGE

390

Weber, D. T. 1959. Effects of reduced stream flows on the trout fishery below Granby Dam, Colorado. M.S. Thesis. Colo. State Univ., Ft. Collins. 149pp.

The purpose of the study was to determine the effects of Granby Dam on the downstream trout fishery and compare the data with pre-impoundment research. Changes in benthic fauna abundance and composition resulted in fewer quality food items available to trout immediately below the dam. In low flows, habitat useful for fish production was greatly diminished below the dam compared with areas further downstream. No differences in Salmo trutta condition factors were found between sections near the dam and further downstream, but S. gairdneri had better condition factors further from the dam.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, HABITAT, INVERTEBRATES--Benthos, Plankton, PRODUCTION, STREAM FLOW, WATER QUALITY--Chemical, Physical

391

Weber, D. T. 1967. The sunfish (Centrarchidae) of Colorado. Colo. Dep. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet. 6. 2pp.

A general descriptive article providing information on largemouth bass (Micropterus salmoides), smallmouth bass (M. dolomieu), white crappie (Pomoxis annularis), black crappie (P. nigromaculatus), green sunfish (Lepomis cyanellus), and bluegill (L. macrochirus). Species listed but not described include the warmouth (L. gulosus), pumpkinseed (L. gibbosus), orange-spotted sunfish (L. humilis) and rock bass (Ambloplites rupestris).

AGE/GROWTH, DESCRIPTION, NATURAL HISTORY, POPULAR

392

Weberg, C. A. 1954. An inventory of the trout reproduction in the major streams. Colo.

Game and Fish Dep. Fed. Aid F-1-R-4, Work Plan IX, Job 1., Job Prog. Rep. 12pp.

Sixteen streams throughout Colorado were investigated for reproductive success of Salmo trutta and Salmo gairdneri.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, FISHERY—Sport, INVENTORY, PLATTE RIVER DRAINAGE, REPRODUCTION, SAN JUAN RIVER DRAINAGE

393

Weberg, C. A. 1954. Fish Hook and Lost Lake studies. Colo. Dep. Game and Fish. 71pp.

The purpose of this study was to evaluate the results of stocking small mountain lakes to discover which size group provided the best return and showed the best growth, and which species was most successful in these lakes. Food habits and food abundance in the lakes were also studied. Although not part of the experimental stocking, brook trout reproduced successfully and provided the best return.

ABUNDANCE, AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY—Sport, FOOD, INVERTEBRATES—Benthos, Plankton, MANAGEMENT, REPRODUCTION, WATER QUALITY—Physical

394

Wernsman, G. R. 1973. Systematics of native Colorado cutthroat trout. M.S. Thesis. Colo. State Univ., Ft. Collins. 57pp.

An analysis of the systematics of four subspecies of Salmo clarki, including the Colorado River subspecies, S. c. pleuriticus. Local distribution and long-term conservation goals are discussed.

COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, DISTRIBUTION, FISHERY—Sport, MANAGEMENT, TAXONOMY/SYSTEMATICS

395

Whicker, F. W., W. C. Nelson, and A. F. Gallegos. 1972. Fallout <sup>137</sup>Cs and <sup>90</sup>Sr in trout from mountain lakes in Colorado. Health Physics 23:519-527.

The authors analyzed the relationship between <sup>137</sup>Cs and <sup>90</sup>Sr concentrations in trout and latitude, elevation, watershed, and dissolved calcium and potassium. Species, age, food habits, and seasonal variation effects were evaluated. Trout from high mountain lakes were found to have higher concentrations of these nuclides than other animals of the region. The authors suggested using trout for monitoring fallout.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, ECOLOGY—Trophic relationships, LIMNOLOGY, PLATTE RIVER DRAINAGE, POLLUTION, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE, TOXICANTS

396

Wick, E. J., D. Snyder, T. Lytle, C. Haynes. 1980. The Colorado Division of Wildlife's Colorado squawfish and humpback chub trend zone monitoring program. P. 100 in 11th Annu. Symp. Desert Fishes Council 1979. (Abstr.)

Describes the sampling program to monitor distribution and status of two endangered fish species.

COLORADO RIVER DRAINAGE, DISTRIBUTION, ENDANGERED, HABITAT, REPRODUCTION

397

Wick, E. J., T. A. Lytle, and C. M. Haynes. 1981. Endangered Wildlife Investigations. Colorado squawfish and humpback chub population and habitat monitoring. Colo. Div. Wildl. SE-3-3, Work Plan 1, Job 1, Job Prog. Rep. 156pp.

Results of endangered fish sampling in selected areas of the Yampa, White, Colorado, and Gunnison rivers during 1979-1980. During these 2 years, a total of 391 endangered fish specimens were captured.

COLORADO RIVER DRAINAGE, DISTRIBUTION, EARLY LIFE HISTORY, ENDANGERED, HABITAT, HYBRIDIZATION, REPRODUCTION

398

Wick, E. J., D. L. Stoneburner, and J. A. Hawkins. 1983. Observations of the ecology of Colorado squawfish (Ptychocheilus lucius) in the Colorado River, Colorado, 1982. Water Resources Field Support Lab., Natl. Park Serv., WRFSL Tech. Rep. No. 83-7; Colo. State Univ.; and Colo. Div. Wildl., Endangered Wildl. Inv. SE3-5, Work Plan 1, Job 1. 55pp.

An unpublished report which describes radio-telemetry observations of migrating squawfish in the Green and Yampa rivers during 1982. Speculations relating to the effects of stream flow and water temperature upon spawning are presented.

BEHAVIOR, COLORADO RIVER DRAINAGE, ENDANGERED, HABITAT, MIGRATION, MOVEMENT, REPRODUCTION, STREAM FLOW

399

Williams, H. J. 1951. The operation of Taylor Reservoir and its effect on Gunnison River

fishing. Colo. Dep. Game and Fish., Denver. 26pp.

The author concluded that fly fishing on the Gunnison River from Gunnison to Sapinero, where Blue Mesa Reservoir is now located, was unaffected by the operation of Taylor Dam. Changes in water volume were not sudden, and the reservoir decreased river turbidity. However, water release did lower water temperatures up to 6°.

COLORADO RIVER DRAINAGE, FISHERY--Sport, STREAM FLOW, WATER QUALITY--Physical

400

Williams, H. J. 1954. A brief study of the major lakes and their tributaries. Colo. Dep. Game and Fish Fed. Aid Proj. F-1-R-4, Work Plan X, Job 4, Job Prog. Rep. 3pp.

The purpose of the study was to identify desirable management techniques and limitations of the concerned lakes.

AGE/GROWTH, COLORADO RIVER DRAINAGE, MANAGEMENT, SAN JUAN RIVER DRAINAGE

401

Wiltzius, W. J. 1973. Selected bibliography on the collection, fertilization, vitality, storage and cryopreservation of gametes--particularly salmonids. Colo. Dep. Game, Fish and Parks Outdoor Facts, Fish. Inform. Leaflet 23. 4pp.

A bibliography of 112 citations relating to subjects described in the title.

BIBLIOGRAPHY, CULTURE, EARLY LIFE HISTORY

402

Wiltzius, W. J. 1974. Post-impoundment fishery investigations, Curecanti Unit, upper Colorado River Storage Project. Final report for Blue Mesa Reservoir. Colo. Div. Wildl. 76pp.

A limnological/fisheries investigation of Blue Mesa Reservoir, Gunnison County. Salmonids are analyzed in detail.

AGE/GROWTH, COLORADO RIVER DRAINAGE, FISHERY--Sport, FOOD, LIMNOLOGY

403

Wiltzius, W. J. 1978. Some factors historically affecting the distribution and abundance of fishes in the Colorado River. Final report for Fishery Investigations of the Lower Gunnison River Drainage. Colo. Div. Wildl. 215pp.

This study attempted to identify major factors associated with construction and operation of dams on the Gunnison River that caused a decline of the trout fishery. Historic changes in abundance of both game and nongame species are discussed. A 3-year sampling program was also conducted to determine present species status in relation to flow regimes. Management recommendations were based on fishing pressure, harvest success, and practical factors.

ABUNDANCE, AGE/GROWTH, ALTERATION, COLORADO RIVER DRAINAGE, COMPETITION, DISEASE, DISTRIBUTION, ENDANGERED, FISHERY--Commercial, Sport, HABITAT, HISTORY, HYBRIDIZATION, INVENTORY, INVERTEBRATES--Benthos, MANAGEMENT, MIGRATION, MOVEMENT, POLLUTION, REPRODUCTION, STREAM FLOW, WATER QUALITY--Physical

404

Wiltzius, W. J. 1985. Fish culture and stocking in Colorado, 1872-1978. Colo. Div. Wildl., Div. Rep. No. 12. 102pp.

Earliest known stocking records in the major Colorado drainages were compiled with an emphasis on catfish, bass, and northern pike. Nearly 80 fishes are mentioned, including trout subspecies and hybrids. It includes extensive discussions of persons and agencies involved in the introduction of fishes to Colorado. It has numerous tables and 100+ photographs (many dating back to the early 1900's).

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DISTRIBUTION, MANAGEMENT, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE

405

Windell, J. T. 1984. Quantification of habitat modification by stream order analysis. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:113. (Abstr.)

An evaluation of stream order analysis to make quantitative estimates of selected habitat modifications on an east slope Rocky Mountain drainage basin. Implications to sport fisheries are given.

ALTERATION, FISHERY--Sport, HABITAT, PLATTE RIVER DRAINAGE, STREAM FLOW

406

Windell, J. T., J. D. Hubbard, and D. L. Horak. 1972. Rate of gastric evacuation in rainbow trout fed three pelleted diets. Prog. Fish-Cult. 34(3):156-159.

An evaluation of gastric evacuation in hatchery Salmo gairdneri fed three different pellet diets as a means of determining diet for efficient production and growth under culture conditions.

CULTURE, FOOD, MANAGEMENT

407

Woodbury, A. M. (ed.). 1963. Studies of biota in Dinosaur National Monument—Utah and Colorado. Univ. Utah, Div. Biol. Sci., Inst. Environ. and Biol. Res. Misc. Papers 1. 77pp.

An evaluation, sponsored by the National Park Service, of the biota of the Green River and adjacent areas. Moffat County, in part.

COLORADO RIVER DRAINAGE, ENDANGERED, HISTORY, INVENTORY, INVERTEBRATES—Benthos, STREAM FLOW, WATER QUALITY—Chemical, Physical

408

Woodling, J. 1980. Game fish of Colorado. An identification guide for sport fish commonly caught in Colorado. Colo. Div. Wildl., Denver. 40pp.

General descriptions of 30 species of Colorado fishes with quality color photographs. Designed for the angler.

DESCRIPTION, FISHERY—Sport, FOOD, HABITAT, NATURAL HISTORY, POPULAR

409

Woodling, J. 1985. Colorado's Little Fish: A guide to the minnows and other lesser known fishes in the State of Colorado. Colorado Div. Wildl. 77pp.

Describes 50 fish species not commonly sought by anglers. Each description includes a color photograph, county distribution map, brief life history notes, habitat and range descriptions, and population status. Major river basins, habitat types, man-induced habitat alterations, and fish anatomy are discussed.

ABUNDANCE, ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, DESCRIPTION, ENDANGERED, HABITAT, NATURAL HISTORY, PLATTE RIVER DRAINAGE, POLLUTION, RIO GRAND RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

410

Worth, G. 1885. Report on the propagation and distribution of food-fishes. U.S. Commission of Fish and Fisheries. Report of the Commissioner for 1893. Part 19:78-138.

Annual report by the U.S. Commissioner of Fish and Fisheries contains tables detailing distribution of fish to the states. Current topics and developments of various U.S. fisheries are discussed in the text.

ARKANSAS RIVER DRAINAGE, COLORADO RIVER DRAINAGE, CULTURE, FISHERY—Sport, MANAGEMENT, PLATTE RIVER DRAINAGE

411

Wu, Shi-Kuei. 1983. Personal Communication. Catalog of Colorado fishes. (Unpubl.) Univ. Colo. Museum, Boulder.

List of specimens dating from early-20th century. Most specimens from Front Range areas; however, the museum has a number of endangered Colorado River endemics in its care.

ARKANSAS RIVER DRAINAGE, COLLECTION, COLORADO RIVER DRAINAGE, ENDANGERED, PLATTE RIVER DRAINAGE, RIO GRANDE RIVER DRAINAGE, SAN JUAN RIVER DRAINAGE

412

Wydoski, R. S., K. Gilbert, K. Seethaler, C. W. McAda, and J. A. Wydoski. 1980. Annotated bibliography for aquatic resource management of the upper Colorado River ecosystem. U.S. Fish and Wildl. Serv. Res. Publ. 135. Washington, D.C. 186pp.

A bibliography consisting of 1,109 entries relating to biology, agriculture, economics, hydrology, geology, grazing, minerals, climatology, sociology, water quality, and resource management. Index by keyword.

BIBLIOGRAPHY, COLORADO RIVER DRAINAGE

413

Yeager, L. E., and D. T. Weber (eds.). 1972. Colorado fisheries research review 1972. Review No. 7. Colo. Div. Game, Fish and Parks. 56pp.

A review of ongoing fishery research in the Colorado Division of Game, Fish, and Parks to date.

FISHERY—Sport, REVIEW

414

Zuckerman, L. D. 1983. Rio Grande River fishes management, Progress report. November 1982-June 1983. Dep. Fish. and Wildl. Biol., Colo. State Univ., Ft. Collins. 53pp.

Since Jordan's extensive fish survey of the Rio Grande River drainage (1889), the fish community has undergone significant changes; the aquatic habitat has been modified, and many non-native fish have been introduced. A goal of this study was to document distribution and status of the fish fauna of the Rio Grande River drainage.

DISTRIBUTION, ENDANGERED, RIO GRANDE RIVER DRAINAGE, STREAM FLOW, WATER QUALITY--Chemical

415

Zuckerman, L. D. 1983. Rio Grande River fishes management. Quarterly Report. July 1983-November 1983. Colo. State Univ., Dep. Fish. and Wildl. Biol., Ft. Collins. 136pp.

The fish fauna of the Rio Grande drainage and San Luis closed basin are described including species distribution, habitat preferences, population status, historical accounts, and fish community structure. The fauna discussed include native, introduced, and extirpated fishes.

COMPETITION, CULTURE, DESCRIPTION, DISTRIBUTION, ENDANGERED, FISHERY--Commercial, Sport, FOOD, HABITAT, HISTORY, HYBRIDIZATION, REPRODUCTION, RIO GRANDE RIVER DRAINAGE

416

Zuckerman, L. D. 1984. Rio Grande River fishes management. Annual report. July 1983-June 1984. Colo. Div. Wildl. 150pp. (Unpubl.)

An extensive and detailed evaluation of the fishes of the Rio Grande drainage in Colorado, including the Rio Grande closed basin. History, past-present distribution, and maps are provided for each of 36 species. The ichthyofauna of several state wildlife areas and the Great Sand Dunes National Monument are included as appendices.

DISTRIBUTION, HABITAT, HISTORY, RIO GRANDE RIVER DRAINAGE

417

Zuckerman, L., and D. Langlois. 1984. Fishes of the San Luis Valley. Proc. Colo.-Wyo. Chap. Am. Fish. Soc. 19:13. (Abstr.)

A general presentation of the ichthyofauna of the little-known San Luis Valley. A new record for the bullhead minnow (Pimephales vigilax) is given.

DESCRIPTION, DISTRIBUTION, HABITAT, HISTORY, NATURAL HISTORY, RIO GRANDE RIVER DRAINAGE

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