BEFORE THE BOARD OF
NATURAL RESOURCES AND CONSERVATION OF THE
STATE OF MONTANA

IN THE MATTER OF APPLICATIONS FOR RESERVATION OF WATER NO. 1781-r, 6294-r, 8476-r, 9442-r, 9646-r, 9931-r, 9933-4, 9934-4, 9935-r, 9937-r, 9938-r, 9939-r, 9940-r, 9941-r, 9942-r, 9943-r, 9944-r, 9945-r, 9946-r, 9947-r, 9948-r, 9949-r, 9951-r, 9952-r, 9953-r, 9954-r, 10,003-r, 10,004-r, 10,005-r, 10,006-r, and 11349-rL&M, 12330-442KJ, 12331-r43Q, 12332-r42K, 12333-r43P, 12334-01 through 12334-14.

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR APPLICANT NO. 1781-r

MONTANA DEPARTMENT OF FISH AND GAME

F. WOODSIDE WRIGHT

CLAYTON R. HERRON

Attorneys for Applicant
Department of Fish and Game

BEFORE THE BOARD OF
NATURAL RESOURCES AND CONSERVATION OF THE
STATE OF MONTANA

IN THE MATTER OF APPLICATIONS FOR RESERVATION OF WATER NO. 1781-r, 6294-r, 8476-r, 9442-r, 9646-r, 9931-r, 9933-r, 9934-r, 9935-r, 9937-r, 9938-r, 9939-r, 9940-r, 9941-r, 9942-r, 9943-r, 9944-r, 9945-r, 9946-r, 9947-r, 9948-r 9949-r, 9951-r, 9952-r, 9953-r, 9954-r, 10,003-r, 10,004-r, 10,005-r, 10,006-r, and 11349-rL&M, 12330-442KJ, 12331-r43Q, 12332-r42K, 12333-r43P, 12334-01 through 12334-14.	PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR APPLICANT NO. 1781-r - MONTANA DEPARTMENT OF FISH AND GAME

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Application for water reservation herein was duly filed by the Montana Fish and Game Commission. Thereafter, some of the duties and responsibilities of that Commission were transferred, by statute to the Department of Fish and Game which is now referred to as applicant herein. The Application of the Montana Department of Fish and Game Numbered 1781-r having come on for hearing on or about August 17, 1977 in Room 231 at Eastern Montana College Library, Billings, Montana and having continued until conclusion thereof in the Senate Chambers of the State Capitol Building, Helena, Montana before the duly appointed Hearing Examiner, James Driscoll, Attorney at Law, Box 534, Helena, Montana:

Comes now the Montana Department of Fish and Game, hereinafter referred to as "Fish and Game", applicant in the above-cited matter, and by and through its attorneys, Clayton R. Herron and F. Woodside Wright, respectfully submits its

Proposed Findings of Fact and Conclusions of Law relating to the said Fish and Game's application for water reservation in the Yellowstone River Basin as attached hereto and as therein stated and respectfully submitted herewith.

Dated this 25 day of May, 1978.

F. Woodside Wright

F. Woodside Wright

Clayton R. Herron

Clayton R. Herron

by

Attorneys for Applicant
Department of Fish and Game
P. O. Box 783
Helena, MT 59601

BEFORE THE BOARD OF
NATURAL RESOURCES AND CONSERVATION
OF THE STATE OF MONTANA

IN THE MATTER OF APPLICATION FOR RESERVATION OF WATER NO. 1781-r BY THE MONTANA FISH AND GAME COMMISSION	) FINDINGS OF FACT AND) CONCLUSIONS OF LAW AS) TO APPLICATION OF) DEPARTMENT OF FISH AND) GAME

The above-entitled matter came on regularly for hearing on or about August 17, 1977, in Billings, Montana, before the Montana Board of Natural Resources and Conservation and its duly appointed Hearing Examiner, James Driscoll. The Applicant appeared by and through its counsel of record, F. Woodside Wright and Clayton R. Herron. The Montana Department of Natural Resources and Conservation appeared by and through its counsel of record, Richard Gordon. The fourteen applicant conservation districts appeared by and through their counsel of record, Gary Spaeth. The City of Billings appeared by and through its counsel of record, Calvin Calton. Utah International, Inc., appeared by and through its counsel of record, Urban Roth. The Intake Water Company appeared by and through its counsel of records, Henry Loble and Boyd Henderson. The Montana Power Company appeared by and through its counsel of record, Robert Woodahl. The Montana Water Development Association appeared without benefit of counsel. The Great Western Sugar Company appeared by and through its counsel of record, Richard McCann. Trout Unlimited and the Federation of Fly Fishermen appeared by and

through their counsel of record, James Goetz. The Montana Wildlife Federation appeared by and through its counsel of record, William Madden. The Environmental Information Center appeared by and through its counsel of record William Leaphart. Witnesses were duly sworn, and oral and documentary evidence was introduced.

The Board, having read and fully considered the complete record, makes the following Findings of Fact and Conslusions of Law relating to the Fish and Game Application No. 1781-r.

FINDINGS OF FACT

1. Fish and Game has made lawful, proper and timely application for reservation of water, to maintain flows, levels, or qualities of water thereof, in the Yellowstone River Basin, including the reaches and tributaries thereof, as follows:

UPPER YELLOWSTONE BASIN (Town of Gardiner to mouth of Boulder River)

Armstrong Spring Creek

Bear Creek

Big Creek

Billman Creek

Brackett Creek

Cedar Creek

Cinnabar Creek

Coke Creek

Eight Mile Creek

Emigrant Spring Creek

Flathead Creek

Fleshman Creek

Fridley Creek

Little Mission Creek

McDonald Spring Creek

Mill Creek

Mission Creek

Hol Heron Creek

Nelson Spring Creek

Rock Creek (Shields Drainage)

Rock Creek (of the Yellowstone)

Shields River

Sixmile Creek

Smith Creek

Suce Creek

Tom Miner Creek

Trail Creek

Yellowstone River (Main Channel, Gardiner to Boulder River)

MIDDLE YELLOWSTONE BASIN (Boulder River to Bighorn River)

Mid-Big Timber Creek

Lower Big Timber Creek

Upper Bluewater Creek

Middle Bluewater Creek

Lower Bluewater Creek

Bridger Creek

Boulder River (Sweet Grass County)

Boulder River (Sweet Grass and Park Counties)

Boulder River (Sweet Grass County)

Upper Butcher Creek

Lower Butcher Creek

Castle Creek (Stillwater County)

Castle Creek (Stillwater and Sweet Grass Counties)

Clarks Fork Yellowstone River

Lower Clarks Fork Yellowstone River

Clear Creek

Dry Creek

East Boulder River (Sweet Grass County)

Fishtail Creek (Stillwater County)

West Fishtail Creek (Stillwater County)

Little Rocky Creek (Stillwater County)

Lower Deer Creek

Picket Pin Creek (Stillwater and Sweet Grass Counties)

Mid-Red Lodge Creek

Lower Red Lodge Creek

Rock Creek

Mid-Rock Creek

Lower Rock Creek

Lower East Rosebud Creek

West Rosebud Creek

Lower West Rosebud Creek

Sage Creek

Stillwater River (Stillwater County)

Mid-Sweet Grass Creek

Lower Sweet Grass Creek

Upper Deer Creek

Lower West Boulder River

West Fork Stillwater River (Stillwater County)

West Fork Stillwater River (Sweet Grass County)

Mid-Willow Creek

Lower Willow Creek

Yellowstone River (Main Channel, Boulder River to Bighorn River)

LOWER YELLOWSTONE BASIN

Bighorn River

Tongue River

Hanging Woman Creek

Otter Creek

Pumpkin Creek

Powder River

Rosebud Creek

Yellowstone River (Big Horn River to Montana-North)

Dakota State Line (Exh. DFG 1781-r pii & iii)

2. Fish and Game is an agency of the State of Montana and thereby authorized by law to make application to the board for reservation of waters for existing or future beneficial uses or to maintain minimum flows, levels or qualities of water as provided by law.

3. Use or reservation of water for the benefit of public fish and wildlife and for public recreational uses are beneficial uses for which purposes application for

reservation of minumum flows, levels and qualities of water is authorized. The reservation application of Fish and Game is for said beneficial uses with respect to all the reaches and tributaries of the Yellowstone River Basin, as hereinbefore set forth.

4. The applicant, Fish and Game has established to the satisfaction of the board the purpose of the reservation as hereinabove stated.

5. The applicant, Fish and Game has established to the satisfaction of the board that there is a need for the reservation of waters in the said respective reaches and tributaries of the Yellowstone River Basin as hereinafter stated and the amounts necessary therefor as hereinafter stated.

6. The reservation of waters for the uses, purposes and needs hereinafter provided for are in the public interest. Those public interests and benefits are:

(a) continued perpetuation of the fish and wildlife resources;

(b) prevention of the gradual depletion of streamflows currently enjoyed by the public for recreational uses;

(c) continued perpetuation of the fish and wildlife resources for current and future utilization by the public;

(d) maintenance of water quality which contributes to a clean, healthful environment for the citizens of the state and the nation; and

(e) contribution to the protection of and continued utilization of existing water rights.

(Exh.DFG 1781-r-1, P. 3, Tr. Vol. II, Test. Spence P. 3)

7. The purpose of the requested reservation does not require construction of any storage or diversion facilities. It does not involve consumptive uses.

8. The environmental benefits to result from granting Fish and Game's application as hereinafter stated are: the continued survival of existing fish populations, maintenance of necessary food and habitat requirements for the fishery, continued water availability for riparian wildlife species and other species of the aquatic habitat, maintenance of the existing stream morphology of the cited stream reaches, continued perpetuation of the existing fish and wildlife resources found in the Yellowstone River Basin for current and future utilization by the public, prevention of gradual depletion of streamflows, maintenance of water quality, protection of the continued utilization of existing water rights in the Yellowstone River Basin, and the continued existence of a free-flowing Yellowstone River. (Tr. Vol. II; Test. Spence P. 3; Exh.DFG 1781-r-1, P. 260)

There are no environmental detriments that result from granting the flows requested by Fish and Game, and hereinafter granted, other than those that occur as a result of granting flow "numbers", which detriments are based on the assumption that all water over and above Fish

and Game requests would be allocated and eventually withdrawn from the stream for other uses, and no longer would be available for fish and wildlife purposes. (Exh.DFG 1781-r-1 P. 9 to 12)

9. Specific economic values of the fish and wildlife and aquatic ecosystem and the recreational aspects of streams in the Yellowstone River Basin are unavailable and unquantifiable in specific terms using present day methodologies. (TR. Vol. 32 p. 20 Lanou; TR. Vol. 13 p. 72, 93, 94 Long ; TR. Vol. 9 test. Stroup p. 2; TR. Vol. 9 p. 143 Stroup; TR. Vol. 11 p. 27, 36, 38, 39 Stroup; TR. Vol. 18 test. Power p. 16). However, conservative estimates of the value of Yellowstone River waters for recreation indicate that the Fish and Game instream reservation request may well represent the most economically rational use of the remaining Yellowstone water.
(TR. Vol. 18 test. Power p. 16, 17).

The value of the existing fishery and aquatic ecosystem in the Yellowstone River Basin, while incalcualable in present economic terms, has significance in its own right and must be recognized in consideration of an application for water in the Yellowstone River Basin.
(TR. Vol. 11, p. 28, Stroup, TR. Vol. 9, Test, Stroup p. 2)

There will be recreational economic losses, both

in income and employment, to all persons who supply goods and services to users of the river if the Fish and Game application is not granted.

(Exh. DFG-1781-r-1, P. 268)

10. There have not been shown herein any demonstrable, non-speculative adverse economic effects to the granting of the application of the Fish and Game as hereinafter stated.

11. The application of the Fish and Game for reservation of flows, is in excess of, and exclusive of, flows of water required to fulfill and provide for existing and established rights to water. Granting of said application for such reservation of flows as hereinafter provided will

not interfere with, depreciate, deplete or adversely affect any existing and established rights to water.

12. There has not been shown herein that any future needs for waters for the Yellowstone River Basin, or any of its reaches or tributaries for any beneficial use will be interefered with, depreciated, depleted or adversely affected by granting of the non-consumptive reservation of flows applied for by Fish and Game as hereinafter stated. Such future needs for such beneficial uses as have been suggested or advanced and supported by credible and probative testimony and evidence in the cases of domestic and municipal uses will not be interfered with or adversely affected by granting the application of the Fish and Game as hereinafter stated. Future needs for such beneficial uses as have been advanced or suggested for domestic, municipal and irrigation needs beyond those herein stated have been only speculative and argumentative and without proof of reasonable expectation of such needs coming into being. As to suggested or advanced needs for irrigation which could, conceivable conflict with the application of the Fish and Game herein, there has been no, or insufficient, proof of suitability of lands to need or to sustain irrigation; no, or insufficient, proof of availability of financing or investment for construction or development of facilities for same; no, or insufficient, proof of any currently existing and viable, plans or schedules for development of such needs or facilities to serve the same; and no, or insufficient,

proof that any present, or future, demands for agricultural products would, economically, justify the development and implementation of facilities for additional irrigation needs. There has been no proof adduced herein of any bona-fide intent and ability to use water for irrigation purposes beyond that which is served by existing rights and which would not be interfered with or adversely affected by the granting of the application of Fish and Game hereinafter stated.

13. The reservation of flows requested by Fish and Game, and granted as hereinafter provided, being a requested reservation of flows for in-stream, non-consumptive use within the State of Montana the same would not be in derogation of any claims to the States of Wyoming or North Dakota under the Yellowstone River Compact.

14. At the present time it is indicated that under and by virtue of, the terms of the Yellowstone River Compact, the State of Wyoming is not utilizing all the waters allocated to it under the said Compact. As to such waters as are not utilized by the State of Wyoming, during the period of such non-utilization, extended term considerations indicate that such waters would better serve the public interests if they were reserved and allocated for in-stream, non-consumptive purposes because:

(a) reservations for in-stream, non-consumptive uses and reservations or appropriations beyond presently existing rights for future diversionary and consumptive uses for

irrigation or other purposes are, to the extent that the latter may be, eventually, diverted for such purposes, mutually exclusive; and

(b) the event of reservation, and use, of such waters for agricultural and other comsumptive uses in Montana and the event of future utilization by the State of Wyoming of any significant portion of its now unutilized allocation of waters would depreciate and adversely affect any investment in, and economic reliance upon the availability of such waters by agricultural or other consumptive users in Montana thereby effecting potential economic loss and adverse effect upon the Montana economy while at the same time, and in the interim depriving the in-stream beneficial uses and benefits from realization; and

(c) the reservation of such unutilized waters for in-stream uses as requested by the Fish and Game at the outset would not bring about such dependence and risk of economic loss but would for the period, and to the extent, that such waters continued to flow, implement and promote the beneficial uses of public fish, wildlife and recreational interests without requirement of investment or expenditure of funds.

15. Insofar as waters, or flows thereof, which are reserved to the State of Wyoming are not utilized by the State of Wyoming, they become waters of the State of Montana and waters within the State of Montana as provided and defined in Section 89-867 R.C.M. and 89-866 R.C.M.

respectively and are, thereby, waters which are available for reservation pursuant to Section 89-890 R.C.M.

16. Waters of the Yellowstone River, and the tributaries thereof, now unallocated to Indian Tribes are waters of the State of Montana and waters within the State of Montana as provided and defined in Section 89-867 R.C.M. and 89-866 R.C.M. respectively and are, thereby, waters which are available for reservation pursuant to Section 89-890 R.C.M.

17. There currently exists a real possibility that some of the waters of the Yellowstone River and its tributaries may in the future be allocated to uses and utilized therefor, by Indian Tribes and their members. Until such time as the rights of such Indian Tribes and their members are lawfully determined it would be to the best interest of the public to reserve the waters of the Tongue and Bighorn Rivers for in-stream, non-consumptive uses.

18. Reservation of waters of the Yellowstone River, and its tributaries, for the in-stream and non-consumptive uses and purposes for which the Fish and Game seeks such reservation herein will more realistically provide for the contingencies of future utilization of waters within the State of Wyoming, under the terms of the Yellowstone River Compact and by Indian Tribes under future legal determinations of the claims of the Indian Tribes. If such waters are not reserved for such in-stream non-consumptivew uses, those waters

will be subject to depletion by reservation or permits for consumptive uses. Those permits would be potentially defeasible by allocations to Indian Tribes and future utilizations by the State of Wyoming. During the period of any such defeasible reservations or permits for consumptive uses, the fish, wildlife and recreational requirements and purposes and uses would be deprived and depreciated.

19. The tributaries in the Upper Yellowstone River Basin, as described in Fish and Game's application, are both physically and biologically related to the mainstream of the Yellowstone River. (Exh.DFG 1781-4-1, P. 292-293, Tr. Vol 11, P. 44, Test, Spence P. 10)

20. Natural processes of river and stream channel flushing and the natural development of a stream reach in a geological sense are necessary to maintain the existing fishery and aquatic ecosystem. Maintenance of the needed minimum flows is required to maintain channel form and processes.

21. An essential part of the habitat for fishery and other components of the aquatic ecosystem is the channel configuration and physical characteristics of the stream, in particular the sinuousity, the islands, the riffles, the pools, the deep channels, the spring floods, and the summer low flows. All of these play an important role in the fishery and aquatic ecosystem, and sufficient water should be reserved to ensure that these components are not

detrimentally affected by dewatering now or in the future. (Tr. Vol. 18, Test. Reichmuth and Vol. 17 Test. Marcoux P. 2)

22. Flows during the high-water period are necessary for channel flushing and maintenance of the channel; and further, high flows are necessary to transport the yearly accumulation of sediment and to control excessive aquatic weed growth. The high flows sweep the gravel bars free of some vegetation. This action aids Canada geese in nesting activities. During periods when a stream has no flow or an insignificant flow, there exists a detriment to the fishery and aquatic ecosystem. (T. Vol 18, Test. Reichmuth P. 3, 5; Exh.DFG 1781-K-1, P. 186)

23. Existence of on-stream reservoirs detrimentally affect the existing fishery and aquatic ecosystem, channel configuration, and riparian wildlife habitat of the Yellowstone River Basin and its tributaries. Location of these reservoirs on the Yellowstone River or its major tributaries could result in scouring of the river channel downstream from the dam, loss of wildlife habitat by reduction of islands and gravel bars, depletion of beaver population in that reach of the river downstream from the dam, weakening of streambank resistance to erosion by high water during spring runoff, reduction of habitat for riparian wildlife species, change the present development of stream channel morphology, and curtail the existing development of riparian vegetation. (Tr. Vol. 18, Test Reichmuth P. 1-10, and Tr. Vol. 13, Test. Martin P. 3-6)

24. Quantity of water is not the only significant determinant in protecting and providing for the fishery and aquatic ecosystem; another variable is water quality. Water quality is affected by the amount of water flowing in the stream, the amount of dissolved solids, the water temperature, and the amount of dissolved oxygen of the stream related to the quantity of water flowing in that stream. (TR. Vol. 5, Test. Thomas)

25. Significant contributors to lowering of water quality are point and nonpoint sources of pollution. Agricultural runoff is a source o nonpoint pollution, and effluent from city sewage treatment plants is a source of point pollution. (Tr. Vol 5, Test. Thomas p. 10-17)

26. Dissolved oxygen is an indicator of the quality of a stream for purposes of a viable aquatic ecosystem. (Tr. Vol 2, p. 81, Test Knudson p. 4)

27. The amount of dissolved oxygen in the water has a direct relationship upon the ability of the aquatic resource and fishery to exist in the water. The higher the amount of effluent and other pollutants in the water the lower the level of dissolved oxygen. (Tr. Vol.2, p. 94-96 Knudson)

28. One-and-a-half (1.5) milligrams per litre is a point of asphyxiation and suffocation of aquatic organisms. (Tr. Vol 2, p. 98, Knudson)

29. The quantity of dissolved oxygen in the waters of the Yellowstone River Basin is governed by the amount of

algal growth in those particular waters: the greater the algal growth, the greater the potential for dissolved oxygen fluctuations and resultant reduction of oxygen for consumption by aquatic life. (Tr. Vol. 17, Test. Knudson)

30. Sediment has a significant relationship to the amount of dissolved oxygen concentration in a stream's water; the greater the amount of sediment, the lower the algal growth and thus the more stable is the dissolved oxygen concentration. (Tr. Vol. 17, Test. Knudson)

31. There is a level of flow of water in a stream reach in which the fishery value will be virtually non-existent. (Tr. Vol. 2, Test. Knudson with Charts P. 4 & 5)

32. There are levels of water in a stream reach at which the fishery value will be hardly existing, severely restricted, limited, or good. The oxygen level in terms of milligrams per litre is related to the flow of the river; where the flow of the Yellowstone River at Custer, is approximately 4,000 cfs. and the dissolved oxygen level is approximately 5.9 milligrams per litre, the fishery value of this reach of stream changes from good to limited. The fishery value of the Yellowstone River at Custer continues to decrease as the flow of the river decreases and the dissolved oxygen in milligrams per litre decreases, such that at 4.5 milligrams per litre of dissolved oxygen and approximately 3,200 cfs. the fishery value changes from limited to severly restricted and at 2,000 cfs. when the dissolved oxygen is approximately 3.2

milligrams per litre, the fishery value becomes hardly existent. (Tr. Vol. 2, Test. Knudson and; Exh.DFG 1781-r-1)

33. The reservation of water for a fishery and aquatic ecosystem enhances the water available for consumptive use along the Yellowstone River and its tributaries; the enhancement is in the form of higher water quality, more constant and reliable flows throughout the irrigation season and the whole year, and also for maintenance of the present diversionary structures utilized by existing water right holders. (Tr. Vol 10, p. 25-26)

34. Granting of the application of Fish and Game for water reservations in the amounts requested will not foreclose the development of off-stream storage projects within the tributaries of the Yellowstone River Basin.

35. There are existing wildlife populations dependent upon certain stream reaches in the Yellowstone River Basin and adequate water is vital to the continuance of the current population of these species. (Exh. DFG-1781-r-1 p. 230-233)

36. The Yellowstone River and its fish and wildlife resources receive their food supply from plants growing both in and out of the river. The river plants are predominantly algae that live attached to the river's bed. They are relatively diverse and currently exist in a state of equilibrium with the river's normal seasonal flow variations. Any tampering with this natural flow regime, by impounding water and stabilizing flows or by massive withdrawals,

would likely result either in the diminished production of the fish and wildlife resources that depend on these plants or in nuisance growths of algae that would hinder enjoyment the utilization of these same fish and wildlife resources. (Tr. Vol 17, Test. Bahls pp. 3-4)

37. An essential component of the aquatic ecosystem are the small aquatic organisms including insects, which provide food for the fish. (Tr. Vol 13, Cross of Peterman p. 195-196)

38. There is a public need for the beneficial use of waters of the Yellowstone River and its tributaries for recreational purposes which would be met by the reservation of flows as requested by Fish and Game.

39. There is a public need for the beneficial use of waters of the Yellowstone River and its tributaries for purposes of providing fish and wildlife habitat sufficient to perpetuate the diverse species comprising this natural resource at levels comparable to currently existing levels.

40. Documentation, evidence and testimony submitted, and received, herein, support the application of Fish and Game for reservations of in-stream flows of the Yellowstone River and its tributaries and the findings herein, as stated herein, that such flows should be reserved. Said application and said findings are based upon evidence and testimony introduced herein by the Fish and Game demonstrating that such requested reservation of flows are based upon the best available state-of-the art evaluations of

water needs to sustain existing aquatic and/or terrestrial ecosystems at the desired and necessary levels.

41. In support of its application the Fish and Game introduced evidence and testimony, which was admitted into the record of the hearing thereon, which evidence and testimony was competent and relevant and introduced through competent and qualified expert witnesses in the fields of fishery biology, wildlife biology, hydrology, recreational demographics, invertebrate biology, water quality. It is amply demonstrated from the record herein that the testimony and opinions of said witness were based upon studies made by them during an extensive period of time with relation to the subjects and matters as to which they testified. Except as hereinafter specifically set forth as to a particular reach or tributary of the Yellowstone River, no competent or relevant evidence or testimony was introduced or received herein in opposition thereto or in contravention thereof.

42. As water is comsumptively used in a stream reach, the return flow is less than the amount diverted, and the quality of the downstream water below the point of return flow is degraded. (Tr. Vol. 5, Test. Thomas P. 32-33)

43. Sufficient water is necessary in the downstream reach of the Yellowstone River and its tributaries to protect existing water right holders in every aspect of that holder's water right including, but not limited to, quantity of water diverted, time of year for diversion,

type of diversion, and water quality. Granting of the reservations of flows requested by the Fish and Game in the upper reaches of the Yellowstone River Basin, the same being subject to existing rights, will serve to protect the availability of water to provide for existing rights to water in the downstream reaches of the Basin.

44. There is a viable and abundant fishery and aquatic ecosystem existent in the Yellowstone River Basin. This fishery and ecosystem are dependent upon the flow of the Yellowstone River and its tributary streams as existent at the time of application. The fishery's dependence upon the various stream reaches is for maintenance of passage requirements, spawning and rearing areas, shelter, and food sources; each of these items requires a sufficient and adequate stream flow.

45. The Yellowstone River and its tributaries in the upper basin are a significant blue-ribbon salmonid fishery. (Tr. Vol 18 Test. Halterman p.2)

46. If sufficient water is not supplied for the natural life cycle of the fishery and other living components of the aquatic ecosystem, there will be a diminution within the fishery and ecosystem of the Yellowstone River Basin. The diminution will be caused in direct part by the decrease in the amount of water available for the livelihood of the fishery and other components of the ecosystem.

47. The results of tampering with ecosystems have

been proven to be disasterous in other areas in the United States. (Tr. Vol. 18, Test. Dana, P. 2)

48. The volume of water in a river or stream is a key factor in the ecological balance of the area, and to significantly reduce the volume is to risk upsetting this balance. (Tr. Vol. 18, Test. Dana, P. 2)

49. If additional reservations or permits for consumptive uses are granted, and the water used for these purposes, there is a serious risk that the Yellowstone River, as it now exists, will be gone forever. Such a process can never be reversed. (Tr. Vol. 18, Test. Dana, P. 3)

50. If a non-consumptive reservation is granted to the Fish and Game in the Yellowstone River Basin, water would still be available if at some time in the future additional consumptive water use is shown to be absolutely essential. (Tr. Vol. 18, Test. Dana, P. 3)

51. There is a stream classification system which has been developed in Montana and which is trout-oriented. This trout-oriented classification applies as to the upper Yellowstone River and its tributaries. However, the middle and lower river stretches are also important. The Yellowstone River between Big Timber and Billings is an important transitory area between trout habitat and habitat for warm water fish. The lower river and its tributaries are important to the public as a warm water fishery. (Tr. Vol. 18, Test. Halterman, P. 4)

52. There is a higher diversity of fish species in the lower Yellowstone than in the upper Yellowstone, and this is a gradual increase from upstream to downstream. There are 11 fish species in the upper basin, 20 species in the middle basin and 45 species in the lower basin. (Tr. Vol. 13, Test. Peterman P. 167-168; Exh.DGF 1781-r-4)

53. A large number of the public, including sportsmen, derive substantial amounts of food and recreation from the fishery on the lower Yellowstone. (Tr. Vol 18, Test. Halterman, P. 4-5)

54. The Yellowstone River is of great importance as a sport fishery and can be divided into three general zones of fish distribution: (1) the upper river from Gardiner to Big Timber (111 miles) supports cold water salmonid populations of national significance and has been classified as a blue-ribbon trout stream. Large populations of a relatively small number of fish species characteristic of cold, clear water rivers inhabit this reach; (2) the middle river from Big Timber to the Bighorn River (160 miles) is a transition zone between the primarily cold water environment of the upper river and the warm water environment of the lower river. Both cold and warm water fishes are present; and (3) the lower Yellowstone extends from the mouth of the Bighorn River to the Montana-North Dakota state line (295 miles). This reach supports a diverse aquatic ecosystem containing a wide variety of species commonly called warm water fishes. (Exh.DFG 1781-

r-4, Tr. Vol 13, Test. Peterman p. 158-159)

55. The flow which is most critical in maintaining the water-sediment balance in a stream is the bank-full flow. This bank-full flow is often called the dominant discharge and is the maximum flow which occurs, on the average, 2 out of 3 years. The two terms are synonymous. Flows which exceed these levels have little to do with channel formation because the excess water spreads out over vegetated areas and is slowed to low velocities. The concept of dominant discharge is both a rational and very good approximation of the high flow needed to maintain stream channel morphology. (Tr. 18, Test. Reichmuth, p. 5-6)

56. Aquatic organisms need adequate dissolved oxygen to survive. There are two processes involved in the amount of dissolved oxygen which may be present in a stream; one process is physical, the other is biological. The physical process involves primarily the water temperature of the stream - the biological process involves the amount of algae present in the stream. If the temperature of the water goes down, a physical process, the respiration and photosynthesis by the algae slows down - a biological process. At the same time, as the water temperature goes down, water has a greater capacity to dissolve exygen. Living aquatic organisms consume oxygen at night through a biological process. Oxygen is, however, produced by some of these same organisms (plants) by photosynthesis

during the daylight periods. Aquatic communities depend on a proper balance between algae production, water temperature and dissolved oxygen. The more plant life present in a stream the more potential there is for fluctuations in dissolved oxygen - higher values would occur during the day and lower values at night. Excessive lowering of dissolved oxygen concentrations causes stress to aquatic populations and can result in death of these living organisms. (Tr. Vol. 17, Test. Ken Knudson, P. 1-6; Tr. Vol. 17, Addendum to Test. Ken Knudson, P. 1-8; Tr. Vol 17, Knudson Cross ex., P. 133-134)

The months of August through mid-September are the summer low-flow period when the Yellowstone River's water temperatures are highest and most conducive to excessive algae and other aquatic plant growth. This excessive plant growth, in turn, has a subsequent impact on the dissolved oxygen balance of the river. (Tr. Vol. 17, Addendum to Test. Ken Knudson, P. 1 & 2)

Extensive water withdrawals occur in the Yellowstone Basin during August and early September. (Tr. Vol. 17, Test. Ken Knudson, P. 6)

Increased algal production and resulting dissolved oxygen fluctuations will be even more severe (or even a nuisance or harmful) if future reduced flows are due to increased man-caused withdrawals rather than naturally low hydrologic conditions. This will be due to (1) new water use consumption for industrial use would not be returned

to the river, thus eliminating this quantity for downstream dilution; (2) only a small percentage of water for expanded agricultural use would be returned, thus reducing downstream dilution, (3) agricultural water which does return to the river will be laden with nutrients at concentrations much higher than were present when the water was diverted; and (4) any increase in human consumption will lead to increases in total nutrient loads ("fertilizers") in the river because no sewage treatment plants in the Yellowstone Basin provide tertiary treatment to remove nutrients. (Tr. Vol. 17, P. 19 of Fish and Game Department report attached to Test. Ken Knudson; Tr. Vol. 17, Test. Ken Knudson, P. 2)

The increased aquatic plant production, brought about not only by increased nutrient concentrations, but also by the warm summer water temperatures, would have a direct impact on the dissolved oxygen balance of the river since all plants, both aquatic and terrestrial, give off oxygen during the day through photosynthesis and take up oxygen at night through respiration. The combined effects of photosynthesis during daylight and respiration during darkness, when recorded over a 24-hour period, yield so-called diel curves of dissolved oxygen. Such diel fluctuations have an adverse impact upon fish and other aquatic organisms, particularly when the low, nighttime dissolved oxygen concentrations become extreme. The dissolved oxygen of water is depleted quite easily, since very small amounts are dissolved in this media under "normal" or

optimum conditions (one part of oxygen to 100,000 parts of water) compared to terrestrial systems, where similar diel activities of plants are hardly noticed by oxygen-dependent organisms. (Tr. Vol. 17, Test. Ken Knudson, P. 2-3; Addendum to Test. Ken Knudson, P. 2-3)

During the summers of 1967 and 1976, diel dissolved oxygen sampling was conducted at several locations on the Yellowstone River. River discharge rates, taken from U. S. Geological Survey records, were also noted during these sampling periods. As the flow of the river became less (therefore concentrating the nutrients and stimulating aquatic plant production per unit area within the river), the dissolved oxygen fluctuations became more extreme. (Tr Vol. 17, Addendum to Test. Ken Knudson, P. 3)

Dissolved oxygen will become critical during the August-mid-September period because: (1) the warm water during this time period has less of a physical capacity to contain relatively high concentrations of dissolved oxygen than does colder water, (2) reduced river flows allow less physical aeration of water to occur because less agitation over riffles will occur and more stagnant areas will be present in the river, (3) reduced water movement causes low dissolved oxygen stress to fish to be amplified. (Tr. Vol. 17, Test. Ken Knudson P. 6)

August and early September flow periods may be the most critical times of the year for aquatic organisms in the Yellowstone River. (Tr. Vo. 17, Test. Ken Knudson, P. 6)

Numerical figures for fishery values at various concentrations of dissolved oxygen have been developed by several workers. The numbers represent the percentage of optimum growth (or "potential yield" of fish populations exposed to different dissolved oxygen concentrations. These numerical values have been termed "good," "limited," "severely restricted," "hardly existing" and "nonexistent." (Tr. Vol. 17, Addendum to Test. Ken Knudson, P. 3-6)

The fishery value of the Yellowstone River at Custer becomes "limited" when summer streamflow is 4,000 cfs. At this flow dissolved oxygen concentration is less than 6.0 mg/l. (Tr. Vol. 17, P. 4 of Addendum to Test. Ken Knudson)

The fishery value of the Yellowstone River at Miles City becomes "limited" when summer streamflow is 6,000 cfs. At this flow the dissolved oxygen concentration is less than 6.0 mg/l. This reach has a greater potential for reaching harmful dissolved oxygen fluctuations with decreased flows than does the reach referred to above. (Tr. Vol. 17, P. 5 of Addendum to Test. Ken Knudson; Exh.DFG 1781-r-1, P. 248)

The fishery value drops much more rapidly at lower dissolved oxygen concentrations that at higher concentrations. The requested flows place the fishery value on the border-line between "good" and "limited." (Tr. Vol. 17, P. 6 of Addendum to Test. Ken Knudson; Tr. Vol. 2, P. 99)

Incremental reductions in flow are not on a "one-

to-one" relationship with the fishery value. At a flow of 4,500 cfs. the fishery value is "good." However, a 50 percent reduction in this amount drops the fishery value from "good" to "hardly existing." A reduction to 1,200 cfs. would reduce the fishery value to "nonexistent." (Tr. Vol. 17, P. 6 of Addendum to Test. Ken Knudson)

If the present fish population of the Yellowstone River is to be maintained at the present quantity and quality, the required streamflow for the months of August through mid-September must be no less than 4,500 cfs. from the Clarks Fork of the Yellowstone to the Bighorn River to the Montana-North Dakota state line. (Tr. Vol. 17, Test. Ken Knudson, P. 6-7; Exh.DFG 1781-r-1, P. 249)

57. Brown trout are the most abundant trout species in the Shields River below the headwaters basin, while mountain whitefish are the most abundant fish species in that reach of stream. Cutthroat trout and mottled sculpin are the only fish species found in the headwaters basin of the Shields River. The Shields River has a number of serious environmental problems, not the least of which is extensive withdrawal of water from stream channels during the irrigation season, which has reduced habitat for salmonids and their food organisms. The Shields River has unstable age class structures of the salmonid fish populations due to environmental problems; these problems are most detrimental to the young-of-the-year and 1-year old trout, which are practically nonexistent in the Shields River; this suggests that salmonid

reproduction in the Shields River mainstem is severely impaired. Trout populations in the tributaries to the Shields River appear to have stable age class structures, suggesting that the tributaries provide substantial recruitment of fish to the Shields River mainstem. (Exh.DFG 1781-r-2. P. 48)

Cutthroat trout were found in 21 of 26 Shields River tributary streams surveyed in 1974; these fish were usually found throughout the entire length of the tributaries where they were found. (Exh.DFG 1781-r-2- P. 47-49)

58. Two and one-half miles of the Shields River were completely dewatered by irrigation in 1974. (Tr. Vol. 17, Test. Stevenson, P. 115)

59. The lower reaches of many tributaries are completely dewatered by irrigation demands from late July through late September; and the flow in several others is less than mini mum flow estimated as necessary to support a good fishery. (Exh.DFG 1781-r-2. P. 63)

60. Higher chemical values of total hardness, total alkalinity and electrical conductivity were obtained on the Shields River than on the Yellowstone River, indicating that the Shields River provides substantial chemical enrichment to the Yellowstone River. (Exh.DFG 1781-4-2, P. 68)

61. The stream classification system developed in Montana is a professional one, verified by studies and which can be fully justified. It has been adopted in other areas such as Wyoming. This classification system designates

the best trout fishing streams as "Blue Ribbon". The upper Yellowstone constitutes the largest stretch of blue-ribbon stream in Montana. It is a stream that is productive year-round, highly accessible, aesthetically outstanding, and a great trout stream. As long as the high quality habitat is maintained the Yellowstone River will continue to be a truly great fishing stream. The natural habitat is directly dependent on maintaining adequate instream flows, among other things, and the maintenance of substantial instream flows is of critical importance to the Yellowstone River. (Tr. Vol. 18, Test. Joe M. Halterman, P. 3-5, also Tr. Vol. 17, Test. Berg)

62. Anglers come to fish the upper Yellowstone River from every state in the union and from many foreign countries, and the local economy depends heavily on the money spent in the communities by these people. (Tr. Vol. 18, Test. Dan Bailey, P. 3)

63. Few, if any, major rivers in the United States remain as close to their natural condition as does the Yellowstone. The upper Yellowstone Basin is most valuable and unique for its scenic, aesthetic, and recreational features, including fish and wildlife habitat. (Tr. Vol. 18, Test. Dana, P. 1)

64. If the upper Yellowstone is maintained in its present condition it will become more and more unique and valuable to Montana as the other rivers of the United States become futher degraded by water diversion and

pollution. (Tr. Vol. 18, Test. Dana, P. 1-2)

65. The Yellowstone Cutthroat trout is a highly prized native species in this upper reach of the Yellowstone River. Although the Yellowstone Cutthroat trout is a native species it now occurs in only a fraction of its former abundance. A significant factor in the decline of the Yellowstone Cutthroat population is the complete diversion of water for irrigation from most of the upper Yellowstone River tributary streams immediately after spring runoff.. (Exh.DFG 1781-r-2, P. 20-25)

66. A segment of the Yellowstone Cutthroat trout population migrate from the mainstem of the Yellowstone River into tributary streams to spawn. Migrations of Cutthroat trout in the upper Yellowstone Basin were confirmed by observing the occurrence of trout in tributaries which were tagged in the mainstem of the Yellowstone River. Studies were conducted in 1973, 1974 and 1975 in the lower reaches of numerous tributaries to the Yellowstone River to document the possible presence of Cutthroat spawing runs. Confirmed spawning run were documented in 9 of 16 tributaries as follows: Cedar, Mol Hern, Tom Miner, Rock, Big, Mill, Emigrant Spring, McDonald Spring, and Nelson Spring Creeks. Studies were made of brown and rainbow trout spawning in 13 upper Yellowstone River tributaries in 1974 and 1975. Spawning runs were observed in 4 of the 13 tributaries as follows: Armstrong, Spring, Nelson Spring, McDonald Spring, and Emigrant Spring Creeks. These are the

only major spring creeks in the upper Yellowstone River. (Exh.DFG 1781-r-2. P. 24-32)

67. The spring creeks in the upper basin are, unlike the high gradient mountain streams, very unique because of their high productivity and relatively constant temperatures. (Tr. Vol. 17, Test. Harold Stevenson, P. 3; Tr. Vol 17, Test. Ron Marcoux, P. 3)

68. Each of said spring creek contains substantial populations of large-sized resident brown and rainbow trout. Substantial numbers of rainbow and brown trout from the Yellowstone River use the spring creeks for spawning purposes. Some fish migrate several miles upstream or downstream in the Yellowstone River to reach a spring creek to spawn. Brown and rainbow trout choose only the lower gradient spring-fed tributaries for spawning. Water depth and water velocity play a role in the selection of a gravel spawning site by trout. (Exh.DFG 1781-r-2, P. 32-33)

69. Streams in the upper Yellowstone-Shields River Basin support a cold water fishery of nationwide importance; these high-quality, cold water streams have clear well-oxygenated water, stable banks and channel configuration, abundant food producing areas, adequate cover and spawning areas for resident salmonid fish populations. Physical access to nearly all the these streams in the upper Yellowstone River is excellent during the fishing season. (Exh.DFG 1781-r-2, P. 77)

70. Yellowstone Cutthroat trout and mountain whitefish

appear to be particularly dependent on the tributaries of the Yellowstone River for spawning. (Exh.DFG 1781-r-2, P. 78)

71. During late summer and early fall, irrigation withdrawals now leave portions of a number of streams in the upper Yellowstone River Basin in a severely or completely dewatered condition. (Exh.DFG 1781-r-2, P. 79)

72. Better fish populations could be expected and maintained, in many areas of the upper Yellowstone-Shields River Basins if minimum instream flow reservations could be established on the major streams. Minimum streamflow must be great enough to maintain optimum spawning areas for adult fish and sufficient food producing and resting areas for fish of all ages. (Exh.DFG 1781-r-2, P. 80)

73. Natural flow regimes and high water quality provided by the free-flowing Yellowstone River and its tributary streams are essential in maintaining this aquatic ecosystem; this ecosystem has adapted to the dynamics of a large, free-flowing river; it is doubtful, if not impossible, that the significant resources of the upper Yellowstone River could be maintained on an impounded Yellowstone River. (Exh. DFG 1781-r-2, P. 83)

74. The purpose of reservation for each stream reach requested by Fish and Game is to provide for a minimum flow, level, and quality of water for the beneficial uses of fish and wildlife and recreation for each month of the year. (Exh.DFG 1781-r-1, P. 2)

75. The need for reservation of water in each stream reach requested by Fish and Game is to provide for continued preservation of fish and wildlife habitat sufficient to perpetuate the several and many species found in each stream reach at currently existing levels; to provide water-based and water-related recreation for residents of this state and tourists and other transients to this state; to provide Fish and Game standing to represent the public's interest in fish and wildlife and recreation when future applications for water use permits in the stream reaches are being considered. The Fish and Game's application for reservation of water in the Yellowstone River Basin represents the public interest in preserving, protecting, and enhancing the environment, providing aesthetically pleasing surroundings, preserving fishing waters in their natural existing state, preserving and protecting fish habitat, preventing unreasonable depletion and degradation of natural resources enhancing and preserving recreational sites, and ensuring perpetuation of non-game wildlife in the existing ecosystem.

76. Fish and Game has demonstrated how the levels and minimum flows requested in its application were determined, and why those levels or flows are necessary to the needs and purposes of the beneficial uses for fish, wildlife and recreational purposes.

77. Demonstrations of the levels and flows needed as requested in the application of Fish and Game were based upon the following state of the art evaluations:

Water Surface Profile Program (WSP)

WSP is a computer adaptation of the Bureau of Reclamatin's Water Surface Profile Computation Method B. The program was written to computerize computations necessary to determine tailwater and backwater elevations below dams and control structures and above reservoirs. WSP is adaptable to in-stream applications. The program allows the user, after sufficient field work, to predict and/or study various changes in stream characteristics at many different flows without having to make numerous field observations at these same flows. The program is calibrated to a specific stream section using one or two observed flows, the corresponding water surface elevations, and cross-sectional data at various locations (transects) in this stream section. Among the parameters which are predicted by the program are width, depth, velocity and wetted perimeter. These parameters can be used in conjuction with known aquatic biological data to estimate possible changes in aquatic habitat under various flow conditions.
(Exh. DFG-1781-r-1, P. 291)

Dominant Discharge

The "dominant discharge" (also known as "bank-full discharge") is that stream discharge which has a recurrence interval of about 1.5 years. It is the peak discharge which occurs 2 out of 3 years on the average. This discharge is believed to be the flow which determines the channel form and allows channel processes

such as sediment transport and bedload movement to occur. The intent in requesting streamflow during the spring high water periods is to maintain channel integrity; i.e., retain existing channel form and allow existing channel processes to occur so that habitat characteristics will be retained. The dominant discharge, when used, was used as the upper limit in the flow requests of Fish and Game. (Exh. DFG-1781-r-1, P. 291)

The dominant discharge quantity was requested only in those stream reaches where USGS streamflow records were available and of sufficient length to allow calculation of this quantity.
(Exh. DFG-1781-r-1, P. 291)

On the ungaged streams Fish and Game requested the dominant discharge, once determined, to occur for one continuous 24-hour period. This resulted in a conservative estimate of the time needed for this flow to accomplish the necessary channel-forming processes. It is indicated that the longer the dominant discharge occurs the more channel work is accomplished. Since the timing of peak flows may vary from year to year, it is feasible only to request the dominant discharge within some broad time period, based on actual streamflow hydrographs for gaged streams in the drainage. Thus the dominant discharge may occur between May 15 and May 31 on some streams, while occurring between June 15 and June 30 on other. Fish and Game requests reflect this variation by stating a broad time period in which the

flows can occur.
(Exh. DFG-1781-r-1, P. 291, 292)

Shields River hydrographs at gaged sites were used to determine the time interval for dominant discharges to occur on tributaries to the Shields. Yellowstone River mainstem hydrographs were used for tributaries to that stream.
(Exh. DFG-1781-r-1, P. 292)

Peak flows requested for the Yellowstone mainstem between the Boulder River and the Clarks Fork River are estimates derived from known dominant discharges at the USGS gages "Yellowstone River at Livingston," "Boulder River at Big Timber," and "Stillwater River at Absarokee."
(Exh. DFG-1781-r-1, P. 292)

Blue Ribbon Classification

The Yellowstone River from Gardiner to the Boulder River at Big Timber was classified as a blue ribbon fishing stream in 1958 and again in 1965 by the Stream Classification Committee (1965). This classification indicates the stream has national as well as statewide importance as a fishing stream. A total of 452 miles is presently classified as "blue ribbon" in Montana. The Yellowstone from Gardiner to Big Timber comprises 23 percent of the state's blue ribbon waters. The stream classification was an attempt to provide a base for calculating the material worth of a fishery and shows quite clearly that Montnan fishing streams are limited both in quantity and quality.

In view of the importance of this famous river, the establishment of streamflow "numbers" as flow recommendations during the low water months, would be the first step in degrading this high quality fishery. Fish populations exist there now due to a wide range of flow conditions. Assigning flow "numbers" to this part of the river would eventually place limitations on the fishery which do not exist today, and ultimately alter the existing status of those aquatic resources. Thus, Fish and Game requested the "instantaneous streamflow, subject to existing, lawfully appropriated water rights in the stream reach" to protect the fishery resources of the reach of the river during the months of January through April (or portions thereof) and August (or portions thereof) through December. Flow numbers were assigned for the high flow periods in some instances. (Exh. DFG-1781-r-1, P. 292)

The tributary streams cannot be separated from the main channel of the Yellowstone River in this portion of the Basin, since they influence water quantity, water quality and are biologically connected. Thus "the instantaneous streamflow..." was also requested for these streams. (Exh. DFG-1781-r-1, P. 292, 293)

Flow Duration Hydrographs

Streamflow frequency data obtained at USGS gaging stations were used to determine streamflows on certain streams and stream reaches. Flow duration data and hydrographs derived from the data were provided by the USGS, Helena, MT.

The data show the percent of time a given flow was equaled or exceeded daily or by month during the given period of record. The data are useful in determining how frequent a given flow would be expected to occur. The data are available for the Yellowstone River gages at Livingston, Billings, Miles City and Sidney, as well as on a number of tributaries.
(Exh. DFG-1781-r-1, P. 293)

Physical, Chemical, Biological Data Collection

Sampling of aquatic populations was done in several ways. Fish population estimates were made according to Vincent (1974). Electrofishing was used in making trout population estimates as well as in routine stream surveys and in the study of the migratory habits of both trout and nonsalmonids. Electrofishing was also employed to sample sauger, walleye, shovelnose sturgeon, paddlefish and other species in the lower Yellowstone River and tributaries. Gill nets and fish traps were used where electrofishing was not feasible or where habits of fish dictated use of other methods.

Aquatic invertebrates were collected with kick nets, Waters and Hester-Dendy samplers.

Water temperatures were collected with recording thermo-graphs and pocket thermometers. Water quality data were collected and analyzed by accepted techniques. Laboratory analyses were made by other agencies such as the Department of Health and Environmental Sciences and Bureau of Mines

and Geology.

Streamflow data were compiled from US Geological Survey records and/or by direct measurement using standard stream-flow measuring techniques.

Depth-velocity requirements were obtained by use of current meters in certain areas where aquatic invertebrates were collected and where fish were observed spawning. Studies by other workers and contacts with persons familiar with a given stream reach were used to verify and/or supplement field data when necessary. Investigations on specific aquatic and riparian species were conducted to determine life history requirements.

(Exh. DFG-1781-r-1, P. 293)

Observations, Analyses, Judgement

and Opinions of Trained and

Qualified Professional Personnel

Low-Flow Photography

Sediment Studies

Other Professionally Acceptable Procedures

Including, but not limited to Creel census; physical measurements of stream cover; flood plain studies; collection of fish population and life history data; depth/velocity criteria; determination of necessary passage flows.

One or more of the above evaluations and procedures

were used in such demonstrations as to each of the several reaches and tributaries of the Yellowstone River, as in these findings hereinafter more specifically set forth.

As referred to in the application of Fish and Game, and in these findings with relation thereto, the following meaning of abbreviations and terms apply:

A. "A/F" means acre-feet;

B. "cfs" means cubic feet per second, rate of stream flow or discharge;

C. One cubic foot per second of flow of water in a stream flowing past any given point for a 24 hour period equals 1.983 acre-feet; the same quantity flowing for a full year would equal 724 acre feet;

D. "Instantaneous flow" is that amount of water flowing past a given point in a given stream or reach at a given time or period; measured in "cfs".

78. The aforesaid evaluations and procedures as evidenced and demonstrated by the application evidence and testimony adduced by Fish and Game were the only such evaluations and procedures adduced or demonstrated as to the requirements for river or stream levels or minumum flows necessary in order to meet the needs and beneficial uses for the fish, wildlife and recreational purposes in the Yellowstone River Basin.

79. There was sufficient evidence and testimony, free and clear of any valid objections as to competency, relevancy, and materiality, adduced by Fish and Game for

the levels and minumum flows necessary to meet the needs and beneficial uses for fish, wildlife and recreational purposes in the Yellowstone River Basin.

80. The evidence and testimony adduced by Fish and Game in support of its application herein having not been met or contravened by evidence or testimony of any objecting party herein, or otherwise, the application of Fish and Game must be sustained, approved and granted by the Board.

Based upon the documentation, evidence and testimony put forth and received herein and upon demonstration made herein, it is hereby found to the satisfaction of the board that as to the particular reaches and tributaries of the Yellowstone River; as to public fish, wildlife and recreational resources present therein, the needs of which will be served by reservation of instream flows in each of such reaches and streams, respectively,; and as to the amounts of instream flows of water which should be reserved to meet the purposes and needs to serve the beneficial uses as set forth in the application of Fish and Game, as follows:

I.

UPPER YELLOWSTONE RIVER

(Town of Gardiner to Mouth of Boulder River)

As to each of the reaches and streams of the Upper Yellowstone Basin, hereinafter set forth, and from the application, testimony and evidence adduced herein by Fish & Game it is established and shown to the satisfaction of the board as follows:

There is substantial recreational use of each stream and reach by fishermen.

The fishery and acquatic resources are of good quality; of statewide importance; and of national prominence, all of which attributes should be protected from degradation by reserving of waters and flows.

Except as hereinafter otherwise stated, the required flow requirements, for each reach and stream, were evaluated, based upon, or related to, Blue Ribbon Stream classifications and upon dominant discharge; and

Except as hereinafter otherwise stated,as applicable to fish life in each of the respective streams and tributaries of the Upper Yellowstone River Basin, the periods of each year when flows for fish passage, spawning, incubation and rearing are required, are as follows:

A. For cutthroat trout: for passage, during the period May 1 to Aug. 15; for spawning, during the period May 15 to Aug. 15; for incubation, during the period May 15 to Sept. 30, and for rearing, during the period Jan. 1 to Dec. 31;

B. For rainbow trout: for passage, during the period Feb. 1 to May 31; for spawning, during the period March 1 to May 31; for incubation, during the period March 1 to July 31; and for rearing, during the period Jan. 1 to Dec. 31;

C. For brown trout: for passage, during the period Sept. 1 to Dec. 15; for spawning, during the period Sept. 1 to Dec. 15; for incubation, during the period Sept. 1 to March 31; and for rearing, during the period Jan. 1 to Dec. 31.

D. For brook trout: for spawning, during the period Sept. 1 to Nov. 30; for incubation, during the period Sept. 1 to March 31; and for rearing, during the period Jan. 1 to Dec. 31;

E. For mountain whitefish: for passage, during the period Sept. 1 to Dec. 15; for spawning, during the period Sept. 1 to Dec. 15; for incubation, during the period Sept. 1 to March 31; and for rearing, during the period Jan. 1 to Dec. 31;

F. For rainbow-cutthroat hybrid trout: for passage, during the period Feb. 1 to May 31; for spawning, during the period March 1 to May 31; for incubation, during the period March 1 to July 31; for rearing, during the period Jan 1. to Dec. 31.

(Exh.DFG-1781-r-1,P.22&23)

There is hereinafter set forth the findings of this board as to the amounts of waters and flows thereof, which are necessary to the public purposes and needs of the public as stated in the application of Fish and Game and herein; and as the same relate to the particular reaches and tributaries of the Upper Yellowstone River Basin and fish and wildlife and recreational uses present in each thereof, all as follows:

ARMSTRONG SPRING CREEK

(Mouth to Origin)

Fish species present:

A. Resident game fish - rainbow, brown, and cutthroat trout and mountain whitefish;

B. Migratory transient game fish - rainbow, brown, and cutthroat trout and mountain whitefish.

(Exh.DFG-1781-r-1,P.21)

The wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks, geese, swans, great blue heron, shorebirds, and bald eagles;

(Exh.DFG-1781-r-1,P.21)

The Creek is nationally known and prominent for its challenge to fly fishermen. (Exh.DFG-1781-r-1,P.21)

Flows are necessary to maintain the high productivity of this spring creek and the excellent trout population it

supports; to maintain documented spawning runs of rainbow and brown trout from the Yellowstone River and potential runs of cutthroat trout and mountain whitefish; and to maintain natural channel form and processes. (Exh.DFG-1781-r-1, P.21)

There should be reserved therein the instantaneous streamflow thereof throughout each year, subject only to existing lawfully appropriated water rights.

BEAR CREEK

(Mouth to the Mouth of North Fork, Bear Creek)

Fish species present:

A. Resident game fish - rainbow and rainbow-cutthroat hybrid trout;

B. Migratory transient game fish - cutthroat and rainbow trout and rainbow cutthroat hybrid trout. (Exh.DFG-1781-r-1,P.24)

The wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG-1781-r-1,P.24)

There is recreational use of this reach of the stream by fishermen. (Exh.DFG-1781-r-1,P.24)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel

form and processes. (Exh.DFG-1781-r-1,P.24)

Flows are necessary to maintain a resident trout population and to maintain potential spawning runs of cutthroat, rainbow, brown trout and whitefish from the Yellowstone River. (Exh.DFG-1781-r-1,P.24)

There should be reserved therein the instantaneous streamflow for the period January 1 through May 10 and August 11 through December 31 each year; subject to existing lawfully appropriated water rights. (Exh.DFG-1781-r-1,P.24)

BEAR CREEK

(North Fork of Bear Creek to Fish Lake)

Fish species present:

A. Resident game fish - cutthroat and rainbow trout, and cutthroat-rainbow hybrid trout;

B. Migratory transient game fish - cutthroat and rainbow trout. (Exh.DFG-1781-r-1,P.25)

Wildlife species present:

A. Resident - beaver, muskrat, marten, mink, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG01781-r-1,P.25)

Flows herein provided for are necessary to protect potential spawning runs of trout at Knox and Fish Lakes and the lower reaches of Bear Creek. (Exh.DFG-1781-r-1,P.25)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is

presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-r-1, P.25)

The instantaneous streamflow subject to existing lawfully appropriated water rights is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.25)

BIG CREEK

(Mouth to Millfork Creek)

Fish species present:

A. Resident game fish - cutthroat, brown, and rainbow trout, rainbow-cutthroat hybrid trout, and mountain whitefish;

B. Migratory transient game fish - cutthroat trout and mountain whitefish.

(Exh.DFG-1781-r-1,P.26)

The wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.26)

This stream supports cutthroat trout and mountain whitefish spawning runs from the Yellowstone River and has potential as a rainbow and brown trout spawning and rearing area. (Exh. DFG-1781-4-1,P.26)

Flows as herein stated, are needed to be reserved to

maintain channel form and processes. (Exh.DFG-1781-r-1,P.26)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes. (Exh.DFG-1781-r-1,P.26)

There should be reserved therein the instantaneous streamflow for the periods of January 1 - May 10 and August 11 - December 31 of each year, subject to existing lawfully appropriated water rights.

BIG CREEK

(Millfork Creek to Bark Cabin Creek)

Fish species present:

A. Resident game fish - rainbow, cutthroat, and bown trout, rainbow-cutthroat hybrid trout, and mountain whitefish;

B. Migratory transient game fish - rainbow, cut-throat, and brown trout, rainbow-cutthroat hybrid trout, and mountain whitefish.

(Exh.DFG-1781-r-1,P.27)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.27)

The flows are necessary to allow potential passage, spawning, and recruitment of trout from the lower reaches

of Big Creek. (Exh.DFG-1781-r-1,P.27)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-4-1,P.27)

The instantaneous streamflow subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.27)

BILLMAN CREEK

(Mouth to the Mouth of Coke Creek)

Fish species present:

A. Resident game fish - cutthroat, rainbow, and brown trout; brook trout may also occur;

B. Migratory transient game fish - cutthroat, rainbow, and brown trout and cutthroat-rainbow hybrid trout; mountain whitefish may be present at certain times of the year.

(Exh.DFG-1781-r-1,P.28)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.28)

The flows are needed to maintain potential spawning runs of cutthroat, rainbow, brown trout, and mountain white-

fish on the Yellowstone River. (Exh.DFG-1781-r-1,P.28)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is necessary to maintain channel form and processes. (Exh.DFG-1781-r-1,P.28)

There should be reserved therein the instantaneous streamflow during the periods of January 1 - May 10 and August 11 - December 31 of each year; subject to existing lawfully appropriated water rights. (Exh.DFG-1781-r-1,P.28)

BILLMAN CREEK

(Coke Creek to Fork South of NE Corner, Section 20)

Located in Township 2 South, Range 9 East, Section 17, to Township 2 South, Range 8 East, Section 20, NE Corner. (Exh. DFG-1781-r-1,P.29)

Fish species present:

A. Resident game fish - cutthroat and rainbow trout, rainbow-cutthroat hybrid trout and brook trout; brown trout and whitefish may also occur in this reach;

B. Migratory transient game fish - cutthroat, rainbow, brown, and brook trout, rainbow-cutthroat hybrids and whitefish may migrate into this reach at certain times of the year for spawning.

(Exh.DFG-1781-r-1,P.29)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.29)

The flows are needed to maintain potential spawning runs of trout and whitefish from lower Billman Creek and the Yellowstone River. (Exh. DFG-1781-r-1,P.29)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified and is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-r-1,P.29)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.29)

BRACKETT CREEK

(Mouth to Sheep Creek)

Fish species present:

A. Resident game fish - cutthroat, rainbow, and brown trout, and whitefish; (rainbow-cutthroat hybrid trout also occur);

B. Migratory transient game fish - cutthroat, rainbow, brown, and brook trout, cutthroat-rainbow hybrid trout, and whitefish may migrate into this reach at certain times of the year for spawning.

(Exh.DFG-1781-r-1,P.30)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG-1781-r-1,P.30)

Flows are needed to maintain potential spawning runs of cutthroat, rainbow, and brown trout, and mountain whitefish from the Shields River. (Exh.DFG-1781-r-1,P.30)

The instream flow which should be reserved for the stream reach, by month, for certain times of each year, is as follows: April 16-30, 35cfs; May 1-10, 66cfs; May 11-20, 72cfs; May 21-31, 77cfs; June 1-10, 69cfs; June 11-20, 56cfs; June 21-30, 43cfs; and July 1-10, 33cfs. Said flows equal 9,376 acre feet per year (not including dominant discharge). (Exh.DFG-1781-r-1,P.30)

There should be reserved in this stream the dominant discharge for one 24-hour period between April 16 and July 31 which is 151cfs and is needed to maintain channel form and processes. (Exh.DFG-1781-r-1,P.30)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, should be reserved for the periods of January 1 - April 15 and July 11 - December 31 each year. (Exh.DFG-1781-r-1,P.30)

BRACKETT CREEK

(Sheep Creek to Skunk Creek)

Fish species present:

A. Resident game fish - cutthroat and brown trout and whitefish; rainbow trout may also be present;

B. Migratory transient game fish - cutthroat, rainbow,

and brown trout and whitefish may enter this reach from downstream reaches for spawning purposes. (Exh.DFG-1781-r-1,P.31)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG-1781-r-1,P.31)

Flows are needed to maintain potential spawning runs of cutthroat, rainbow, and brown trout and whitefish from the lower reaches of Brackett Creek and from the Shields River. (Exh.DFG-1781-r-1,P.31)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-r-1,P.31)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.31)

BRACKETT CREEK

(Skunk Creek to one mile up North, Middle & South Forks)

Fish species present:

A. Resident game fish - cutthroat, brook, and brown trout and whitefish;

B. Migratory transient game fish - cutthroat, rainbow, and brown trout and whitefish may enter this reach from downstream reaches for spawning. (Exh.DFG-1781-r-1,P.32)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG-1781-r-1,P.32)

Flows are needed to maintain potential spawning of cutthroat, rainbow, and brown trout and whitefish which may enter this reach from the lower reaches of Brackett Creek. (Exh.DFG-1781-r-1,P.32)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes, and should be reserved. (Exh.DFG-1781-r-1,P.32)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.32)

CEDAR CREEK

(Mouth to Second Fork of Cedar Creek)

Fish species present:

A. Resident game fish - cutthroat, rainbow, brown,

and brook trout and whitefish; and rainbow-cutthroat hybrid trout may also occur;

B. Migratory transient game fish - cutthroat trout; rainbown and brown trout and rainbow-cutthroat hybrids and whitefish may enter from downstream reaches for spawning.

(Exh.DFG-1781-r-1,P.33)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.33)

Flows are necessary to maintain passage, spawning, and recruitment of cutthroat trout which migrate from the Yellowstone River to spawn; there is also potential spawning by whitefish, rainbow, and brown trout from the Yellowstone River. (Exh.DFG-1781-r-1,P.33)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes, and should be reserved. (Exh.DFG-1781-r-1,P.33)

The instantaneous streamflow during the periods of January 1 to May 10 and August 11 to December 31 of each year, subject to existing lawfully appropriated water rights, should be reserved. (Exh.DFG-1781-r-1,P.33)

CEDAR CREEK

(Cedar Creek from Second Fork to North Fork)

Fish species present:

A. Resident game fish - cutthroat, rainbow, brown, and brook trout, rainbow-cutthroat hybrids and whitefish may be present in the reach;

B. Migratory transient game fish - cutthroat, rainbow, brown, and brook trout, rainbow-cutthroat hybrids and whitefish may enter this reach from downstream reaches for spawning purposes.

(Exh.DFG-1781-r-1,P.34)

Whildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.34)

Flows are necessary to maintain potential spawning runs of trout entering from the lower reaches of Cedar Creek and from the Yellowstone River. (Exh.DFG-1781-r-1,P.34)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved.(Exh.DFG-1781-r-1,P.34)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for

the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.34)

CINNABAR CREEK

(Mouth to Cottonwood Creek)

Fish species present:

A. Resident game fish - rainbow trout and rainbow-cutthroat hybrids; cutthroat, brown, and brook trout may also occur;

B. Migratory transient game fish - cutthroat, rainbow, and brown trout, rainbow-cutthroat hybrids and whitefish may enter this reach from downstream reaches for spawning. (Exh.DFG-1781-r-1,P.35)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory transient - ducks and bald eagles. (Exh.DFG-1781-r-1,P.35)

Flows are needed to allow potential passage, spawning, and successful recruitment of Yellowstone cutthroat trout, rainbow and brown trout and whitefish which may migrate from the Yellowstone River. (Exh.DFG-1781-r-1,P.35)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquanitified but is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-r-1,P.35)

There should be reserved in this stream the instantaneous streamflow during the periods January 1 to May 10 and August 11 to December 31 of each year, subject to existing lawfully appropriated water rights. (Exh.DFG-1781-r-1,P.35)

CINNABAR CREEK

(Cottonwood Creek to F.S. Boundary at Township 8 South, Range 7 East, Section 32)

Fish species present:

A. Resident game fish - rainbow and brook trout; cutthroat and brown trout, rainbow-cutthroat hybrids and whitefish may also occur;

B. Migratory transient game fish - cutthroat, rainbow, and brown trout, rainbow-cutthroat hybrids and whitefish may enter this reach from downstream reaches to spawn.

(Exh.DFG-1781-r-1,P.36)

Wildlife species present:

A. Resident - beaver, muskrat, mink, marten, and river otter;

B. Migratory Transient - ducks and bald eagles.

(Exh.DFG-1781-r-1,P.36)

Flows are needed to allow potential spawning migration from the lower reaches of Cinnabar Creek, Mol Heron Creek, and the Yellowstone River. (Exh.DFG-1781-r-1, P.36)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is

presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh.DFG-1781-r-1,P.36)

There should be reserved in this stream the instantaneous streamflow during the periods of January 1 to May 10 and August 11 to December 31 of each year, subject to existing lawfully appropriated water rights. (Exh.DFG-1781-r-1,P.36)

COKE CREEK

(Mouth to Minor Creek)

Fish species present:

A. resident game fish - cutthroat trout; rainbow, brown, and brook trout; rainbow-cutthroat hybrids and whitefish may also occur;

B. migratory transient game fish - cutthroat, rainbow, brown, and brook trout and rainbow-cutthroat hybrids may enter this reach from downstream reaches to spawn. (Exh.DFG-1781-r-1, P. 37)

Wildlife species present:

A. resident - beaver, muskrat, mink, and marten;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, P. 37)

Flows are necessary to allow potential passage, spawning, and successful recruitment of cutthroat, rainbow and brown trout and whitefish from Billman Creek and the Yellowstone River and to maintain flows in Billman Creek. (Exh. DFG-1781-r-1, P. 37)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes, and should be reserved. (Exh. DFG-1781-r-1, P. 37)

There should be reserved in this stream the instantaneous stream flow during the periods of January 1 - May 10 and August 11 - December 31 of each year subject to existing lawfully appropriated water rights. (Exh. DFG-1781-r-1, P. 37)

COTTONWOOD CREEK

(Mouth to Little Cottonwood Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, brown, and brook trout, and rainbow-cutthroat hybrids.

B. migratory transient game fish - cutthroat, rainbow, brown, and brook trout, and rainbow-cutthroat hybrids may enter this reach from down-stream reaches to spawn. (Exh. DFG-1781-r-1, P. 38)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 38)

Flows are necessary to allow potential spawning of cutthroat, rainbow, and brown trout, and whitefish from the Shields River. (Exh. DFG-1781-r-1, P. 38)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved.

The instantaneous streamflow, subject to existing lawfully appropriated water right is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1 P. 38)

COTTONWOOD CREEK

(Little Cottonwood Creek to Trespass Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, brown, and brook trout, rainbow-cutthroat hybrids; whitefish may also occur;

B. migratory transient game fish - cutthroat, rainbow, brown, and brook trout, and rainbow-cutthroat hybrids. (Exh. DFG-1781-r-1, P. 39)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 39)

Flows are needed to allow potential spawning of cutthroat, rainbow, brown, and brook trout, and whitefish from the lower reach of Cottonwood Creek. (Exh. DFG-1781-r-1, P. 39)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and process and should be reserved. (Exh. DFG-1781-r-1, P. 39)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, should be reserved during the periods January 1 to March 31 and July 21 to December 31 of each year. (Exh. DFG-1781-r-1, P. 39)

EIGHT MILE CREEK

(Mouth to Big Draw)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brook trout; rainbow-cutthroat hybrids, brown trout, and whitefish may also occur;

B. migratory transient game fish - known to occur is the whitefish; other species which may enter this reach for spawning include cutthroat, rainbow, and brown trout, and rainbow-cutthroat hybrids.

(Exh. DFG-1781-r-1, p. 40)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, p. 40)

Flows are necessary to allow passage, spawning, and successful recruitment of whitefish which are known to migrate from the Yellowstone River into this stream; and for potential spawning runs of cutthroat, rainbow, and brown trout from the Yellowstone River. (Exh. DFG-1781-r-1, p. 40)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 40)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow during the periods of January 1 - May 10 and August 11 - December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 40)

EIGHT MILE CREEK

(Big Draw to North Fork of Eight Mile Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brook trout; rainbow-cutthroat hybrids, brown trout, and whitefish may also occur;

B. migratory transient game fish - known to occur is the whitefish; other species which may enter this reach for spawning include cutthroat, rainbow, and brown trout, and rainbow-cutthroat hybrids.

(Exh. DFG-1781-r-1, p. 41)

Wildlife species present:

A. resident - beaver, mink, muskrat, marten, and river otter;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, p. 41)

Flows are necessary to allow potential passage, spawning, and recruitment of trout from the lower reaches of Eight Mile Creek and also from the Yellowstone River. (Exh. DFG-1781-r-1, p. 41)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is necessary to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 41)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow

for the periods January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 41)

EMIGRANT SPRING CREEK

(Mouth to origin)

Fish species present:

A. resident game fish - brown and brook trout and whitefish; and cutthroat, rainbow, and rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - known to occur are cutthroat, rainbow, and brown trout; whitefish may also enter this reach from downstream reaches spawning. (Exh. DFG-1781-r-1, p. 42)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 42)

Flows are necessary to maintain this highly productive spring creek and the excellent trout population it supports; flows are also needed to maintain documented spawning runs of cutthroat, rainbow, and brown trout from the Yellowstone River and for potential spawning runs of whitefish; this stream is well known for its challenge to fly fishermen. (Exh. DFG-1781-r-1, p. 42)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, should be reserved for the period of January 1 to December 31 of each year. (Exh. DFG-1781-r-1, p. 42)

FLATHEAD CREEK

(Mouth to Muddy Creek)

Fish species present:

A. resident game fish - cutthroat and brown trout and whitefish;

B. migratory transient game fish - cutthroat and brown trout and whitefish which may enter the reach from downstream reaches to spawn. (Exh. DFG-1781-r-1, P. 43)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 43)

Flows are necessary to allow potential spawning of cutthroat, rainbow, and brown trout and whitefish from the Shields River. (Exh. DFG-1781-r-1, P. 43)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 43)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 and should be reserved. (Exh. DFG-1781-r-1, P. 43)

FLATHEAD CREEK

(Muddy Creek to Cache Creek)

Fish species present:

A. resident game fish - cutthroat, brook, and brown trout, and mountain whitefish;

B. migratory transient game fish - cutthroat and brown trout and whitefish may enter the reach from downstream reaches for spawning purposes. (Exh. DFG 1781-r-1, P. 44)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 44)

Flows are necessary to allow potential spawning of cutthroat, rainbow, and brown trout, and mountain whitefish from the lower reaches of Flathead Creek and from the Shields River. (Exh. DFG-1781-r-1, P. 44)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 44)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1,P.44

FLATHEAD CREEK

(Cache Creek to South Fork of Flathead Creek)

Fish species present:

A. resident game fish - cutthroat and brook trout;

B. migratory transient game fish - cutthroat, brook, and brown trout, and whitefish may enter this reach from downstream reaches for spawning purposes. (Exh. DFG-1781-r-1, P. 45)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 45)

Flows are necessary to allow potential spawning of cutthroat, brown, and brook trout, and whitefish from the lower reaches of Flathead Creek. (Exh. DFG-1781-r-1, P. 45)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved.

The instantaneous streamflow subject to existing lawfully appropriated water rights is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 45)

FLESHMAN CREEK

(Mouth to Perkins Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, brown, and brook trout; rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - cutthroat, rainbow, and brown trout, and cutthroat-rainbow hybrids may enter this reach from downstream reaches for spawning purposes. (Exh. DFG-1781-r-1, P. 46)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, P. 46)

Flows are necessary to allow potential passage, spawning, and successful recruitment of cutthroat, rainbow, and brown trout, and whitefish which may migrate from the Yellowstone River. (Exh. DFG-1781-r-1, P. 46)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved.

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1,P.46)

FRIDLEY CREEK

(Mouth to Miller Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brook trout; rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - mountain whitefish is known to occur; other species which may enter the reach from downstream reaches for spawning purposes are cutthroat, rainbow, and brown trout, and rainbow-cutthroat hybrids. (Exh. DFG-1781-r-1, P. 47)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 47)

Flows are necessary to allow passage, spawning, and successful recruitment of mountain whitefish which migrate from the Yellowstone River and to allow potential cutthroat, rainbow, and brown trout spawning runs from the Yellowstone River. (Exh. DFG-1781-r-1, P. 47)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved.

The instantaneous streamflow, subject to existing

lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 47)

FRIDLEY CREEK

(Miller Creek to Needle Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brown trout; rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - cutthroat, rainbow, and brown trout, rainbow-cutthroat hybrids, and mountain whitefish may enter the stream reach from downstream reaches for spawning purposes. (Exh. DFG-1781-r-1, P. 48)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 48)

Flows are needed to allow potential passage, spawning, and recruitment of trout and whitefish which may migrate from the lower reaches of Fridley Creek and from the Yellowstone River. (Exh. DFG-1781-r-1, P. 48)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 48)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for

the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 48)

LITTLE MISSION CREEK

(Mouth to Little Mission Forks)

Fish species present:

A. resident game fish - cutthroat trout;

B. migratory transient game fish - cutthroat and rainbow trout which may enter this stream reach from downstream reaches for spawning purposes. (Exg. DFG-1781-r-1, p. 49)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 49)

Flows are necessary to allow potential passage, spawning, and recruitment of trout which may migrate from the lower reaches of Mission Creek. (Exh. DFG-1781-r-1, p. 49)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 49)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 - May 10 and August 11 - December 31 and should be reserved. (Exh. DFG-1781-r-1, p. 49)

MILL CREEK

(East Fork to Passage Creek)

Fish species present:

A. migratory transient game fish - rainbow trout may enter this stream reach from downstream reaches for spawning purposes. (Exh. DFG-1781-r-1, P. 52)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 52)

Flows are needed to allow potential passage, spawning, and recruitment of trout which may migrate from the lower reach of Mill Creek and from the Yellowstone River. (Exh. DFG-1781-r-1, P. 52)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved.

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 52)

MCDONALD SPRING CREEK

(Mouth to the northern boundary of Section 32)

Fish species present:

A. resident game fish - rainbow and brown trout, and mountain whitefish; cutthroat and rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - rainbow, cutthroat, and brown trout are known to occur; species which may enter this stream reach from downstream reaches for spawning are rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, p. 50)

Wildlife species present:

A. resident - beaver, muskrat , mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 50)

Flows are necessary to maintain this highly productive spring creek and the excellent resident trout population in supports; flows are needed to maintain documented spawning runs of Yellowstone cutthroat trout, rainbow, and brown trout from the Yellowstone River and also to allow potential spawning runs of whitefish; the stream is well known for its challenge to fly fishermen. (Exh. DFG-1781-r-1, p. 50)

There is recreational use of this reach of the stream by fishermen. (Exh. DFG-1781-rl, P. 50)

The fishery and aquatic resource in this stream

reach are of such good quality, statewide importance, and national prominence that the instantaneous streamflow subject to existing lawfully appropriated water rights is the required flow for the period January 1 to December 31 and should be reserved. (Exh. DFG-1781-r-1, P.50)

MILL CREEK

(Mouth to the East Fork)

Fish species present:

A. resident game fish - cutthroat trout and rainbow cutthroat hybrids; rainbow and brown trout and whitefish may also occur;

B. migratory transient game fish - cutthroat trout are known to occur; rainbow and brown trout, rainbow-cutthroat hybrids, and whitefish may also enter this reach from downstream reaches for spawning purposes. (Exh. DFG-1781-r-1, p. 51)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 51)

Flows are necessary to allow passage, spawning, and recruitment of cutthroat trout which are known to migrate from the Yellowstone River; flows are needed to maintain a potential whitefish, rainbow and brown trout spawning and rearing area. (Exh. DFG-1781-r-1, p. 51)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 51)

The instantaneous streamflow, subject to existing

lawfully appropriated water rights, is the required flow for the periods of January 1 - May 10 and August 11 - December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 51)

MISSION CREEK

(Mouth to Spring Creek)

Fish species present:

A. resident game fish - rainbow and brown trout and whitefish; cutthroat trout and rainbow-cutthroat hybrids may also occur;

B. migratory transient game fish - mountain whitefish known to be present; cutthroat, rainbow, and brown trout, and rainbow-cutthroat hybrids may also enter the stream reach from downstream reaches for spawning. (Exh. DFG-1781-r-1, P. 54)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 54)

Flows are necessary to allow passage, spawning, and recruitment of whitefish which migrate from the Yellowstone River and for potential cutthroat, rainbow, and brown trout spawning runs from the Yellowstone River. (Exh. DFG-1781-r-1, P. 54)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 54)

The instantaneous streamflow, subject to existing

lawfully appropriated water rights is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 54)

MISSION CREEK

(Spring Creek to Little Bear Draw)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brown trout, and rainbow-cutthroat hybrids; mountain whitefish may also be present;

B. migratory transient game fish - cutthroat, rainbow, and brown trout, and mountain whitefish may enter this reach from downstream reaches to spawn. (Exh. DFG-1781-r-1, P. 55)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles: (Exh. DFG-1781-r-1, P. 55)

Flows are necessary to allow potential passage, spawning, and recruitment of fish which may migrate from the lower reach of Mission Creek and from the Yellowstone River. (Exh. DFG-1781-r-1, P. 55)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 55)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December

31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 55)

MOL HERON CREEK

(Mouth to Cinnabar Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, and brown trout, rainbow-cutthroat hybrid trout, and mountain whitefish;

B. migratory transient game fish - cutthroat trout and whitefish; other species which may enter this reach from downstream reaches to spawn are rainbow and brown trout and rainbow-cutthroat hybrids. (Exh. DFG-1781-r-1, P. 56)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 56)

The flows are necessary to allow potential passage, spawning and recruitment of cutthroat trout and whitefish which are known to migrate from the Yellowstone River; and also for potential spawning runs of rainbow and brown trout from the Yellowstone River. (Exh. DFG-1781-r-1, P.56)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 56)

The instantaneous streamflow, subject to existing

lawfully appropriated water rights, is the required flow for the period of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG 1781-r-1, P. 56)

MOL HERON CREEK

(Cinnabar Creek to the Yellowstone Park boundary)

Fish species present:

A. resident game fish - cutthroat and rainbow trout; rainbow-cutthroat hybrids, brown trout and whitefish may also be present.

B. migratory transient game fish which may enter this stream reach from downstream reaches to spawn are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, P. 57)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 57)

The flows are necessary to allow potential passage, spawning, and recruitment of trout which may migrate from the lower reaches of Mol Heron Creek. (Exh. DFG-1781-r-1, P. 57)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 57

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow

for the periods of Janualy 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 57)

NELSON SPRING CREEK

(Mouth to origin)

Fish species present:

A. resident game fish - rainbow and brown trout; cutthroat trout and whitefish may also be present;

B. migratory transient game fish - cutthroat, rainbow and brown trout; species which may enter this reach from downstream reaches to spawn are rainbow and cutthroat trout and whitefish.

(Exh. DFG-1781-r-1, p. 58)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, p. 58)

Reserved flows are necessary to maintain this highly productive spring creek and the excellent resident trout population it supports; flows are also needed to maintain documented spawning runs of cutthroat, rainbow and brown trout from the Yellowstone River as well as potential spawning runs of whitefish; this stream is nationally known for its challenge to fly fishermen. (Exh. DFG-1781-r-1, p. 58)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the period January 1 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 58)

ROCK CREEK OF THE YELLOWSTONE

(Mouth to Steele Creek)

Fish species present:

A. resident game fish - cutthroat trout; rainbow trout, rainbow-cutthroat hybrids and whitefish may also be present.

B. migratory transient game fish - cutthroat trout; species which may migrate into the reach from downstream reaches to spawn are rainbow and brown trout, rainbow-cutthroat hybrids and white-fish. (Exh. DFG-1781-r-1, P. 61)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 61)

The flows are necessary to allow passage, spawning, and successful recruitment of cutthroat trout which are known to migrate from the Yellowstone River and also for potential spawning runs of rainbow and brown trout and whitefish from the Yellowstone River. (Exh. DFG-1781-r-1, P. 61)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 61)

The instantaneous streamflow, subject to existing

lawfully appropriated water rights is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 61)

ROCK CREEK (SHIELDS DRAINAGE)

(Mouth to Forest Service

West Boundary in Section 8)

Fish species present:

A. resident game fish - cutthroat, brown and brook trout; rainbow trout, rainbow-cutthroat hybrids and whitefish may also be present;

B. migratory transient game fish which may enter the reach from downstream reaches to spawn are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, p. 59)

Wildlife soecies present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 59)

The flows are necessary to allow potential spawning of cutthroat, brown and rainbow trout and whitefish from the Shields River. (Exh. DFG-1781-r-1, p. 59)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 59)

The instantaneous streamflow, subject to existing

lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 59)

ROCK CREEK (SHIELDS DRAINAGE)

(Forest Service west boundary in Section 8 to Smeller Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, brown and brook trout and whitefish;

B. migratory transient game fish which may enter this reach from downstream reaches to spawn are cutthroat, rainbow, brown and brook trout and whitefish. (Exh. DFG-1781-r-1, p. 60)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 60)

The flows are necessary to allow potential spawning of cutthroat, brown and brook trout from the Shields River. (Exh. DFG-1781-r-1, p. 60)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 60)

The instantaneous streamflow subject to existing lawfully appropriated water rights is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p.60)

SHIELDS RIVER

(Mouth to Cottonwood Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and white-fish;

B. migratory transient game fish which may migrate into this reach from downstream reaches to spawn are rainbow, cutthroat and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, P. 62)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 62)

The flows are necessary to allow potential spawning runs of cutthroat, rainbow and brown trout and whitefish from the Yellowstone River. (Exh. DFG-1781-r-1, P. 62)

Evaluations of the flow requirements for this stream reach include use of USGS streamflow frequency data at the Clyde Park gauging station, and 70 percent exceedance flows consistent with methodology for the Yellowstone mainstem. (Exh. DFG-1781-r-1, P. 63; Tr. Vol. 17, P. 111, Stevenson).

The instream flow required for the stream reach, in

cfs. by month for certain times of the year is as follows:

April	1-15	99	June	1-10	325
	16-30	156		11-20	278
May	1-10	240		21-30	151
	11-20	319	July	1-10	80
	21-31	287			

These flows equal 39,811 acre feet per year which should be reserved exclusive of dominant discharge. (Exh. DFG-1781-r-1, P. 62)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 10 is 774 cfs. (1,535 acre feet) and is needed to maintain channel form and processes and should also be reserved. (Exh. DFG-1781-r-1, P. 62)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the period of January 1 to March 31 and July 11 to December 31 of each year and should also be reserved. (Exh. DFG-1781-r-1, P. 62)

SHIELDS RIVER

(Cottonwood Creek to Elk Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow and brown trout and whitefish; rainbow-cutthroat hybrids may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches to spawn are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, P. 63)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks, bald eagles, and great blue heron. (Exh. DFG-1781-r-1, P. 63)

The flows are necessary to allow potential spawning of cutthroat, rainbow and brown trout and whitefish from the lower reach of the Shields River and from the Yellowstone River. (Exh. DFG-1781-r-1, P. 63)

Evaluations of the flow requirements for this stream reach include use of USGS streamflow frequency data at the Wilsall gauging station, and 70 percent exceedance flows consistent with methodology for the Yellowstone mainstem given on page 74 of Exh. DFG-1781-r-1. (Exh. DFG-1781-r-1, P. 63; Tr. Vol. 17, P. 111, Stevenson)

The instream flow required for the stream reach in cfs. by month for certain times of the year is as follows:

April	16-30	39	June	1-10	189
May	1-10	83		11-20	157
	11-20	137		21-30	105
	21-31	184	July	1-10	56
				11-20	36

These flows equal 20,308 acre feet per year excluding the dominant discharge, and should be reserved. The dominant discharge required in this stream reach for one 24-hour period between April 15 and July 31 is 457 cfs. (906 acre feet) and is needed to maintain channel form and processes and should, also, be reserved. (Exh. DFG-1781-r-1, P. 63)

The instantaneous streamflow, subject to existing lawfully appropriated water rights is the required flow for the periods of January 1 to April 15 and July 21 to December 31 of each year and should also be reserved. (Exh. DFG-1781-r-1, P. 63)

SHIELDS RIVER

(Elk Creek to Lodgepole Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow, brown and brook trout and whitefish; rainbow-cutthroat hybrids may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, p. 64)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks, bald eagles and great blue herons; (Exh. DFG-1781-r-1, p. 64)

The flows are necessary to allow potential spawning of cutthroat, rainbow and brown trout and whitefish from the lower reaches of the Shields River and from the Yellowstone River. (Exh. DFG-1781-r-1, p. 64)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 64)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow

for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 64)

SIX MILE CREEK

(Mouth to the north fork of Six Mile Creek)

Fish species present:

A. resident game fish - cutthroat and brown trout; rainbow trout and rainbow-cutthroat hybrids may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches tc spawn are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, p. 65)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 65)

The flows are necessary to allow potential passage, spawning and successful recruitment of cutthroat, rainbow and brown trout and whitefish which may migrate from the Yellowstone River. (Exh. DFG-1781-r-1, p. 65)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 65)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for

the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 65)

SMITH CREEK

(Mouth to Bitter Creek)

Fish species present:

A. resident game fish - cutthroat, brown and brook trout; whitefish may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches to spawn are cutthroat, rainbow, brown and brook trout and whitefish. (Exh. DFG-1781-r-1, p. 66)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 66)

The flows are necessary to allow potential spawning of cutthroat, brown and brook trout and whitefish frcm the Shields River. (Exh. DFG-1781-r-1, p. 66)

The dominant discharge required in this stream reach for one 24-hour period between April 1 and July 20 is presently unquantified but is needed to mainain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 66)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to March 31 and July 21 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1,p. 66)

SUCE CREEK

(Mouth to Lost Creek)

Fish species present:

A. resident game fish - cutthroat, rainbow and brown trout and rainbow-cutthroat hybrids; white-fish may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches to spawn are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, P. 67)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten, and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 67)

The flows are necessary to allow potential passage, spawning and recruitment of Yellowstone cutthroat trout, rainbow and brown trout and whitefish which may migrate from the Yellowstone River. (Exh. DFG-1781-r-1, P. 67)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 67)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow

for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P.67)

TOM MINER CREEK

(Mouth to Canyon Creek)

Fish species present:

A. cutthroat and brown trout; rainbow trout and whitefish may also be present;

B. migratory transient game fish known to occur are cutthroat trout and whitefish. Rainbow and brown trout and rainbow-cutthroat hybrids may also migrate into the stream reach from downstream reaches to spawn. (Exh. DFG-1781-r-1, P. 68)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, P. 68)

The flows are necessary to allow passage, spawning, and successful recruitment of cutthroat trout and whitefish which are known to migrate from the Yellowstone River and to allow potential spawning of rainbow and brown trout from the Yellowstone River. (Exh. DFG-1781-r-1, P. 68)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P.68)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 68)

TOM MINER CREEK

(Canyon Creek to Trail Creek)

Fish species present:

A. resident game fish - cutthroat trout; rainbow and brown trout, rainbow-cutthroat hybrids and whitefish may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches for spawning are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and white fish. (Exh. DFG-1781-r-1, P. 69)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles;

(Exh. DFG-1781-r-1, P. 69)

The flows are necessary to allow potential passage, spawning and recruitment of trout which may migrate from the lower reaches of Tom Miner Creek. (Exh. DFG-1781-r-1, P. 69)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P. 69)

The instantaneous streamflow, subject to existing lawfully appropriated water rights is the required flow for

the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 69)

TRAIL CREEK

(Mouth to West Pine Creek)

Fish species present:

A. resident game fish - brown trout and rainbow-cutthroat hybrids. Cutthroat and rainbow trout may also be present;

B. migratory transient game fish which may migrate into this reach from downstream reaches for spawning are cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish. (Exh. DFG-1781-r-1, p. 70)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 70)

The flows are necessary to allow potential passage, spawning and recruitment of cutthroat, rainbow and brown trout and whitefish which may migrate from the Yellowstone River into Trail Creek. (Exh. DFG-1781-r-1, p. 70)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 70)

The instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow

for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 70)

TRAIL CREEK

(West Pine Creek to the south boundary of Section 35)

Fish species present:

A. resident game fish - brown trout and rainbow-cutthroat hybrids;

B. migratory transient game fish which may migrate into this reach from downstream reaches for spawning purposes are cutthroat, rainbow and brown trout and mountain whitefish. (Exh. DFG-1781-r-1, p. 71)

Wildlife species present:

A. resident - beaver, muskrat, mink, marten and river otter;

B. migratory transient - ducks and bald eagles; (Exh. DFG-1781-r-1, p. 71)

The flows are necessary to allow potential passage, spawning and recruitment of trout which may migrate from the lower reaches of Trail Creek. (Exh. DFG-1781-r-1, p. 71)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is presently unquantified but is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, p. 71)

The instantaneous streamflow, subject to existing lawfully appropriated water rights is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 71)

YELLOWSTONE RIVER

(Main stream of the Yellowstone River from Gardiner to Tom Miner Creek)

Fish species present in this stream reach are:

A. resident game fish - cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and mountain whitefish;

B. migratory transient game fish - brook trout.

(Exh. DFG-1781-r-1, p. 72)

Wildlife species present:

A. resident - beaver, muskrat, marten, river otter, raccoon, white-tailed deer and pheasant;

B. migratory transient - numerous species of ducks, Canada geese, bald eagles and great blue herons.

(Exh. DFG-1781-r-1, p.72)

The flows are necessary to preserve and maintain fish and wildlife populations at current levels in this blue-ribbon stream, and to maintain the physical characteristics of the stream channel through adequate sediment transport and bedload movement.

(Exh. DFG-1781-r-1, p. 72)

Evaluations of the flow requirements include use of streamflow frequency data and current biological data. Flow requests are based on streamflow

frequency data at the USGS gauging station on the Yellowstone River at Corwin Springs, the "existing rights" of the department in this reach and the flow requirements for the lower Yellowstone River. (Exh. DFG-1781-r-1, p. 72)

There are periods of the year when flows are required by Canada geese for nesting, as follows:

A. for nest establishment - during the period February 15 to March 15;

B. for egg incubation - during the period March 1 to May 15. (Exh. DFG-1781-r-1, p. 72)

The instream flow required for the stream reach in cfs by month of the year is as follows:

May 11-20	2900	July 1-10	5700
21-31	5500	11-20	4000
June 1-10	7800	21-31	2900
11-20	8700	Aug. 1-10	2200
21-30	7700		

These flows equal 956,826 acre feet per year exclusive of the dominant discharge and should be reserved. (Exh. DFG-1781-r-1, p. 73)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 15,000 cfs (29,752 acre feet) and is needed to maintain channel form and processes and also, should be reserved. (Exh. DFG-1781-r-1, p. 73)

The fishery and aquatic resource in this stream reach are of such good quality, statewide importance, and national

prominence that the instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 73)

YELLOWSTONE RIVER

(Main stream of the Yellowstone River from Tom Miner Creek to Big Creek.)

Fish species present:

A. resident game fish-cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and whitefish;

B. Migratory transient game fish - brook trout.

(Exh. DFG-1781-r-1, P. 74)

Wildlife species present:

A. resident - beaver, marten, muskrat, river otter, raccoon, white-tailed deer and pheasant;

B. migratory transient - numerous species of ducks, Canada geese, bald eagles and great blue heron;

(Exh. DFG-1781-r-1, P. 74)

The flows are necessary to preserve and maintain fish and wildlife populations at current levels in this blue-ribbon stream; and to maintain the physical characteristics of the stream channel through adequate sediment transport and bedload movement.

(Esh. DFG-1781-r-1, P.75)

Evaluations of the flow requirements for this stream reach include streamflow frequency and hydrograph data. Flow requests are based on streamflow frequency data at the

USGS gauging station on the Yellowstone River at Corwin Springs, "existing rights" of Fish and Game in reach, and flow recommendations as being required for the lower Yellowstone River. (Exh. DFG-1781-r-1, P. 74)

Periods of the year when flows are required for Canada geese nesting are as follows:

A. for nest establishment - during the period February 15 to March 15;

B. for egg incubation - during the period March 1 to May 15. (Exh. DFG-1781-r-1, P. 22)

The instream flow required for the stream reach, in cfs., by month of the year is as follows:

May	11-20	1700	July	1-10	4500
	21-31	4300		11-20	2800
June	1-10	6600		21-31	2000
	11-20	7500	Aug.	1-10	1000
	21-30	6500			

These flows equal 744,396 acre feet per year exclusive of the dominant discharge. The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 15,000 cfs. (29,752 acre feet) and is needed to maintain channel form and processes and should, also, be reserved. (Exh. DFG-1781-r-1, P. 75)

The fishery and aquatic resource in this stream reach are of such good quality, statewide importance and national prominence that the instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required

flow for the periods of January to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 75)

YELLOWSTONE RIVER

(Main stream of the Yellowstone River from Big Creek to the Shields River)

Fish species present:

A. resident game fish - cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and mountain whitefish;

B. migratory transient game fish - brook trout

(Exh. DFG-1781-r-1, P. 76)

Wildlife species present:

A. resident - beaver, muskrat, marten, river otter, raccoon, white-tailed deer and pheasant;

B. migratory transient - numerous species of ducks, Canada geese, bald eagles and great blue heron;

(Exh. DFG-1781-r-1, P. 76)

The flows are necessary to maintain and preserve fish and wildlife populations at current levels in this blue-ribbon stream, and to maintain the physical characteristics of the stream channel through adequate sediment transport and bedload movement.

(Exh. DFG-1781-r-1, P.77)

Evaluations of the flow requirments for this stream reach include use of streamflow frequency data and current biological data. Flow requests are based on streamflow frequency data at the USGS

gauging station on the Yellowstone River near Livingston, "existing rights" of the department, and flow recommendations for the lower Yellowstone River. (Exh. DFG-1781-r-1. P. 76)

The periods of the year when flows are required for Canada geese nesting are as follows:

A. for nest establishment - during the period February 15 to March 15;

B. for egg incubation - during the period March 1 to May 15. (Exh. DFG-1781-r-1, P. 22)

The instream flow required for the stream reach in cfs. by month of the year is as follows:

May	11-20	1900	July	1-10	5400
	21-31	4700		11-20	3800
June	1-10	7700		21-31	2500
	11-20	9000	Aug.	1-10	1600
	21-30	8000			

These flows equal 898,908 acre feet per year and should be reserved. (Does not include the dominant discharge.) (Exh.DFG-1781-r-1, P.77)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 18,200 cfs. (36,099 acre feet) and is needed to maintain channel form and processes and should be reserved. (Exh. DFG-1781-r-1, P.77)

The fishery and aquatic resource in this stream reach are of such good quality, statewide importance and national prominence that the instantaneous streamflow, subject to existing lawfully appropriated water rights, is the required

flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 77)

YELLOWSTONE RIVER

(Main stream of the Yellowstone River from the Shields River to the Boulder River)

Fish species present:

A. Resident game fish - cutthroat, rainbow and brown trout, rainbow-cutthroat hybrids and mountain whitefish.

B. Migratory transient game fish - brook trout. (Exh. DFG-1781-r-1, p. 78)

Wildlife species present:

A. Resident - beaver, muskrat, marten, river otter, raccoon, white-tailed deer and pheasants.

B. Migratory transient - numerous species of ducks, Canada geese, bald eagles and great blue heron. (Exh. DFG-1781-r-1, P. 78)

Flows are necessary to preserve and maintain fish and wildlife populations at current levels in this blue-ribbon stream, and to maintain the physical characteristics of the stream channel through adequate sediment transport and bedload movement. (Exh. DFG-1781-r-1, P. 78)

Evaluations of the flow requirments for this stream reach include use of streamflow frequency data and current biological data, examination of streamflow frequency data from the U. S. Geological Survey, consideration of the applicants' existing rights in the Yellowstone River in this reach, and recognition of

flow recommendations as being needed in the lower reaches of the Yellowstone River. (Exh. DFG-1781-r-1, p. 78)

The periods of the year when flows are required for Canada geese nesting in the reach are as follows:

A. for nest establishment during the period from February 15 to March 15; for egg incubation during the period of March 1 to May 15. (Exh. DFG-1781-r-1, p.22)

The instream flow required for the stream reach in cfs, by month of the year, is as follows:

May	11-20	2200	July	1-10	5500
	21-31	4900		11-20	3800
June	1-10	8000		21-31	2500
	11-20	9300	August	1-10	1600
	21-30	7200			

These flows equal 907,240 acre feet per year excluding the flow required for the dominant discharge and should be reserved. (Exh. DFG-1781-r-1, p. 79)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 18,200 cfs (36,099 acre feet) and is necessary to maintain channel form and processes and should also be reserved. (Exh. DFG-1781-r-1, p. 79)

The fishery and aquatic resource in this stream reach are of such good quality, statewide importance, and national prominence that the instantaneous streamflow, subject to

existing lawfully appropriated water rights, is the required flow for the periods of January 1 to May 10 and August 11 to December 31 of each year and should be reserved. (Exh. DFG-1781-r-1, p. 79)

II.

MIDDLE YELLOWSTONE BASIN

(Boulder River to Bighorn River)

As to each of the reaches and streams of the Middle Yellowstone Basin, hereinafter set forth, and from the application, testimony and evidence adduced herein by Fish and Game it is established and shown to the satisfaction of the board as follows:

There is substantial recreational use of each stream and reach by fishermen.

The fishery and aquatic resources are of good quality and of importance to the public which attributes should be protected from degradation by reserving of waters and flows.

Except as hereinafter otherwise stated, the required flow requirements, for each reach and stream, were evaluated based upon water discharge measurements, photographs, fisheries data collections, USGS flow data and judgement of qualified professional personnel.

Specific reference is made to the following streams and reaches:

East Boulder River (Dry Fork to Bramlee Creek)

East Boulder River (Dry Fork Creek to Mouth)

Castle Creek (Lodgepole Creek to Picket Pin Creek)

Castle Creek (Mouth to Lodgepole Creek)

Castle Creek (Picket Pin Creek to 1500 feet upstream there from)

Boulder River, Sweetgrass County, (Falls Creek to

Hawley Creek)

Boulder River, Sweetgrass and Park (West Boulder to Falls Creek)

Boulder River, Sweetgrass County (Mouth to West Boulder River)

West Fork, Stillwater River (Sweetgrass-Stillwater county line to Tumble Creek)

West Fork, Stillwater River (Castle Creek to county line)

West Fork Stillwater River (Mouth to Castle Creek)

Stillwater River (Westfork River to North end Sioux Charlie Lake)

Stillwater River (Rosebud River to West Fork Stillwater River)

Stillwater River (Mouth to Rosebud River)

Fish Tail Creek

East Fishtail Creek

West Fishtail Creek

Little Rocky Creek

Picket Pin Creek

As to these streams and reaches findings, as follows, are specifically applicable: Flows requested by Fish and Game for the low flow periods of the year are approximately equal to the average annual minimum flows which have historically occurred in the stream reach, and these flows are necessary to maintain fish populations and habitat in their present condition. Young-of-the-year trout occupy shallow, low-velocity pools located at the margins of the

stream. At progressively decreasing flows, this habitat is lost first. Habitat becomes critical for young-of-the-year trout at a higher flow than for older trout which occupy deeper portions of the stream. Natural fish populations cannot be maintained without production of young-of-the-year fish. (Tr. Vol. 16, Test. Stewart, P. 3; P. 62-63)

There is hereinafter set forth the findings of this board as to the amounts of waters and flows thereof, which are necessary to the public purposes and needs of the public as stated in the application of Fish and Game and herein; and as the same relate to the particular reaches and tributaries of the Middle Yellowstone River Basin and fish and wildlife and recreational uses present in each thereof, all as follows:

MID BIG TIMBER CREEK

(Gallatin National Forest Boundary to the conference with Swamp Creek)

Resident game fish species present: rainbow, brown, and brook trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 83)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh. DFG-1781-r-1, P. 83)

Flows requested in this stream reach are below what would be optimum fishing levels and considerably below requirements for other waterbased recreational opportunities. Reservation of flow in amounts requested, and herein granted, is necessary to maintain a portion of the existing fish and aquatic life. Without at least this request for minimum flows, the system will not have sufficient water exchange to maintain water quality necessary to sustain trout populations. Photographs at various discharge values and 10 years of occasional observations indicate that esthetics are best at flows of 50 to 75 cfs. Fishermen interviews revealed optimum fishing during August and September occurs at flows around 40 to 50 cfs.

Electrofishing in a 300-foot section re-emphasized the importance of maintaining undercut banks and overhanging vegetation. At 13 cfs. only the outside of each meander contained these critical habitat types. (Exh. DFG-1781-r-1, P. 83)

There is significant recreational use of this reach of the stream by fishermen. (Exh. DFG-1781-r-1, P. 83)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for rainbow trout: for spawning, during the months of May through July; for incubation, during the months of May through September 15; and for rearing, during the months of January through December;

B. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December;

C. for mountain whitefish: for spawning, during the months of September through November; for incubation, during the months of September through May; and for rearing, during the months of January through December.

(Exh. DFG-1781-r-1, P. 84)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 50 to 75 cfs. (Exh. DFG-1781-r-1, P. 83)

The instream flow required for the stream reach in cfs. by month of the year is as follows:

LOWER BIG TIMBER CREEK

(Swamp Creek to the Yellowstone River)

Resident game fish species present: brown trout and mountain whitefish. (Exh.DFG-1781-r-1, P.85)

The resident wildlife species present: beaver, muskrat, mink, and raccoon.

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through May; and for rearing during the months of January through December;

B. for mountain whitefish: for spawning, during the months of September through November; for incubation, during the months of September through May; and for rearing, during the months of January through December. (EXH. DFG-1781-r-1, P. 86)

The instream flow required for this stream reach, in cfs, by month of the year is as follows:

Jan.	10	May	85	Sept.	20
Feb.	10	June	180	Oct.	15
Mar.	10	Jul.1-20	100	Nov.	10
Apr.	20	Jul.21-31	30	Dec.	10
		Aug.	30		

These flows equal 28,701 acre feet per year and should be reserved. (Exh.DFG-1781-r-1, P.85; Tr.17, Page Preceeding P.2)

Jan.	10	May	85	Sept.	20
Feb.	10	June	180	Oct.	15
Mar.	10	July 1-20	100	Nov.	10
Apr.	20	July 21-31	30	Dec.	10
		Aug.	30		

These flows equal 28,701 acre feet per year and should be reserved. (Exh. DFG-1781-r-1. P. 83)

UPPER BLUEWATER CREEK

(From headwaters to Bluewater Springs Trout Hatchery)

Resident game fish species present: brown trout. (Exh. DFG-1781-r-1, P.87)

Resident wildlife species present: beaver, mink, muskrat, and raccoon. (Exh. DFG-1781-r-1, P. 87)

The flows requested by Fish and Game, and herein granted, are essential to maintain trout embryo survival. (Exh. DFG-1781-r-1, P. 87)

This stream reach was intensively studied both biologically and physically for 15 years. (Exh. DFG-1781-r-1, P. 87)

It has been demonstrated in several studies the detrimental effects of sediment, relationship of both high and low flows with sediment transport and deposition. The requested flows for this reach are essential to maintain trout embryo survival. They are below the amount of water presently in the system and that utilized by agriculture. Lesser flows in this reach would have considerable adverse impact downstream. Less flows would lessen flows downstream, cause fines to settle out and ultimately force downstream brown trout to occupy only the upper 5 miles of Bluewater Creek. At present, brown trout exist in 10 miles of the 13-mile stream. Lack of trout in lower 3 miles is due to low flows, silt deposition, and increased temperature. (Exh. DFG-1781-r-1, P. 87)

Evaluation procedures used to determine the flow

requirements for this stream reach are based upon water discharge measurements, photographs, fisheries data collections, production study, known age study, sediment investigations, aquatic insect study, flow duration curves, and professional judgment. (Exh. DFG-1781-r-1, P. 87; Exh. DFG-1781-r-7; Tr. Vol. 17, P. 1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through May 7; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 88)

The instream flow required for this stream reach, in cfs, by month of the year is as follows:

Jan.	9.5	May	9.5	Sept.	9.5
Feb.	9.5	June	9.5	Oct.	9.5
Mar.	9.5	July	9.5	Nov.	9.5
Apr.	9.5	Aug.	9.5	Dec.	9.5

These flows equal 6,878 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 87)

MIDDLE BLUEWATER CREEK

(Bluewater Springs Trout Hatchery to McDowell Coulee)

Resident game fish species present: brown and rainbow trout. (Exh. DFG-1781-r-1, P. 89)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh. DFG-1781-r-1, P.89)

Stream reach has a streamflow which is very stable. (Exh. DFG-1781-r-1, P.89)

The requested flows are well below the lowest measured flows and are necessary to maintain existing trout egg survival, nursery areas, bank cover, feeding stations, and adequate temperature regimes. (Exh. DFG-1781-r-1, P. 89)

A flow of 26 cfs allows for existing water uses as well as providing for trout needs. (Exh. DFG-1781-r-1, P.89)

Lesser flows would cause increased sediments deposition and adversely effect the fishery. Evaluations to determine the flow requirements for this stream reach are based upon water discharge measurements and photographs, fishery data collections, sediment investigations, professional judgment, flow duration curves, and aquatic insect studies. (Tr. Vol. 17, P. 1-48, Exh. DFG-1781-r-1, P. 89, Exh. DFG-1781-r-7)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the

months of October through May 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 15; and for rearing, during the months of January through December.

(Exh. DFG-1781-r-1, P. 90)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	26	May	26	Sept.	26
Feb.	26	June	26	Oct.	26
Mar.	26	July	26	Nov.	26
Apr.	26	Aug.	26	Dec.	26

These flows equal 18,823 acre feet per year and should be reserved.

LOWER BLUEWATER CREEK

(McDowell Coulee to mouth)

Resident game fish species present: brown trout. (Exh.DFG-1781-r-1,P.91)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1, P.91)

This stream reach has less stable flows than upstream reaches due to irrigation withdrawal and waste water return flows. (Exh. DFG-1781-r-1, P.91)

The largest trout present in Bluewater Creek are found in this reach (Exh.DFG-1781-r-1, P.91)

The flows requested by Fish and Game will allow other water uses above present levels and still maintain brown trout populations. (Exh.DFG-1781-r-1, P.91)

Evaluations of flow requirements for this stream reach are based upon water discharge measurements and photographs, fishing collection data, sediment studies, judgment of qualified professional personnel and flow duration curves. (Tr.17, Test. Marcuson, P. 1-48; Exh. DFG-1781-r-7; Exh.DFG-1781-r-1,P.91)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through May 7; for rearing, during the months of January through December (Exh.DFG-1781-r-1,P.92)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	20	May	20	Sept.	20
Feb.	20	June	20	Oct.	20
Mar.	20	July	20	Nov.	20
Apr.	20	Aug.	20	Dec.	20

These flows equal 14,479 acre feet per year and should be reserved. (Exh.DFG-1781-1-P.91)

BRIDGER CREEK

(Headwaters to Krone Ditch headgate)

Resident game fish species present: cutthroat, rainbow, brown, and brook trout. (Exh. DFG-1781-r-1,P.93)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1, P.93)

The flows requested to be reserved by Fish and Game, for all months except late May and June, are inadequate for maximum public enjoyment or optimum fish production. They are strictly maintenance flows and do not allow for an optimum fishery. (Exh.DFG-1781-r-1,P.93; Tr. Vol. 17, P.16)

Four (4) cfs flow in July and August allows for additional water uses in the stream reach, such as for irrigation which currently utilizes considerable water out of the stream. (Exh.DFG-1781-r-1,P.93; Tr.Vol. 17, P.37,38)

Evaluations of flow requirements for this stream reach are based upon water discharge measurements and photographs, judgment of qualified professional personnel fishery data collections and creel census. (Tr. Vol.17, Test. Marcuson P.1-48, Exh.DFG-1781-r-1, Exh. DFG-1781-r-7, P.93)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for cutthroat trout: for spawning, during the

months of May and June; for incubation, during the months of May through August; and for rearing; during the months of January through December;

B. for rainbow trout: for spawning, during the months of May and June; for incubation, during the months of May through August; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through April 15; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through April 15; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1,P.93)

Fishermen interviews indicate preference for stream-flow of 10 to 20 cfs during August and September even though these flows are rare. (Exh.DFG-1781-r-1, P.93)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 10-20 cfs in the upper and middle reaches. The lower reach has no aesthetic value due to a wide, gravel-laden channel. (Exh. DFG-1781-r-1,P.93)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	3	May 1-20	3	Aug.	4
Feb.	3	May 21-31	15	Sept.	3
Mar.	3	June	15	Oct.	3
Apr.	3	July	4	Nov.	3
				Dec.	3

These flows equal 3,268 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.93)

BOULDER RIVER IN SWEET GRASS COUNTY

(Mouth to the mouth of the West Boulder River.)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh.DFG-1781-r-1,P.95)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1,P.95)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P.3)

Evaluations of flow requirements for this stream reach are based upon USGS flow data, low flow photography, extrapolation of fish population and life history data from an adjacent reach of the river. (Exh.DFG-1781-r-1,P.95; Exh.DFG-1781-r-9; Tr.Vol.16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through March; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of April to mid-May; for incubation, during the months of April through June; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1,P.96)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	80	May	300	Sept.	195
Feb.	80	June	1,690	Oct.	200
Mar.	80	July	565	Nov.	80
Apr.	80	Aug.	185	Dec.	80

These flows equal 217,990 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.95)

BOULDER RIVER IN SWEET GRASS & PARK COUNTIES

(Mouth of West Boulder to the mouth of Falls Creek.)

Resident game fish species present: brook, brown, and rainbow trout. (Exh.DFG-1781-r-1,P.97)

Resident wildlife species present: for this stream reach are beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1, P.97)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr.Vol. 16, Test. Phil Stewart, P.3)

Evaluations of flow requirements for this stream reach are based upon USGS flow data, low flow photography, fish population and life history data obtained by electro-fishing. (Exh.DFG-1781-r-1,P.97;Exh.DFG-1781-r-9, Tr.Vol. 16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brook trout: for spawning, during the month of October; for incubation, November through mid-March; and for rearing, during the months of January through December;

B. for brown trout: for spawning, during the month of November; for incubation, during the months of November through mid-April; and for rearing, during

the months of January through December;

C. for rainbow trout: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-July; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.98)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	50	May	150	Sept.	145
Feb.	50	June	1,080	Oct.	115
Mar.	50	July	480	Nov.	50
Apr.	50	Aug.	200	Dec.	50

These flows equal 148,947 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.97)

BOULDER RIVER IN SWEET GRASS COUNTY

(Mouth of Falls Creek to the mouth of Hawley Creek)

Resident game fish species present: brook, cutthroat, and rainbow trout. (Exh. DFG-1781-r-1, P.99)

Resident wildlife species present: beaver, mink, muskrat, and raccoon.

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of flow requirements for this stream reach are based upon USGS flow data, fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1,P.99; Exh.DFG-1781-r-9; Tr. Vol.16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brook trout: for spawning, during the months of October; for incubation, during the months of October through mid-March; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-July; and for rearing, during the months of January through December;

C. for cutthroat trout: for spawning, during the

months of mid-April through May; for incubation, during the months of mid-April through mid-July; and for rearing, during the months of January through December.

(Exh. DFG-1781-r-1, P. 100)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	80	May	300	Sept.	195
Feb.	80	June	1690	Oct.	200
Mar.	80	July	565	Nov.	80
Apr.	80	Aug.	185	Dec.	80

These flows equal 217,990 acre feet per year and should be reserved. (Exh. DFG-r-1, P. 95)

UPPER BUTCHER CREEK

(Headwaters to West Butcher Creek.)

Resident game fish species present: brown and brook trout. (Exh.DFG-1781-r-1,P.101)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1,P.101)

The requested flows will not provide optimum conditions for maintenance of the fishery. (Exh.DFG-1781-r-1, P.101))

Evaluations of the flow requirements for this stream reach are based upon judgment of qualified professional personnel, fisheries data collections, stream surveys, and stream discharge measurements. (Exh.DFG-1781-r-1,P.101, Exh.DFG-1781-r-7; Tr. Vol. 17, P.1-48)

There is recreational use of this reach of the stream by fishermen. (Exh.DFG-1781-r-1,P.101)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout; for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January to December;

B. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January

through December (Exh.DFG-1781-r-1,P.102)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	5	May	5	Sept.	5
Feb.	5	June	5	Oct.	5
Mar.	5	July	5	Nov.	5
Apr.	5	Aug.	5	Dec.	5

These flows equal 3,620 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.101)

LOWER BUTCHER CREEK

(West Butcher Creek to the Mouth)

Resident game fish species present: brown and brook trout. (Exh.DFG-1781-r-1,P.103)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh.DFG-1781-r-1,P.103)

The requested flows will barely maintain the existing fishery, based upon physical channel measurements. (Exh.DFG-1781-r-1, P.103)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements and photographs, judgment of qualified professional personnel, fisheries data collections, and physical measurements of depths, overhanging vegetation, and undercut banks. (Exh.DFG-1781-r-1, P.103; Exh.DFG-1781-r-7; Tr. Vol. 17. Test. Marcuson, P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

B. for brook trout; for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December.

(Exh.DFG-1781-r-1, P.104)

In this stream reach the fishery suffers severe degradation when the streamflow is below 10 cfs. (Exh.DFG-1781-r-1,P.103)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	10	May	25	Sept.	15
Feb.	10	June	40	Oct.	15
Mar.	10	July	40	Nov.	10
Apr.	15	Aug.	40	Dec.	10

These flows equal 14,540 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.103)

CASTLE CREEK

(Mouth to the mouth of Lodgepole Creek.)

Resident game fish species present: brown trout. (Exh.DFG-1781-r-1,P.105)

Resident wildlife species present: beaver, muskrat, mink, and raccoon; also migratory transient wildlife species: the bald eagle. (Exh.DFG-1781-r-1,P.105)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol.16, Test. Stewart, P.3)

For this reach of stream, 20 cfs is the minimum flow required for brown trout spawning in November. (Exh.DFG-1781-r-1,P.105)

Evaluations of the flow requirements for this stream reach are based upon water surface profile program, USGS flow data, Fish and Game gauging data, low flow photography, spawning redd velocity measurements, and fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1, P.105; Exh.DFG-1781-r-9; Tr. Vol. 16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of November to mid-December; for incubation, during the months of November through March; and for rearing,

during the months of January through December; (Exh.DFG-1781-r-1,P.106)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May	25	Sept.	22
Feb.	15	June	60	Oct.	20
Mar.	15	July	30	Nov.	20
Apr.	15	Aug.	22	Dec.	15

These flows equal 16,526 acre feet per year which should be reserved. (Exh.DFG-1781-r-1, P.105)

CASTLE CREEK

(Lodgepole Creek to Picket Pin Creek.)

Resident game fish species present: brown trout. (Exh.DFG-1781-r-1,P.107)

Resident wildlife species present: beaver, mink, muskrat, and raccoon; and the migratory transient wildlife species: the bald eagle. (Exh.DFG-1781-r-1,P.107)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P.3)

Evaluations of the flow requirements for this stream reach are based upon water surface profile program, Fish and Game gauging data, low flow photography, spawning redd velocity measurements, fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1,P.107; Exh.DFG-1781-r-9; Tr. Vol. 16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through April; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1,P.108)

The instream flow required for the stream reach,

in cfs, by month of the year is as follows:

Jan.	8	May	10	Sept.	10
Feb.	8	June	40	Oct.	9
Mar.	8	July	20	Nov.	8
Apr.	8	Aug.	12	Dec.	8

These flows equal 8,983 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.107)

CASTLE CREEK

(Picket Pin Creek to 1,500 feet upstream therefrom)

Resident game fish species present: brook and brown trout. (Exh.DFG-1781-r-1,P.109)

Resident wildlife species present: muskrat and mink; and the migratory transient wildlife species, the bald eagle. (Exh.DFG-1781-r-1,P.109)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occured. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr.16,Test. Phil Stewart,P.3)

Evaluations of the flow requirements for this stream are based upon stream gauging by Montana Fish & Game and U.S.Forest Service, low flow photography, fish population and life history data obtained by electrofishing, spawning redd velocity measurements. (Exh.DFG-1781-r-1,P.109; Exh. DFG-1781-r-9; Tr.16,P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brook trout: for spawning, during the month of October; for incubation, during the months of October through January; and for rearing, during the months of January through December;

B. for brown trout: for spawning, during the month of November; for incubation, during the months

of November through March; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.110)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	1	May	2	Sept.	2
Feb.	1	June	8	Oct.	2
Mar.	1	July	5	Nov.	1
Apr.	1	Aug.	3	Dec.	1

These flows equal 1,691 acre feet per year, and should be reserved. (Exh.DFG-1781-r-1,P.109)

CLARK'S FORK YELLOWSTONE RIVER

(Montana-Wyoming State Line to Bluewater Creek)

Resident game fish species present: cutthroat, rainbow, and brown trout and mountain whitefish. (Exh.DFG-1781-r-1,P.111)

Resident wildlife species present: beaver, muskrat, mink, raccoon, and otter. (Exh.DFG-1781-r-1,P.111)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements, judgment of qualified professional personnel and fisheries data collections. (Exh. DFG-1781-r-1, P. 111; Exh.DFG-1781-r-7; Tr. Vol. 17, P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and

for rearing, during the months of January through December;

D. for mountain whitefish: for spawning, during the months of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.112)

The instream flow required for the stream reach, in cfs, by months of the year is as follows:

Jan.	160	May	1100	Sept.	250
Feb.	150	June	2900	Oct.	200
Mar.	150	July	1400	Nov.	200
Apr.	200	Aug.	450	Dec.	175

These flows equal 429,353 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.111)

LOWER CLARK'S FORK YELLOWSTONE RIVER

(Bluewater Creek to the Mouth)

Resident game fish species present: brown trout, mountain whitefish, and sauger. (Exh.DFG-1781-r-1,P.113)

Resident wildlife species present: beaver, muskrat, mink, raccoon, and otter. (Exh.DFG-1781-r-1,P.113)

Evaluations of the flow requirements for this stream reach are based upon water discharge measurements, judgment of qualified professional personnel and fisheries data collections. (DFG-1781-r-1,P.113; Exh.DFG-1781-r-7; Tr. 17,P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

B. for whitefish: for spawning, during the months of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December;

C. for sauger: for spawning, during the months of May and June; for incubation, during the months of May and June; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.114)

The instream flow required for the stream reach, in

cfs, by month of the year is as follows:

Jan.	250	May	1070	Sept.	400
Feb.	240	June	2900	Oct.	400
Mar.	240	July	1400	Nov.	330
Apr.	390	Aug.	470	Dec.	260

These flows equal 504,020 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.113)

CLEAR CREEK

(Headwaters to Mouth)

Resident game fish species present: rainbow, brown and brook trout and mountain whitefish. (Exh. DFG-r-1, P. 115)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh. DFG-r-1, P. 115)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements and photographs, judgment of qualified professional personnel and fisheries data collections. (Exh. DFG-r-1, P. 115; Exh. DFG-1781-r-7; Tr. Vol. 17, P. 1-48)

There is recreational use of this reach of the stream by fishermen. (Exh. DFG-1781-r-1, P. 115)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are:

A. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing during the months of January through December;

B. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

C. for brook trout: for spawning, during the months of October and November; for incubation, during the

months of October through mid-May; and for rearing, during the months of January through December;

D. for whitefish: for spawning, during the months of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 116)

In this stream reach the fishery and aquatic ecosystem suffer severe degradation when the streamflow is below 10 cfs. (Exh. DFG-1781-r-1, P. 115)

Fishermen interviews indicate preferences for streamflow of 20 to 30 cfs. (Exh. DFG-1781-r-1, P. 115)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 20 to 30 cfs. (Exh. DFG-1781-r-1, P. 115)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May 1-21	15	Aug.	20
Feb.	15	May 21-31	30	Sept.	20
Mar.	15	June	30	Oct.	20
Apr.	15	July 1-21	30	Nov.	18
		July 21-31	20	Dec.	15

These flows equal 13,874 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 115)

DRY CREEK

(Headwaters to Mouth)

Resident game fish species present: brown and brook trout. (Exh. DFG-1781-r-1, P. 117)

Resident wildlife species present: beaver, muskrat, mink, and raccoon. (Exh. DFG-1781-r-1, P. 117)

Evaluations of the flow requirements for this stream reach are based upon creel census and judgment of qualified professional personnel. (Exh. DFG-1781-r-1, P. 117; Exh. DFG-1781-r-7; Tr. Vol. 17, P. 1-48)

There is significant recreational use of this reach of the stream by fishermen. (Exh. DFG-1781-r-1, P. 117)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation, and rearing are:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December.

B. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 117)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan	2	May	2	Sept.	2
Feb.	2	June	2	Oct.	2
Mar.	2	July	2	Nov.	2
Apr.	2	Aug.	2	Dec.	2

These flows equal 1,448 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 117)

EAST BOULDER RIVER

(Mouth to Dry Fork Creek)

Resident game fish species present: brown and rainbow trout. (Exh. DFG-1781-r-1, P. 119)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh. DFG-1781-r-1, P. 119)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Phil Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon USGS flow data, Fish and Game flow data, low flow photography, fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 119; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through April; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of April through May; for incubation, during the months of April through mid-July; and for rearing, during the months of January through December.

(Exh. DFG-1781-r-1, P. 120)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May	20	Sept.	20
Feb.	15	June	165	Oct.	18
Mar.	15	July	50	Nov.	15
Apr.	15	Aug.	22	Dec.	15

These flows equal 23,157 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 119)

EAST BOULDER RIVER

(Dry Fork to Brownlee Creek)

Resident game fish species present: brown, rainbow and rainbow-cutthroat hybrid trout. (Exh. DFG-1781-r-1, P. 121)

Resident wildlife species present: beaver, muskrat and mink. (Exh. DFG-1781-r-1, P. 121)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon USGS flow data and fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 121; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through April; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of mid-May through June; for incubation, during the months of mid-May through mid-August; and for rearing, during the months of January through

December. (Exh. DFG-1781-r-1, P. 122)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	10	May	14	Sept.	14
Feb.	10	June	120	Oct.	13
Mar.	10	July	36	Nov.	10
Apr.	10	Aug.	16	Dec.	10

These flows equal 16,421 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 121)

FISHTAIL CREEK

(From the confluence of east and west Fishtail Creeks to Mouth)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh.DFG-1781-r-1,P.123)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.123)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occured. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol.16,Test. Stewart,P.3)

Evaluations of the flow requirements for this stream reach are based upon low flow stream gauging by Fish and Game, low flow photography, correlation of flow with a nearby USGS gauge, and fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1,P.123; Exh. DFG-1781-r-9; Tr.16,P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through mid-April; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-July;

and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.124)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	10	May	14	Sept.	10
Feb.	10	June	24	Oct.	10
March	10	July	14	Nov.	10
April	10	Aug.	10	Dec.	10

These flows equal 8,563 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.123)

EAST FISHTAIL CREEK

(West Fishtail Creek to its East Fork)

Resident game fish species present: brook, brown and rainbow trout. (Exh.DFG-1781-r-1.P.125)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.125)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16,Test. Stewart, P.3)

Evaluations of the flow requirements for this stream reach are based upon low flow stream gauging by Fish and Game, low flow photography, correlation of low flow with a nearby USGS gauge, fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 125; Exh. DFG-1781-r-9; Tr. 16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brook trout: for spawning, during the month of October; for incubation, during the months of October through mid-March; and for rearing, during the months of January through December;

B. for brown trout: for spawning, during the month of November; for incubation, during the months of November through April; and for rearing,

during the months of January through December;

C. for rainbow trout: for spawning, during the months of May through mid-June; for incubation, during the months of May through July; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.126)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	4	May	7	Sept.	4
Feb.	4	June	12	Oct.	4
March	4	July	4	Nov.	4
April	4	Aug.	4	Dec.	4

These flows equal 3,740 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.125)

WEST FISHTAIL CREEK

(East Fishtail Creek to Richmond-Kennedy Ditch)

Resident game fish species present: brook, brown and rainbow trout. (Exh.DFG-1781-r-1,P.127)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.127)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr.16,test,Phil Stewart,P.3)

Evaluations of the flow requirements for this stream reach are based upon low flow stream gauging by Fish and Game, low flow photography, correlation of low flow with a nearby USGS gauge, and fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1,P.127; Exh. DFG-1781-r-9; Tr.16,P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brook trout: for spawning, during the month of October; for incubation, during the months of October through mid-March; and for rearing, during the months of January through December;

B. for brown trout: for spawning, during the month of November; for incubation, during the

months of November through mid-April; and for rearing, during the months of January through December;

C. for rainbow trout: for spawning, during the months of May through mid-June; for incubation, during the months of May through July; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.128)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	4	May	10	Sept.	4
Feb.	4	June	20	Oct.	4
March	4	July	10	Nov.	4
April	4	Aug.	4	Dec.	4

These flows equal 4,586 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.127)

LITTLE ROCKY CREEK

(Mouth to Forest Service Road #1414 Crossing)

Resident game fish species present: brown and cut-throat trout. (Exh. DFG-1781-r-1, P. 129)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1, P. 129)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon spot flow measurements by USGS and Fish and Game, low flow photography, correlation of low flows with a nearby USGS gauge, and fish population and life history data obtained by electrofishing. (Exh.DFG-1781-r-1, P.129; Exh.DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through April; and for rearing, during the months of January through December;

B. for cutthroat trout: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-July;

and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 130)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	4	May	6	Sept.	4
Feb.	4	June	8	Oct.	4
Mar.	4	July	6	Nov.	4
Apr.	4	Aug.	4	Dec.	4

These flows equal 3,380 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 129)

LOWER DEER CREEK

(Headwaters to Interstate Highway 90)

Resident game fish species present: brown, rainbow, brook and cutthroat trout. (Exh. DFG-1781-r-1, P. 131)

Resident wildlife species present: beaver, muskrat, mink, and reccoon. (Exh. DFG-1781-r-1, P. 131)

A flow of at least 10 cfs is necessary to maintain adequate nursery areas, fish cover, depths and velocities; however, existing irrigation rights and demands do not allow the occurrence of this flow during the summer months. (Exh. DFG-1781-r-1, P. 131)

The headwaters portion of this stream reach contains small numbers of indigenous cutthroat trout. (Exh. DFG-1781-r-1, P. 131)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements and photographs, professional judgment and fish data collections. (Exh. DFG-1781-r-1, P. 131)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during

the months of June through September 7; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 132)

The upper portion of this stream reach has a significant aesthetic value as well as being an excellent fishing stream. (Exh. DFG-1781-r-1, P. 131)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	5	May 1-20	5	Sept.	5
Feb.	5	21-31	25	Oct.	5
Mar.	5	June	25	Nov.	5
Apr.	5	July	8	Dec.	5
		Aug.	8		

These flows equal 5,615 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 131)

PICKET PIN CREEK

(Mouth to the Mouth of Swamp Creek)

Resident game fish species present: brook, brown and cutthroat trout. (Exh. DFG-1781-r-1, P. 133)

Wildlife species present:

A. resident - beaver, muskrat, mink and raccoon;

B. migratory transient - bald eagles;

(Exh. DFG-1781-r-1, P. 133)

Flows requested for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Phil Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, Fish and Game and U.S. Forest Service gauging data, low flow photography, fish population and life history data obtained by electrofishing and spawning redd velocity measurements. (Exh.DFG-1781-r-1, P.133; Exh.DFG-1781-r-9; Tr. Vol. 16, P.53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brook trout: for spawning, during the month of October; for incubation, during the months of October through February; and for rearing, during the months of January through December;

C. for cutthroat trout: for spawning, during the month of May; for incubation, during the months of

May through mid-July; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 134)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	5	May	7	Sept.	6
Feb.	5	June	25	Oct.	6
Mar.	5	July	10	Nov.	5
Apr.	5	Aug.	8	Dec.	5

These flows equal 5,546 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 133)

MID RED LODGE CREEK

(Custer National Forest boundary to the conference with east and west Red Lodge Creeks)

Resident game fish species present: brown, rainbow, brook and cutthroat trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 135)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh. DFG-1781-r-1, P. 135)

This stream reach provides a varied and excellent fishing and recreational area. (Exh. DFG-1781-r-1, P. 135)

Evaluations of the flow requirements for this stream reach are based on water discharge measurements, judgment of qualified professional personnel, fisheries data collections and measurements of channel physical parameters.
(Exh.DFG-1781-r-1,P. 1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December;

B. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and

for rearing, during the months of January through December;

C. for rainbow trout: for spawning, during the month of June; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

D. for cutthroat trout: for spawning, during the month of June; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

E. for whitefish: for spawning, during the months of September through November; for incubation, during the months of September through May; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 136)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	10	May 1-20	10	Aug.	20
Feb.	10	21-31	25	Sept.	15
Mar.	10	June	25	Oct.	10
Apr.	10	July 1-20	25	Dec.	10
		21-31	20		

These flows equal 9,803 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 135)

LOWER RED LODGE CREEK

(Confluence of east and west Red Lodge Creeks to Cooney Reservoir)

Resident game fish species present: brown, rainbow brook and cutthroat trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 137)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh. DFG-1781-r-1, P. 137)

Seasonal irrigation withdrawals prevent this stream reach from reaching its potential as a fishery. (Exh. DFG-1781-r-1, P. 137)

The flows requested by Fish and Game are less than optimum, but are adequate to maintain the fishery at present fishing levels. (Exh. DFG-1781-r-1, P. 137)

Evaluations of the flow requirements for this stream reach are based upon water discharge measurements and photographs, professional judgment, fisheries data collections, and water surface profiles. (Exh. DFG-1781-r-1, P.137; Exh. DFG-1781-r-7; Tr. Vol. 17, Test. Marcuson P. 1-48)

This stream reach is a popular fishing spot. (Exh. DFG-1781-r-1, P. 137)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing,

during the months of January through December;

B. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December;

C. for rainbow trout: for spawning, during the months of May and June; for incubation, during the months of May through late August; and for rearing, during the months of January through December;

D. for whitefish: for spawning, during the months of October and November; for incubation, during the months of October through April; and for rearing, during the months of January through December;

E. for cutthroat trout: for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 138)

This stream reach is subject to extreme dewatering during the irrigation period each year. (Exh. DFG-1781-r-1, P. 137)

In this stream reach fly fishermen prefer a streamflow of 50 to 70 cfs. (Exh. DFG-1781-r-1, P. 137)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 75 cfs or more. (Exh. DFG-1781-r-1, P. 137)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	12	May	1-20	40	Aug.	25
Feb.	22		21-31	60	Sept.	36
Mar.	28	June		100	Oct.	32
Apr.	40	July		62	Nov.	24
					Dec.	16

These flows equal 26,779 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 137; Tr. Vol 17, P. preceding P. 2)

ROCK CREEK

(Custer National Forest boundary to West Fork Rock Creek)

Resident game fish species present: cutthroat, rainbow, brook and brown trout. (Exh. DFG-1781-r-1, P. 139)

Resident wildlife species present: beaver, muskrat and mink. (Exh. DFG-1781-r-1, P. 139)

Evaluation of the flow requirements for this stream reach are based upon water discharge measurements and photographs, judgment of qualified professional personnel fisheries data collections, Rock Creek Flood Plain Study, drainage inventory of streams and lakes. (Exh. DFG-1781-r-1, P. 139; Exh. DFG-1781-r-7; Tr. Vo. 17, Test. Marcuson, P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and

for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 140)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May	45	Sept.	70
Feb.	15	June	220	Oct.	44
Mar.	15	July	220	Nov.	25
Apr.	15	Aug.	135	Dec.	20

These flows equal 26,888 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 139)

MID ROCK CREEK

(West Fork Rock Creek to Bailey Ditch)

Resident game fish species present: cutthroat, rainbow, brook and brown trout. (Exh.DFG-1781-r-1,P.141)

Resident wildlife species present: beaver, muskrat, and raccoon. (Exh.DFG-1781-r-1,P.141)

Evaluations of the flow requirements for this stream reach are based upon water discharge measurements and photographs, judgment of qualified professional personnel, fisheries data collections, Rock Creek Flood Plain Study, drainage inventory of streams and lakes. (Exh.DFG-1781-r-1, P.141; Exh.DFG-1781-r-7; Tr. Vol. 17, Test. Marcuson, P. 1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation,

during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.142)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	25	May	60	Sept.	80
Feb.	25	June	295	Oct.	55
March	20	July	295	Nov.	35
April	20	Aug.	170	Dec.	25

These flows equal 66,941 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.141)

LOWER ROCK CREEK

(Bailey Ditch to Mouth)

Resident game fish species present: rainbow, brown and brook trout and mountain whitefish. (Exh.DFG-1781-r-1, P.143)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.143)

Stream reach has excellent brown trout populations where the stream channel is unaltered, however, few of these unaltered areas now exist. (Exh.DFG-1781-r-1,P.143)

Spring spawning fish species do not exist in this reach because there is a lack of water to incubate eggs laid in redds, however, fall spawning brown and brook trout are self-sustaining because they are able to use post-irrigation season flows. (Exh.DFG-1781-r-1,P.143)

Evaluations of the flow requirements for this stream reach are based upon water surface profiles, water discharge measurements and photographs, judgment of qualified professional personnel, fisheries data collections, Rock Creek Flood Plain Study. (Exh.DFG-1781-r-1, P.143; Exh.DFG-1781-r-7; Tr.Vol.17,P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for

rearing, during the months of January through December;

b. for brown trout; for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

C. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for whitefish: for spawning, during the months of September through November; for incubation during the months of September through April 7; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.144)

This stream reach is subject to extreme dewatering during the irrigation period each year. (Exh.DFG-1781-r-1,P.143)

In this stream reach interviews indicate that fly fishermen prefer a streamflow of 75-100 cfs, while lure and bait fishermen prefer 100-200 cfs. (Exh.DFG-1781-4-1, P.143)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 150-200 cfs. (Exh.DFG-1781-r-1,P.143)

The instream flow required for the stream reach in cfs, by month of the year is as follows:

Jan.	30	May	65	Sept.	50
Feb.	30	June	375	Oct.	40
March	30	July	310	Nov.	35
April	25	Aug.	95	Dec.	35

These flows equal 67,677 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.143)

LOWER EAST ROSEBUD CREEK

(Custer National Forest boundary to West Rosebud Creek)

Resident game fish species present: cutthroat, brown, rainbow and brook trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 145)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh. DFG-1781-r-1, P. 145)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements and photographs, fish data collections, drainage stream and lake surveys. (Exh. DFG-1781-r-1, P. 145; Exh. DFG-1781-r-7; Tr. Vol. 17, P.1-48)

There is significant recreational use of this reach of the stream by fishermen, boater, hikers, and other recreationists. (Exh. DFG-1781-r-1, P. 145)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

F. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

C. for brown trout: for spawning, during the months of October to November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 146)

In this stream reach it is indicated that, fishermen prefer a streamflow of 100 to 125 cfs. (Exh. DFG-1781-r-1, P. 145)

The instream flow required for the stream reach in cfs by month of the year is as follows:

Jan.	60	May	50	Sept.	80
Feb.	60	June	200	Oct.	60
Mar.	60	July	200	Nov.	60
Apr.	60	Aug.	150	Dec.	60

These flows equal 55,809 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 145)

WEST ROSEBUD CREEK

(Custer National Forest boundary to Fiddler Creek)

Resident game fish species present: cutthroat, rainbow, brown and brook trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 147)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh. DFG-1781-r-1, P. 147)

Streamflow in this reach is partially controlled by Montana Power Company at its Mystic Lake power plant. (Exh. DFG-1781-r-1, P. 147)

Evaluations of the flow requirements for this stream reach are based upon water discharge measurements (USGS flow records), judgment of qualified personnel, fisheries data collections, drainage inventory of streams and lakes. (Exh. DFG-1781-r-1, P. 147; Tr. Vol. 17, Test. Marcuson, P. 1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during th months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December.

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

E. for whitefish: for spawning, during the months of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 147)

In this stream reach it is indicated, fishermen prefer a streamflow of 50-75 cfs in the upper portion of this reach and 75 to 200 cfs in the lower portion. (Exh. DFG-1781-r-1, P. 147)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 200 cfs. (Exh. DFG-1781-r-1, P. 147)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	50	May	1-20	40	Aug.	150
Feb.	50		21-31	100	Sept.	90
Mar.	50	June		150	Oct.	50
Apr.	40	July		200	Nov.	50
					Dec.	50

These flows equal 58,214 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 147)

LOWER WEST ROSEBUD CREEK

(Rosebud Creek from Fiddler Creek to Mouth)

Resident game fish present: cutthroat, rainbow, brown and brook trout and mountain whitefish. (Exh.DFG-1781-r-1,P.149)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.149)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, water discharge measurements and photographs, judgment of qualified professional personnel and fisheries data collections. (Exh. DFG-1781-r-1,P.149; Exh.DFG-1781-r-7; Tr. Vol. 17, Marcuson P. 1-48)

There is considerable recreational use of this reach of the stream by fishermen and other persons seeking water-based recreation. (Exh.DFG-1781-r-1,P.149)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing during the months of January through December.

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

E. for whitefish: for spawning, during the month of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 148)

This stream reach has good quality water and this water is necessary to maintain good quality water in those stream reaches below it in the Yellowstone Basin. (Exh. DFG-1781-r-1, P. 149)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	65	May	1-20	50	Sept.	120
Feb.	65		21-31	130	Oct.	65
Mar.	65	June		195	Nov.	65
Apr.	50	July		260	Dec.	65
		Aug.		145		

These flows equal 61,537 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 149)

SAGE CREEK

(Headwaters to Crow Indian Reservation)

Resident game fish species present: brook and rainbow trout. (Exh. DFG-1781-r-1, P. 151)

Resident wildlife species present: beaver, mink and muskrat. (Exh. DFG-1781-r-1, P. 151)

Evaluations of the flow requirements for this stream reach are based upon water surface profile, fish data collections, and judgment of qualified professional personnel. (Exh. DFG-1781-r-1, P. 151; Exh. DFG-1781-r-7; Tr. Vol. 17, Marcuson, P. 1-48)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for rainbow trout: for spawning, during the months of June and July; for incubation; during the months of June through September 7; and for rearing, during the months of January through December;

B. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 152)

Fishermen interviews indicate preference for streamflow of 15 to 20 cfs. (Exh. DFG-1781-r-1, P. 151)

This stream reach has a significant aesthetic value

and the streamflow which protects that value is 15 to 20 cfs. (Exh. DFG-1781-r-1, P. 151)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May	15	Sept.	15
Feb.	15	June	15	Oct.	15
Mar.	15	July	15	Nov.	15
Apr.	15	Aug.	15	Dec.	15

These flows equal 10,866 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 151)

STILLWATER RIVER

(Mouth to Rosebud River)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh.DFG-1781-r-1,P.153)

Wildlife species present:

A. resident - beaver, muskrat, mink and raccoon;

B. migratory transient - bald eagles;

(Exh.DFG-1781-r-1,P153)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P.3)

Evaluations of the flow requirements for this stream reach are based upon USGS gauging data, low flow photography, extrapolation of fish population and life history data from an adjacent reach of the Stillwater River. (Exh.DFG-1781-r-1, P.153; Exh.DFG-1781-r-9; Tr. Vol. 16, Test. Stewart P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through March; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the

months of April through mid-May; for incubation, during the months of April through June; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.154)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	225	May	560	Sept.	630
Feb.	225	June	2075	Oct.	440
March	225	July	1480	Nov.	225
April	225	Aug.	740	Dec.	225

These flows equal 438,827 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.153)

STILLWATER RIVER

(Rosebud River to West Fork Stillwater River)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 155)

Wildlife species present:

A. resident - beaver, muskrat, mink and raccoon;

B. migratory transient - bald eagle;

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon USGS gauging data, low flow photography, fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 155; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the month of November; for incubation, during the months of November through March; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of April through mid-May; for incubation,

during the months of April through June; and for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 154)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	75	May	190	Sept.	275
Feb.	75	June	1200	Oct.	180
Mar.	75	July	760	Nov.	75
Apr.	75	Aug.	350	Dec.	75

These flows equal 205,699 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 155)

STILLWATER RIVER

(West Fork Stillwater River to the north end of Sioux Charlie Lake)

Resident game fish species present: brook, brown and rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 157)

Wildlife species present:

A. resident - beaver, muskrat, mink, raccoon and otter;

B. migratory transient - bald eagle;

(Exh. DFG-1781-r-1, P. 157)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon USGS gauging data; low flow photography and fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 157; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are:

A. for brook trout: for spawning during the month of October; for incubation during the months of October through mid-March; and for rearing during

the months of January through December.

B. for brown trout: for spawning during the month of November; for incubation during the months of November through April; and for rearing during the months of January through December.

C. for rainbow trout: for spawning during the months of May through mid-June; for incubation during the months of May through July; and for rearing during the months of January through December. (Exh. DFG-1781-r-1, P. 158)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	45	May	150	Sept.	120
Feb.	45	June	710	Oct.	100
Mar.	45	July	480	Nov.	45
Apr.	45	Aug.	175	Dec.	45

These flows equal 121,252 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 157)

MID-SWEET GRASS CREEK

(Forest Service boundary to Lake Adam diversion)

Resident game fish species present: rainbow, brook and brown trout and mountain whitefish. (Exh.DFG-1781-r-1, P.159)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1, P.159)

This reach of Sweet Grass Creek is most productive for fish and fishing recreation. (Exh.DFG-1781-r-1,P.159)

Flows in this reach are already heavily appropriated for irrigation. (Exh.DFG-1781-r-1,P.159)

Considerable fish habitat degradation occurs in this reach when flows are reduced from 75 to 21 cfs. (Exh.DFG-1781-r-1,P.159)

The requested flows are considerably less than flows which would optimize the fishery in the summer months, but flows which would be optimum are not available due to current irrigation demands. (Exh,DFG-1781-r-1,P.159)

Evaluations of the flow requirements for this stream reach are based upon water discharge measurements, photographs and USGS records, professional judgment and fisheries data collections and creel census. (Exh.DFG-1781-r-1,P.159; Exh.DFG-1781-r-7; Tr.Vol.Test.Marcuson,P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for rainbow trout: for spawning during the months of June and July; for incubation during the months of June through September; and for rearing during the months of January through December.

B. for brook trout: for spawning during the months of October and November; for incubation during the months of October through April; and for rearing during the months of January through December.

C. for brown trout: for spawning during the months of October and November; for incubation during the months of October through April; and for rearing during the months of January through December.

D. for whitefish: for spawning during the months of September through November; for incubation during the months of September through May; and for rearing during the months of January through December. (Exh.DFG-1781-r-1,P.160)

In this stream reach 75 cfs is necessary to maintain the fishery and aquatic ecosystem at its optimum level. (Exh.DFG-1781-r-1,P.159)

A flow of 15 cfs is the minumum which will maintain the fishery during winter months. (Exh.DFG-1781-r-1,P.159)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May 1-20	25	Sept.	25
Feb.	15	21-31	100	Oct.	25
March	15	June	200	Nov.	25
April	15	July	100	Dec.	25
		Aug.	45		

These flows equal 27,218 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.159)

LOWER SWEET GRASS CREEK

(Lake Adam diversion to Mouth)

Resident game fish species present: brown trout and mountain whitefish. (Exh.DFG-1781-r-1,P.161)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.161)

This stream reach has a large channel with extreme flow fluctuations due to irrigation withdrawals. Irrigation return flows are of poor quality and the fishery has only those flows left over from irrigation demands to maintain itself during this time of year. (Exh.DFG-1781-r-1,P.161)

Evaluations of the flow requirements for this stream reach are based upon Water Surface Profile, water discharge measurements and photographs and judgment of qualified professional personnel. (Tr.17,P.1-49; Exh.DFG-1781-r-1,P.161; Exh.DFG-1781-r-7)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for brown trout: for spawning during the months of October and November; for incubation during the months of October through April; and for rearing during the months of January through December.

B. for whitefish: for spawning during the months of September through November; for incubation

during the months of September through May; and for rearing during the months of January through December. (Exh.DFG-1781-r-1,P.162)

In this stream reach fishermen interviews indicate a preference for a streamflow of 100-150 cfs during the summer fishing season and good aesthetic values require at least 100 cfs. Neither of these conditions exist during the irrigation season. (Exh.DFG-1781-r-1,P.161; Tr.Vol.17, Test. Marcuson,P. 1-76)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	20	May 1-20	40	Sept.	40
Feb.	20	21-31	100	Oct.	40
March	20	June	200	Nov.	20
Apr.	20	July 1-20	100	Dec.	20
		21-31	60		
		Aug.	60		

These flows equal 36,644 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.161)

UPPER DEER CREEK

(Headwaters to a point upstream from I-90 bridge where low flows disappear into streambed)

Resident game fish species present: cutthroat, brown and brook trout. (Exh.DFG-1781-r-1,P.163)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.163)

Flows in this reach of stream fluctuate widely during the year. Low flows are caused by both natural and man-made conditions. The lower 1½ miles of this stream are dewatered completely by irrigation withdrawals, and, also during the low flow period, water is lost into the streambed due to natural conditions. (Exh.DFG-1781-r-1, P.163)

Evaluations of the flow requirements for this stream reach are based upon Water Surface Profile, water discharge measurements and photographs, judgment of qualified professional personnel and fish data collections. (Tr.Vol.17 Test.Marcuson. p.1-49; Exh.DFG-1781-r-1,P.163; Exh.DFG-1781-r-7)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for cutthroat trout: for spawning during the months of June and July; for incubation during the months of June through mid-September; for rearing during the months of January through December.

B. for brown trout: for spawning during the months of October and November; for incubation during the months of October through May 7; and for rearing during the months of January through December.

C. for brook trout: for spawning during the months of October and November; for incubation during the months of October through May 7; and for rearing during the months of January through December. (Exh.DFG-1781-r-1,P.164)

In this stream reach fishermen prefer a summer streamflow of 10-20 cfs. (Exh.DFG-1781-r-1,P.163)

This stream reach has aesthetic values which are best maintained at a flow of 15 cfs in the summer. (Exh. DFG-1781-r-1,P. 163)

The upper reaches of this stream provide excellent small stream fishing.

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	5	May 1-20	5	Sept.	5
Feb.	5	21-31	25	Oct.	5
March	5	June	25	Nov.	5
Apr.	5	July	8	Dec.	5
		Aug.	8		

These flows equal 5,614 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.163)

LOWER WEST BOULDER RIVER

(Gallatin National Forest Boundary to Mouth)

Resident game fish species present: cutthroat, rainbow, brown and brook trout and mountain whitefish. (Exh.DFG-1781-r-1,P.165)

Resident wildlife species present: beaver, muskrat, mink and raccoon.
(Exh.DFG-1781-r-1,P.165)

Evaluations of the flow requirements for this stream reach are based upon Water Surface Profile, fish data collections, and judgment of qualified professional personnel. (Exh.DFG-1781-r-1,P.165; Exh.DFg-1781-r-7; Tr. Vol. 17, Test. Marcuson, P.1-48)

There is recreational use of this reach of the stream by fishermen. (Exh.DFG-1781-r-1,P.165)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for cutthroat trout: for spawning during the months of June and July; for incubation during the months of June through September 7; and for rearing during the months of January through December.

B. for rainbow trout: for spawning during the months of June and July; for incubation during the months of June through September 7; and for rearing during the months of January through December.

C. for brown trout: for spawning during the months

of October and November; for incubation during the months of October through mid-May; and for rearing during the months of January through December.

D. for brook trout: for spawning during the months of October and November; for incubation during the months of October through mid-May; and for rearing during the months of January through December.

E. for whitefish: for spawning during the months of September and October; for incubation during the months of September through April 7; and for rearing during the months of January through December. (Exh.DFG-1781-r-1,P.166)

In this stream reach fishermen prefer a streamflow of 125-200 cfs. (Exh.DFG-1781-r-1,P.165)

This stream reach has a significant aesthetic value and the streamflow which protects that value is 250 cfs or more. (Exh.DFG-1781-r-1,P.165)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	50	May 1-20	50	Sept.	75
Feb.	50	21-31	300	Oct.	75
March	50	June	300	Nov.	60
April	50	July 1-20	300	Dec.	50
		21-31	200		
		Aug.	75		

These flows equal 74,096 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.165)

WEST FORK STILLWATER RIVER

(Mouth to Castle Creek)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 167)

Wildlife species present:

A. resident - beaver, muskrat, mink and raccoon;

B. migratory transient - bald eagle;

(Exh. DFG-1781-r-1, P. 167)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

For this stream reach 50 cfs in November is a minimum requirement for brown trout spawning. (Exh. DFG-1781-r-1, P. 167)

Evaluations of the flow requirements for this stream reach are based upon USGS and Fish and Game gauging data, Water Surface Profile Program, low flow photography, fish populations and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 167; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for brown trout: for spawning during the month

of November; for incubation during the months of November through March; and for rearing during the months of January through December.

B. for rainbow trout: for spawning during the months of mid-April through May; for incubation during the months of mid-April through mid-July; and for rearing during the months of January through December. (Exh. DFG-1781-r-1, P. 168)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	35	May	70	Sept.	60
Feb.	35	June	350	Oct.	50
Mar.	35	July	125	Nov.	50
Apr.	35	Aug.	75	Dec.	35

These flows equal 57,530 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 167)

WEST FORK STILLWATER RIVER

(Castle Creek to Stillwater-Sweetgrass County line)

Resident game fish species present: brown and rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1, P. 169)

Wildlife species present:

A. resident - beaver, muskrat, mink and raccoon;

B. migratory transient - bald eagle;

(Exh. DFG-1781-r-1, P. 169)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P.3)

Evaluations of the flow requirements for this stream reach are based upon Fish and Game gauging data, Water Surface Profile Program, low flow photography, fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 169; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for brown trout: for spawning during the month of November; for incubation during the months of November through April; and for rearing during

the months of January through December.

B. for rainbow trout: for spawning during the months of mid-May through June; for incubation during the months of mid-May through mid-August; and for rearing during the months of January through December. (Exh. DFG-1781-r-1, P. 170)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	30	May	60	Sept.	50
Feb.	30	June	300	Oct.	45
Mar.	30	July	110	Nov.	30
Apr.	30	Aug.	65	Dec.	30

These flows equal 48,814 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 169)

WEST FORK STILLWATER RIVER

(Sweetgrass-Stillwater County line to Tumble Creek)

Resident game fish species present: brown and rainbow trout. (Exh.DFG-1781-r-1, P. 171)

Resident wildlife species present: beaver, muskrat and mink. (Exh. DFG-1781-r-1, P. 171)

Flows requested by Fish and Game for the high flow portions of the year approximate average monthly minimum flows which have historically occurred. These flows are conservative statements of flows needed for channel flushing and maintenance. (Tr. Vol. 16, Test. Stewart, P. 3)

Evaluations of the flow requirements for this stream reach are based upon Fish and Game and U. S. Forest Service gauging data, Water Surface Profile Program, low flow photography, fish population and life history data obtained by electrofishing. (Exh. DFG-1781-r-1, P. 171; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are:

A. for brown trout: for spawning during the month of November; for incubation during the months of November through mid-May; and for rearing during the months of January through December.

B. for rainbow trout: for spawning during the months of mid-May through June; for incubation during the months of mid-May through mid-August;

for rearing during the months of January through December. (Exh. DFG-1781-r-1, P. 172)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	25	May	25	Sept.	25
Feb.	25	June	200	Oct.	25
Mar.	25	July	100	Nov.	25
Apr.	25	Aug.	40	Dec.	25

These flows equal 34,047 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 171)

LOWER WILLOW CREEK

(Forest boundary to Cooney Reservoir)

Resident game fish species present: rainbow, brown and brook trout and mountain whitefish. (Exh.DFG-1781-r-1, P.175)

Resident wildlife species present: beaver, muskrat, mink and raccoon. (Exh.DFG-1781-r-1,P.175)

Considerable irrigation occurs in this reach, but is usually well supplemented by subsurface flows caused by water diverted from the Rock Creek drainage onto the gravelly soils of the East Bench. (Exh.DFG-1781-r-1,P.175)

Evaluations of the flow requirements for this stream reach are based upon Water Surface Profile, water discharge measurements and photographs, judgment of qualified professional personnel and fisheries data collections. (Exh.DFG-1781-r-1,P.175; Exh.DFG-1781-r-7; Tr.Vol. 17,Test. Marcuson,P.1-48)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are as follows:

A. for cutthroat trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing, during the months of January through December;

B. for rainbow trout: for spawning, during the months of June and July; for incubation, during the months of June through September 7; and for rearing,

during the months of January through December;

C. for brown trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

D. for brook trout: for spawning, during the months of October and November; for incubation, during the months of October through mid-May; and for rearing, during the months of January through December;

E. for whitefish: for spawning, during the month of September through November; for incubation, during the months of September through April 7; and for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.148)

In this stream reach the fishery and aquatic ecosystem suffer severe degradation when the streamflow is below 25 cfs. (Exh.DFG-1781-r-1,P.175)

In this stream reach fishermen prefer a streamflow of 40 cfs. (Exh.DFG-1781-r-1,P.175)

Spring-spawning trout are limited in their ability to reproduce in this stream reach because of silt deposition. (Exh.DFG-1781-r-1,P.175)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	3	May	17	Sept.	16
Feb.	5	June	23	Oct.	12
March	6	July	21	Nov.	9
Apr.	12	Aug.	16	Dec.	7

These flows equal 8,890 acre-feet per year and should be reserved. (Exh.DFG-1781-r-1,P.175; Tr.17, P. preceding P.2)

YELLOWSTONE RIVER

(Boulder River to the Stillwater River)

Resident game fish species present in this stream reach: brown and rainbow trout and mountain whitefish. (Exh.DFG-1781-r-1,P.177)

Wildlife species present:

A. Resident - beaver, muskrat, marten, river otter, raccoon, white-tailed deer and pheasants.

B. Migratory transient - numerous ducks, Canada geese, bald eagle and great blue heron.

(Exh.DFG-1781-r-1,P.177)

Evaluations of the flow requirements for this stream reach are based upon examination of discharge frequency data from the U.S. Geological Survey, dominant discharge, consideration of the existing water rights of Fish and Game in the Yellowstone River in this reach, current biological data obtained from the middle and lower reaches of the Yellowstone River, and recognition of flow requirements in the lower reaches of the Yellowstone River. The Fish and Game request for reservation is based upon the 50 percent and 70 percent exceedance flows minus this department's existing water rights in the reach. (Exh.DFG-1781-r-1,P.177)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January		0	July	1-10	6,800
February		0		11-20	4,500
March		200		21-31	2,800
April	1-15	400	August	1-10	1,600
	16-30	0		11-31	1,100
May	1-10	500	September		300
	11-20	2,600	October		0
	21-31	5,900	November		600
June	1-10	10,200	December		300
	11-20	11,600			
	21-30	9,100			

These flows equal 1,262,081 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.178)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 23,578 cfs, (46,766 acre feet) which is necessary to maintain channel maintenance processes. This, also should be reserved. (Exh.DFG-1781-r-1,P.178)

YELLOWSTONE RIVER

(Stillwater River to the north-south Carbon-Stillwater county lines)

Resident game fish species present: rainbow and brown trout, mountain whitefish and burbot. (Exh.DFG-1781-r-1,P.179)

The wildlife species present:

A. Resident - beaver, muskrat, marten, river otter, raccoon, white-tailed deer and pheasants.

B. Migratory transient - numerous ducks, Canada geese, bald eagles and great blue heron.

(Exh.DFG-1781-r-1,P.179)

Evaluations of the flow requirements for this stream reach are based upon examination of discharge frequency data from the U.S. Geological Survey, dominant discharge, consideration of the existing water rights of Fish and Game in the Yellowstone River in this reach, current biological data obtained from the middle and lower reaches of the Yellowstone River, and recognition of flow requirements in the lower reaches of the Yellowstone River. The request is based upon 50 percent and 70 percent exceedance flows minus Fish and Game's existing water rights in the reach. (Exh.DFG-1781-r-1,P.179)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January		100	July	1-10	9,000
February		100		11-20	5,900
March		300		21-31	3,600
April	1-15	500	August	1-10	2,100
	16-30	0		11-31	1,400
May	1-10	600	September		500
	11-20	3,100	October		100
	21-31	7,000	November		800
June	1-10	12,100	December		400
	11-20	14,000			
	21-30	11,300			

These flows equal 1,550,082 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.181)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 29,486 (58,485 acre feet) which is needed to perform channel maintenance processes. This also should be reserved. (Exh.DFG-1781-r-1,P.179,180)

YELLOWSTONE RIVER

(North-South Carbon-Stillwater county lines to Clarks Fork of the Yellowstone River)

Resident game fish species present: brown and rainbow trout, mountain whitefish, channel catfish, sauger and burbot. (Exh.DFG-1781-r-1,P.181)

Resident wildlife species present: ducks, Canada geese, bald eagles and great blue heron. (Exh.DFG-1781-r-1 P.181)

Evaluations of the flow requirements for this stream reach are based upon examination of discharge frequency data from the U.S. Geological Survey, dominant discharge, current biological data obtained from the middle and lower reaches of the Yellowstone River, and recognition of flow requirements in the lower reaches of the Yellowstone River. The request is based upon the 50 percent and 70 percent exceedance flows. The department has no "existing right" in this reach and therefore no water quantities have been subtracted from the 50 percent and 70 percent exceedance flows. (Exh.DFG-1781-r-1,P.177,181)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for rainbow trout: for spawning, during the months of mid-May through mid-August; for incubation during the months of mid-May through September; for rearing, during the months of January through

December.

B. for brown trout: for spawning, during the months of September through November; for incubation, during the months of September through March; for rearing, during the months of January through December.

C. for whitefish: for spawning, during the months of September through mid-December; for incubation, during the months of September through March; for rearing, during the months of January through December.

D. for sauger: for spawning, during the months of April and May; for incubation, during the months of April and May; for rearing, during the months of January through December.

E. for burbot: for spawning, during the months of February and March; for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.22 & 184)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January		1,600	July	1-10	11,600
February		1,600		11-20	8,500
March		1,800		21-31	6,200
April	1-15	2,000	August	1-10	4,700
	16-30	2,600		11-31	4,000
May	1-10	3,200	September		3,000
	11-20	5,700	October		2,700
	21-31	10,000	November		2,300
June	1-10	14,700	December		1,900
	11-20	16,600			
	21-31	13,900			

These flows equal 3,118,013 acre feet per year and should be reserved. (Exh.DFG-1781-r-1.P.182)

The dominant discharge required in this stream reach for one 24-hour period between May 11 and August 10 is 29,486 (58,485 acre feet) which is necessary to perform channel maintenance processes and this should also be reserved. (Exh.DFG-1781-r-1, P.182)

YELLOWSTONE RIVER

(Clarks Fork of the Yellowstone River to Bighorn River)

Resident game fish species present: rainbow and brown trout, mountain whitefish, channel catfish, sauger, walleye ling (burbot) and white crappie. (Exh. DFG-1781-r-1, P. 183)

Wildlife species present:

A. resident - beaver, muskrat, marten, mink, raccoon, pheasants, white-tailed deer, ducks and raptors.

B. migratory transient - bald eagles, Canada geese, ducks, great blue heron, whistling swan and sandhill crane. (Exh. DFG-1781-r-1, P. 183)

Evaluations of the flow requirement for this stream reach are based upon examination of discharge frequency data from the U. S. Geological Survey, dominant discharge, current biological data obtained from the middle and lower reaches of the Yellowstone River, and recognition of flow recommendations in the lower reaches of the Yellowstone River. The request is based on the 50 percent and 70 percent exceedance flows as measured at the USGS gauge "Yellowstone River near Billings." The department has no "existing right" in this reach and therefore, no water quantities have been subtracted from the 50 percent and 70 percent exceedance flows. (Exh. DFG-1781-r-1, P. 177, 183)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for rainbow trout: for spawning, during the month of mid-May through mid-August; for incubation, during the months of mid-May through September; for rearing, during the months of January through December.

B. for brown trout: for spawning, during the months of September through November; for incubation, during the months of September through March; for rearing, during the months of January through December.

C. for sauger and walleye: for spawning, during the months of April and May; for incubation, during the months of April and May; for rearing, during the months of January through December.

D. for burbot: for spawning, during the months of February and March; for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 184)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	2,500	July	1-20	11,100
Feb.	2,500		21-31	6,300
Mar.	2,900	Aug.		4,800
Apr.	3,600	Sept.		3,700
May	1-20 6,100	Oct.		3,600
	21-31 12,500	Nov.		3,500
June	1-7 17,900	Dec.		2,800
	8-30 19,700			

These flows equal 4,041,913 acre feet per year and should

be reserved. (Exh/ DFG-1781-r-1, P. 183)

The dominant discharge required in this stream reach for one 24-hour period between May 1 and July 31 is 34,500 cfs (68,430 acre feet) which is necessary to allow channel maintenance processes to occur and this, also, should be reserved. (Exh. DFG-1781-r-1,P. 183)

III

LOWER YELLOWSTONE BASIN

(Big Horn River to North Dakota Boundary)

As to each of the reaches and streams of the Lower Yellowstone Basin, hereinafter set forth, and from the application, testimony and evidence adduced herein by Fish and Game it is established and shown to the satisfaction of the board as follows:

The fishery and aquatic resources are of good quality and of importance to the public, which attributes should be protected from degradation by reserving of waters and flows.

There is hereinafter set forth the findings of this board as to the amounts of waters and flows thereof, which are necessary to the public purposes and needs of the public as stated in the application of Fish and Game and herein; and as the same relate to the particular reaches and tributaries of the Lower Yellowstone River Basin and fish and wildlife and recreational uses present in each thereof, all as follows:

BIGHORN RIVER

(Afterbay Dam to the Little Bighorn River)

Fish species present:

A. Resident game fish - rainbow, brown and cutthroat trout, mountain whitefish, sauger and burbot.

B. Migratory transient game fish - brown trout, northern pike, sauger and channel catfish. (Exh. DFG-1781-r-1,P.187)

Wildlife species present:

A. Resident - beaver, muskrat, mink, raccoon, fox, squirrel, white-tailed deer, mule deer, coyote, skunk, bobcat and red fox.

B. Migratory transient - numerous ducks, Canada geese, bald eagles, golden eagles, osprey, mountain lion, black bear and otter. (Exh.DFG-1781-r-1,P.187)

There is substantial recreational use of this stream reach by fishermen, and other recreationists. (Tr.Vol.13, Test. Erickson, "Water Based Recreation", Task 7, P.61-63; Exh.DFG-1781-r-1,P.187; Tr. Vol.14,Test. Swedberg , P.97-99)

Flows are necessary to maintain the existing growth of aquatic plants which are necessary as food for the aquatic invertebrate and insect populations and to maintain an important trout fishery.

Flows in June and July need to be sufficient to transport the yearly accumulation of sediment and control excessive aquatic weed growth. High flows at this time of year also sweep the gravel bars free of some vegetation,

which aids the Canada geese in their nesting activities the following spring. (Exh.DFG-1781-r-1,P.186)

Evaluations of the flow requirements for this stream reach are based upon comparison of USGS gauging data at stations on the Bighorn River at Yellowtail Dam, at the mouth of the Bighorn River and the Yellowstone River at Miles City from 1968-1975 (post-Yellowtail Dam) and utilizing the lower of the flows occurring on a monthly basis as reflected by the operation of Yellowtail Dam. (Exh.DFG-1781-r-1,P.186,254)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are as follows:

A. for rainbow trout: for spawning, during the months of mid-March through April and October through mid-November; for incubation, during the months of mid-March through mid-June and October through mid-December; for rearing, during the months of January through December.

B. for brown trout: for spawning, during the months of mid-October through December; for incubation, during the months of mid-October through March; for rearing, during the months of January through December.

C. for burbot: for passage, during the months of October through March; for spawning, during the months of February through March 7; for incubation,

during the months of February through April.

D. for sauger: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-June. (Exh.DFG-1781-r-1,P.188)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January	3,300	July 1-20	3,800
February	3,200	21-31	3,200
March	4,000	August	2,800
April	3,600	September	2,600
May 1-20	3,800	October	2,700
21-31	3,800	November	3,100
June 1-7	5,200	December	3,200
8-30	5,200		

These flows equal 2,484,187 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.186)

BIGHORN RIVER

(Little Bighorn River to Mouth)

Fish species present:

A. Resident game fish - channel catfish, black crappie and largemouth bass.

B. Migratory transient game fish - brown trout, northern pike, sauger, burbot and channel catfish. (Exh.DFG-1781-r-1,P.190)

Wildlife species present:

A. Resident - beaver, muskrat, mink, raccoon, fox, squirrel, white-tailed deer, mule deer, coyote, skunk, bobcat and red fox.

B. Migratory transient - numerous ducks, Canada geese, cormorant, osprey and bald eagle. (Exh.DFG-1781-r-1,P.190)

Flows requested by Fish and Game are necessary to maintain existing populations of channel catfish, sauger, and burbot and for potential paddlefish spawning. Said flows are also needed to pass migratory species over the Manning and Kemph diversion dams during spring and fall months. The March, April and early May flows are necessary for protection of goose nests from flooding and predation.

Evaluations of the flow requirements for this stream reach are based upon comparison of USGS gauging data at stations on the Bighorn River at Yellowtail Dam, at the mouth of the Bighorn River and the Yellowstone River at Miles City from 1968-1975 (post-Yellowtail Dam) and uti-

lizing the lower of the flows occurring on a monthly basis as reflected by the operation of Yellowtail Dam. (Exh.DFG-1781-r-1,P.189,254)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are as follows:

A. for channel catfish: for passage, during the months of August through October; for spawning, during the months of mid-August through September 7; for incubation, during the months of mid-August through mid-September; for rearing, during the months of January through December.

B. for burbot: for passage, during the months of October through April; for spawning, during the months of February through March 7; for incubation, during the months of February through April.

C. for sauger: for spawning, during the months of mid-April through May; for incubation, during the months of mid-April through mid-June. (Exh.DFG-1781-r-1,P.188,191)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January	3,300	July	1-20	3,800
February	3,200		21-31	3,200
March	4,000	August		2,800
April	3,600	September		2,600
May	1-20	3,800	October	2,700
	21-31	3,800	November	3,100
June	1-7	5,200	December	3,200
	8-30	5,200		

These flows equal 2,484,187 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.189)

TONGUE RIVER

(Montana-Wyoming state line to the Tongue River Reservoir)

The fish species present are:

A. Resident game fish - sauger, walleye, smallmouth bass, rock bass and channel catfish.

B. Migratory transient game fish - sauger and walleye (Exh.DFG-1781-r-1,P.195,196)

Evaluations of the flow requirements for this stream reach are based upon Northern Great Plains Resource Program (NGPRP) estimates as the basis for the low flow requests. Field work on the stream fish populations authenticated the use of these flows. USGS flow duration data were used for May and June. These flows were also authenticated by field observations of the river at known gauged flows. (Exh.DFG-1781-r-1,P.196, Tr.Vol. 14,Elser, P.49)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are as follows:

A. for sauger: for passage, during the months of mid-April through June; for spawning, during the months of mid-April through June; for rearing, during the months of January through December.

B. for walleye: for passage, during the months of mid-April through June; for spawning, during the months of mid-April through June; for rearing, during the months of January through December.

C. for smallmouth bass: for spawning, during the

months of mid-May through mid-July; for rearing, during the months of January through December.

D. for rock bass: for spawning, during the months of mid-May through mid-July; for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.197)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	160	May 1-20	700	Aug.	100
Feb.	160	21-31	1200	Sept.	100
March	200	June	1350	Oct.	200
Apr.	200	July	360	Nov.	200
				Dec.	150

These flows equal 237,900 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.198)

TONGUE RIVER

(Tongue River Dam to Four Mile Creek)

Resident game fish species: brown trout, northern pike, walleye, black crappie and white crappie. (Exh.DFG-1781-r-1, P.195,196)

Evaluations of the flow requirments for this stream reach are based upon water temperature data and depth and velocity criteria for spawning and incubation flows as suggested by Bovee (1974) and Stalmaker and Arnette (1976), used in conjunction with the Water Surface Profile Program; wetted perimeter output from the Water Surface Profile Program was used to determine rearing flows; Bovee's (1975) indicator species method was used for rearing flows for stonecats. (Exh.DFG-1781-r-1,P.199,201)

The Tongue River immediately downstream from the Tongue River Dam represents the only stream trout fishery in the area. While catchable rainbow trout are stocked annually by Fish and Game, brown trout are reproducing in the stream. Fish population sampling revealed that while the brown trout population is not large, it is a fishable population. Each year, a few "trophy" sized browns are taken. Therefore, it is important to recognize and protect this remnant trout population.

The Tongue River Reservoir creel census conducted in 1975 and 1976 also interviewed anglers fishing the river downstream from the dam. In 1975, 70.2 percent of the recorded catch below the dam was crappie. Walleye made up

15.3 percent of the catch and northern pike added about 2.0 percent. This reach of the Tongue River is important from a sport fishing standpoint and the populations of sport fish present should be protected. (Exh.DFG-1781-r-1 P.201)

The periods of the year when flows are required by the fish species found in this stream reach for spawning, incubation and rearing are as follows:

A. for brown trout: for spawning, during the months of October and November; for incubation, during the months of November through December; for rearing, during the months of January through December.

B. for northern pike: for rearing, during the months of January through December.

C. for walleye: for rearing, during the months of January through December.

D. for black and white crappie: for spawning, during the months of May through July; for rearing, during the months of January through December.

E. for the stonecat: for rearing, during the months of January through December. (Exh.DFG-1781-r-1, P.200, Tr. Vol. 14, Test. Elser, P.51)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	150	May	700	Aug.	150
Feb.	150	June	700	Sept.	150
March	150	July 1-15	700	Oct.	190
April	150	July 16-31	150	Nov.	190
				Dec.	150

These flows equal 196,480 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.198, Tr. Vol. 14, Test. Elser P.56-57)

TONGUE RIVER

(Four Mile Creek to S-H Diversion)

Resident game fish species present: smallmouth bass, rock bass, northern pike, sauger and walleye. (Exh.DFG-1781-r-1,P.201)

Evaluations of the flow requirments for this stream reach are based upon water temperature data, depth and velocity criteria for spawning and incubation flows as suggested by Bovee (1975), Coble (1975) and Scott and Crossman (1973); water surface profile program (WSP); wetted perimeter method used in conjunction with WSP was used for rearing flows for all species. (Exh.DFG-1781-r-1 , P.203; Tr. Vol. 14, Test. Elser P. 56-57)

Fish population sampling on the Tongue River near Birney and Ashland indicates an excellent population of smallmouth bass. Anglers take many smallmouth, with fish ranging to 3 pounds reported. Reproductive success in the Birney area depends on flow conditions. The total number of age 0 smallmouth bass collected at Birney ranged from 28 in the fall of 1974 to 4 in the fall of 1975.. Flows should be stabilized for smallmouth bass spawning.

Sauger and northern pike are popular with fishermen in the Birney-Ashland area and provide excellent fishing in the spring. The Tongue River supports the only rock bass population in Montana, which should be protected. (Exh.DFG-1781-r-1,P.205)

The periods of the year when flows are required by

the fish species found in this stream reach for spawning and rearing are as follows:

A. for smallmouth bass: for spawning, during the months of mid-May through mid-July; for rearing, during the months of January through December.

B. for sauger: for spawning, during the months of April and May; for rearing, during the months of January through December.

C. for northern pike: for rearing, during the months of January through December.

D. for rock bass: for spawning, during the months of mid-May through mid-July; for rearing, during the months of January through December.

E. for stonecat: for rearing, during the months of January through December. (Exh.DFG-1781-r-1, P.204)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	150	July 1-15	700
Feb.	150	16-31	150
March	150	Aug.	150
April	150	Sept.	150
May 1-20	390	Oct.	150
21-31	700	Nov.	150
June	700	Dec.	150

These flows equal 193,430 acre feet per year and should be reserved. (Exh.DFG-1781-r-1, P.198)

TONGUE RIVER

(Tongue River from S-H Diversion to T & Y Diversion)

Resident game fish species present: sauger, smallmouth bass, channel catfish and rock bass. (Exh.DFG-1781-r-1,P.205)

Evaluations of the flow requirements for this stream reach are based upon water temperature data and depth and velocity criteria for spawning and incubation flows as reported by Bovee (1974) and Scott and Crossman (1975), used in conjunction with the Water Surface Profile program (WSP); wetted perimeter method from the WSP program was used for rearing flows. (Exh.DFG-1781-r-1,P.205,207; Tr. Vol. 14, Test. Elser, P.56-57)

Sport fishing in this reach, particularly immediately downstream from the S-H Diversion is becoming increasingly popular. Sauger, channel catfish and smallmouth bass are favorite targets of anglers from Miles City, Ashland, Forsyth, and the surrounding area. Fish population sampling shows fair concentrations of smallmouth bass and sauger and an excellent catfish population. Baited traps fished for channel catfish result in a catch of almost 5 cats per trap. Catfish average 17.8 inches and 2.35 pounds. Flow levels indicated are important in maintaining the sport fish potential of this reach of the Tongue River. (Exh.DFG-1781-r-1,P.207)

The periods of the year when flows are required by the fish species found in this stream reach for spawning

and rearing are as follows:

A. for sauger: for spawning, during the months of April and May; for rearing, during the months of January through December.

B. for smallmouth bass: for spawning, during the months of mid-May through mid-July; for rearing, during the months of January through December.

C. for rock bass: for spawning, during the months of mid-May through mid-July; for rearing, during the months of January through December.

D. for stonecat: for rearing, during the months of January through December.

E. for channel catfish: for spawning, during the months of July and August; for rearing, during the months of January through December. (Exh.DFG-1781-r-1, P.206)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	190	May 1-20	400	Aug.	190
Feb.	190	21-31	700	Sept.	190
March	190	June	700	Oct.	190
April	400	July 1-15	700	Nov.	190
		16-31	190	Dec.	190

These flows equal 214,960 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.198)

TONGUE RIVER

(T & Y Diversion to the Yellowstone River)

Fish species present:

A. resident game fish - sauger and channel catfish.

B. migratory transient game fish - paddlefish, shovelnose sturgeon, sauger, walleye and burbot.

(Exh.DFG-1781-r-1, P.207)

Evaluations of the flow requirements for this stream reach are based upon indicator species method as suggested by Bovee (1974); water temperature data and depth and velocity criteria, used in conjunction with the Water Surface Profile (WSP) Program for determining passage and spawning flows. Criteria were according to Bovee (1974); rearing flows were derived by using the wetted perimeter method in conjunction with the WSP program (Exh.DFG-1718-r-1, P.207,208)

Migrations of spawning populations of shovelnose sturgeon, sauger and channel catfish into the Tongue River are important to the integrity of the Yellowstone River. Passage and spawning flows identified for these species are important not only to the Tongue River, but to the Yellowstone River as well. (Exh.DFG-1781-r-1, P. 209,210)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning and rearing are as follows:

A. for sauger: for spawning, during the months of

March through May; for rearing, during the months of January through December.

B. for shovelnose sturgeon: for spawning, during the months of May through mid-July; for rearing, during the months of January through December.

C. for channel catfish: for passage, during the months of June through August; for spawning, during the months of June thrcugh August; for rearing, during the months of January through December.

D. for stonecat: for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.209)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	190	May	600	Sept.	190
Feb.	190	June	600	Oct.	190
March	525	July 1-15	600	Nov.	190
April	525	16-31	225	Dec.	190
		Aug.	225		

These flows equal 243,090 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P. 198)

HANGING WOMAN CREEK

(East Fork to the Tongue River)

Fish species present:

A. resident game fish - smallmouth bass and sauger.

B. migratory game fish - northern pike and channel catfish. (Exh. DFG-1781-r-1, P. 211)

Evaluations of the flow requirements for this stream reach are based on migrant fish trap data, USGS stream discharge records and streamflow monitoring. (Exh. DFG-1781-r-1, P. 211, Tr. Vol. 14, Test. Elser, P. 53-54, 56)

Northern pike and channel catfish provide a good deal of the sport fishing potential for the Tongue River in the Birney area. Since both species, as well as non-sport species, utilize Hanging Woman Creek as a spawning and nursery stream, it is important to maintain flows adequate to insure continued production in the stream. In order to maintain the integrity of the Tongue River itself, the integrity of tributaries must also be preserved. (Exh. DFG-1781-r-, P. 211)

The periods of the year when flows are required by the fish species found in this stream reach for passage and spawning are as follows:

A. for northern pike: for passage, during the months of April to mid-May; for spawning, during the months of April to mid-May.

B. for channel catfish: for passage, during the months of mid-May to mid-July; for spawning , during

months of mid-May to mid-July. (Exh. DFG-1781-r-1, P. 213; Tr. Vol. 14, Test. Elser, P. 53-54)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	--	May	1-15	15	Sept.	--
Feb.	--		16-31	4.5	Oct.	--
Mar.	--	June		4.5	Nov.	--
Apr.	15	July	1-15	4.5	Dec.	--
		Aug.		--		

These flows equal 1,883 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 214)

OTTER CREEK

(Bear Creek to the Tongue River)

Fish species present:

A. resident game fish - white crappie and smallmouth bass.

B. migratory transient game fish - northern pike and channel catfish. (Exh. DFG-1781-r-1, P. 212,215)

Evaluations of the flow requirements for this stream reach are USGS gauging records on Otter Creek, field observations of northern pike and channel catfish use of the Tongue River near the mouth of Otter Creek, and knowledge of professional personnel of stream morphology of Otter Creek. (Exh. DFG-1781-r-1, P. 215; Tr. Vol. 14, Test. Elser, P. 54-56)

Stream is important as spawning and nursery area for fishery of Tongue River. (Exh. DFG-1781-r-1, P. 217)

The periods of the year when flows are required by the fish species found in this stream reach for passage, and spawning are as follows:

A. for northern pike: for passage, during the months of April through mid-May; for spawning, during the months of April through mid-May.

B. for channel catfish: for passage, during the months of mid-May to mid-July; for spawning, during the months of mid-May to mid-July. (Exh. DFG-1781-r-1, P. 216; Tr. Vol. 14, Test. Elser, P. 54-55)

The instream flow required for the stream reach, in

cfs, by month of the year is as follows:

Jan.	--	May	1-15	15	Aug.	--
Feb.	--		16-31	5	Sept.	--
Mar.	--	June		5	Oct.	--
Apr.	15	July	1-15	5	Nov.	--
					Dec.	--

These flows equal 1,943 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 214)

PUMPKIN CREEK

(Deer Creek to the Tongue River)

Migratory transient game fish present: channel catfish, sauger, and white crappie. (Exh. DFG-1781-r-1, P. 217)

Evaluations of the flow requirements for this stream reach are USGS gauging data on Pumpkin Creek; field observations of the use of the Tongue River by spawning sauger which are blocked in their migration by the T & Y Diversion which causes them to move into Pumpkin Creek; field observations of young-of-the-year channel catfish, sauger and white crappie in Pumpkin Creek and observations of stream-flow records during the spawning periods for these species, and knowledge of qualified professional personnel of stream morphology of Pumpkin Creek. (Exh. DFG-1781-r-1, P. 217, 219; Tr. Vol. 14, Test. Elser, P. 55,56)

Sauger migrate from the Yellowstone River into the Tongue River each spring to spawn. Indicated size of this run during the spring of 1976 was 3,873. This run is fished heavily in the Tongue River and in the lower reach of Pumpkin Creek. Since sauger migration is blocked by the T & Y Diversion, many fish move into Pumpkin Creek. Channel catfish also move out of the Yellowstone into the Tongue to spawn. It is therefore important to maintain flow levels in Pumpkin Creek which would be adequate to protect current fish population levels.

The periods of the year when flows are required by

the fish species found in this stream reach for passage and spawning are as follows:

A. for sauger: for passage, during the months of March through May; for spawning during the months of March through May.

B. for white crappie: for passage, during the months of May and June; for spawning, during the months of May and June.

C. for channel catfish: for passage, during the months of June through August; for spawning, during the months of June through August. (Exh. DFG-1781-r-1, P. 218; Tr. Vol. 14, Test. Elser, P. 54-55)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	--	May	35	Sept.	--
Feb.	--	June	35	Oct.	--
Mar.	20	July	5	Nov.	--
Apr.	20	Aug.	5	Dec.	--

These flows equal 7,268 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 214)

ROSEBUD CREEK

(Cottonwood Creek to the Yellowstone River)

Fish species present:

A. resident game fish - sauger, walleye, northern pike and channel catfish.

B. migratory transient game fish - sauger, walleye northern pike, channel catfish and burbot. (Exh. DFG-1781-r-1, P. 224)

Evaluations of the flow requirements for this stream reach are based on the Bovee (1974) method for spawning discharge determination; specific biological field studies including migrant fish trapping and tagging; USGS stream discharge data. (Exh. DFG-1781-r-1, P. 199,225)

Yellowstone River fish utilize the Rosebud.

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, and rearing are as follows:

A. for burbot: for passage, during the months of January through March; for spawning, during the months of January through March.

B. for northern pike: for passage, during the months of April to mid-May; for spawning, during the months of April through mid-May; for rearing, during the months of January through December.

C. for sauger: for passage, during the months of April and May; for spawning, during the months of April and May; for rearing, during the months of

January through December.

D. for channel catfish: for spawning, during the months of June and July; for rearing, during the months of January through December.

E. for stonecat: for rearing, during the months of January through December. (Exh. DFG-1781-r-1, P. 225, 226)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Jan.	15	May	50	Sept.	5
Feb.	15	June	10	Oct.	5
Mar.	15	July	10	Nov.	5
Apr.	50	Aug.	5	Dec.	5

These flows equal 11,452 acre feet per year and should be reserved. (Exh. DFG-1781-r-1, P. 223)

YELLOWSTONE RIVER MAINSTREAM

(Bighorn River to the Montana-North Dakota state line)

The fish species present in this stream reach are as shown in Table 1, attached. (Exh. DFG-1781-r-1, P. 230)

Fish species shown in Table 1 which are resident game fish are: pallid sturgeon, shovelnose sturgeon, rainbow trout, brown trout, northern pike, smallmouth bass, largemouth bass, sauger and walleye, burbot and channel catfish. (Exh. DFG-1781-r-1, P. 229, 230)

Fish species shown in Table 1, which are migratory transient game fish, are: paddlefish and walleye. (Exh. DFG-1781-r-1, P. 229, 230)

The resident and migratory wildlife species present for this stream reach are as given in Tables 2 and 3, attached. (Exh. DFG-1781-r-1, P. 231-233)

Evaluations of the flow requirements used for this stream reach are as follows for specific times of the year:

A. March and April - field study of Canada goose nesting and production on the Yellowstone River, particularly on the islands which are the preferred nesting areas;

B. May, June and July - field study of high flows needed for paddlefish migration around the Intake Diversion Dam on the Yellowstone River; dominant discharge;

C. August through November - wetted perimeter/discharge

curve used in conjunction with the water surface profile program;

D. December, January and February - USGS stream discharge records and flow duration data. (Exh. DFG-1781-r-1, P. 235-252; Tr. Vol 13, P. 175-196; Tr. Vol. 14, P. 1-18)

In addition, extensive sampling of fish populations for relative abundance and distribution was conducted in the river. Sampling was done by electrofishing, gill nets and seines. Movements of fish were monitored by tagging individual fish with numbered fish tags. (Exh. DFG-1781-r-4, P. 11-17; P. 18)

There is substantial recreational use of this reach of the stream by fishermen, boaters, hikers, and other recreationists. (Tr. Vol. 14, Test. Erickson, P. 109-144)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning, incubation and rearing are as follows:

A. for paddlefish: for passage, during the period of April 21 to July 31; for spawning, during the period of April 21 to July 31; for passage around Intake Diversion, during the period of June 8 to June 30;

B. for shovelnose sturgeon: for migration, during the period of April 15 to August 7; for spawning, during the period of April 15 to August 7; for rearing, during the period of January through December;

C. for walleye and sauger: for spawning, during the period of April 1 through May 30; for incubation, during the period of April 1 through May 30; for rearing, during the period of January through December;

D. for burbot (ling): for spawning, during the period of December 15 through February; for rearing, during the period of January through December. (Exh. DFG-1781-r-1, P. 234, 235)

The periods of the year when flows are required by the waterfowl species found in this reach for nest establishment and egg incubation are as follows:

A. for Canada goose: for nest establishment, during the period of March 1 to April 30; for egg incubation, during the period of April 5 to June 1;

B. for mallard: for nest establishment, during the period of April 21 to June 7; for egg incubation, during the period of May 18 to July 5. (Exh. DFG-1781-r-1, P. 235; Tr. Vol. 16, Test. Hinz, P. 11-52)

Flows for March and April are required for successful Canada goose reproduction on the lower Yellowstone. An estimated 30 percent of the breeding population of Canada geese in the surveyed areas of the central flyway portion of Montana nest in the Yellowstone River mainstem. The period from March 1 to April 30 emcompasses goose nest initiation. A flow of 11,000 cfs during this period will prevent excessive destruction of nests by predators. Flows higher than 12,000 cfs may produce nest flooding. (Exh.

DFG-1781-r-1, P. 237-238; Tr. Vol. 16, Test. Hinz, P. 11-52)

Flows for May, June and July are required to stimulate and allow passage of paddlefish beyond the diversion dam at Intake. Although the shovelnose sturgeon also migrates during this period, the paddlefish was selected as the indicator species because of its large size and importance as a sport fish. If paddlefish passage requirements are met, requirements of the other species will also be met. Flows during this period are also required to maintain the existing channel morphology of the river. (Exh. DFG-1781-r-1, P. 238-240)

The paddlefish inhabits the Yellowstone only seasonally, spending most of the time in Garrison Reservoir, North Dakota. Paddlefish migrate up the river as far as Forsyth. However, to reach that point they must negotiate the diversion dam at Intake. If they can get past this diversion dam, an additional 166 miles of main river and two major tributaries (Tongue and Powder Rivers) are available for spawning. (Exh. DFG-1781-r-1, P. 240-241)

A natural side channel around the Intake diversion allows paddlefish passage. This channel is dry except during spring runoff. Field observations of paddlefish movement through the side channel show that 45,000 cfs is required to allow passage from June 8 to June 30. (Exh. DFG-1781-r-1, P. 240-241)

The lower Yellowstone has a diversity of aquatic and wildlife habitats because of its numerous channel features

such as islands and gravel bars. These characteristics are caused and maintained by the annual flood flows of the river. It is the higher spring flows which determine the form of the channel, not the average or lower flows, because the higher flows transport the major amount of suspended sediment and bedload material. (Exh. DFG-1781-r-1, P. 238-239; Tr. Vol. 13, Test. Peterman, P. 144 et seq.)

Changes in spring flood flows would cause habitat changes which in turn would cause changes in fish and wildlife habitat. The flood flow most important in determining channel formation processes is the "bank full" flow. So that these processes and thus the channel morphology can be maintained, a bank full flow should be reserved for a 24-hour period between June 8 and June 30. (Exh. DFG-1781-r-1, P. 238-240, 253) (See Peterman Test, supra)

Flows requested during the period August through November are for purposes of fish rearing. Rearing refers to the life cycle period between the time a given species hatches and the time it is capable of spawning. Young fish reach adult size during this period. The successful rearing of fishes is dependent on an adequate food supply, adequate habitat area and suitable water quality. During this period, most, if not all, of the fish species in the lower Yellowstone feed on aquatic insects. Food production takes place primarily in riffle areas. Riffle areas are also most easily affected by flow reduction since they are the shallowest areas of a stream. Food production can

best be maintained by maximizing the wetted perimeter, or wetted area, where insects live. If suitable riffle conditions can be maintained in food production, suitable pool conditions will also be maintained as fish habitat. (Tr. Vol 13, P. 195-196; Exh. DFG-1781-r-1, P. 242-243)

The wetted perimeter/discharge relationship used in conjunction with the Water Surface Profile Program was used to establish the rearing flows required in the lower Yellowstone River. (Tr. Vol. 14, Test. Peterman, P. 1-3)

The USGS - Washington Department of Fisheries method of recommending rearing flows assumes that rearing capability is proportional to food production, which in turn is proportional to the amount of wetted area (wetted perimeter) in riffles. Wetted perimeter is plotted against discharge (flow) and the smallest flow which maximizes wetted perimeter was picked as the requested flow. (Exh. DFG-1781-r-1, P. 242-243)

Flows for December through February are required to maintain aquatic life through the winter months which are periods of greatest stress to these organisms. This period is also the time of lowest flow during the year. Natural mortality is greatest during this period. Factors to consider during this period are spawning by burbot, the effects of ice on aquatic habitat (both anchor ice and the spectacular ice jams which occur in the lower river), and the reduction of habitat for fish and aquatic life due to low flow conditions even without ice formation. Significant

water depletion at this time could produce severe impacts on aquatic life and furbearers. Although quantitative data on the causes of winter mortality and the flows necessary to minimize this mortality are limited, the median flows, based on USGS records from 1936-1974 were believed to represent the most suitable winter flows. (Exh. DFG-1781-r-1, P. 249, 252)

The shovelnose sturgeon is a popular game fish in the lower Yellowstone River. It also occurs in portions of the Mississippi, Missouri and Ohio river drainages, but the Yellowstone is the only river system left where their habitat has not been altered by dam construction and/or channelization. (Exh. DFG-1781-r-4, P. 17)

Shovelnose sturgeon are common in the Yellowstone from Forsyth to the Missouri River, a distance of about 240 river miles. (Exh. DFG-1781-r-4, P. 4, 18)

Shovelnose sturgeon are known to migrate from the Yellowstone into the Tongue River to spawn during the spring. (Exh. DFG-1781-r-4, P. 18)

Data indicate the shovelnose also migrate from the Yellowstone into the Powder River to spawn. (Exh. DFG-1781-r-4, P. 19; Tr. Vol. 13, P. 164-165)

Shovelnose found migrating into the Tongue River are significantly larger than those reported from other locations in the Missouri-Mississippi drainages. Sizes in the Tongue River ranged between 1.5 and 15.5 pounds with the major portion of the fish weighing between 2.5 and 5.5 pounds.

Average size of sturgeon from the Mississippi-Missouri drainage was about 1 to 1.5 pounds with few fish weighing 4 pounds or more. (Exh. DFG-1781-r-4, P. 21-22)

The pallid sturgeon occurs in the lower Yellowstone and Mississippi-Missouri River drainages, but occurs only rarely. (Exh. DFG-1781-r-4, P. 17)

The sauger and walleye are two of the most important sport fish in the lower Yellowstone. Popular fishing sites are at the mouths of major tributaries such as the Bighorn and Tongue Rivers and below diversion dams. The sauger is a native Montana fish. The walleye is not native but has been widely introduced in Montana. The distribution of both species is probably similar although sauger are more abundant. (Exh. DFG-1781-r-4, P. 22-23)

Spawning areas used by sauger and walleye are gravel to sand stream bottom with water depths of 15-24 inches. There are numerous sites which meet these criteria in the lower Yellowstone although only limited investigations have been done to document the presence of these spawning fish in the lower Yellowstone. (Exh. DFG-1781-r-4, P. 26-29)

Extensive movement of sauger occurs in the lower Yellowstone as determined by tagging studies. Some fish moved as far as 68 miles from the site where originally tagged. (Exh. DFG-1781-r-4, P. 30-31)

The burbot is a native Montana fish and is relatively common in the Yellowstone River from Big Timber to the Missouri River including the Tongue and Bighorn Rivers.

Angling for this fish is popular in the late winter and early spring along the Yellowstone below diversion dams and at the mouths of tributary streams. Good catches are made by anglers from late February through April, mostly during late evening hours. Few burbot are caught during daylight hours. Burbot have been caught of a size up to 27 inches in length and weighing nearly 3 pounds apiece. Burbot spawn in the winter during January and February. (Exh. DFG-1781-r-4, P. 33-34)

Channel catfish are native to Montana and are common in the lower Yellowstone below the Huntley diversion. They are one of the most important game fish in this area and make up as much as 25 percent of the anglers catch. (Exh. DFG-1781-r-4, P. 37)

It is indicated that channel catfish prefer backwater areas of the Yellowstone rather than main channel areas during late summer and fall. Spawning occurs at this time and there is indicated a preference for these backwaters for spawning sites due to optimum temperature conditions and suitable nest sites such as cut banks, rocks, log jams, and beaver caches and dens. (Exh. DFG-1781-r-4, P. 38-39)

It is indicated that channel catfish undergo movement in the Yellowstone as far as 60 to 92 miles. (Exh. DFG-1781-r-4, P. 40)

Migratory catfish caught in the Tongue River reached a size of over 30 inches and weight of 17 pounds. Average sizes are approximately 22 inches and 5.5 pounds. Catfish

caught in the Yellowstone have ranged up to 28 inches in length and 6.5 pounds with average sizes between 16-17 inches and 1.5 to 1.9 pounds. (Exh. DFG-1781-r-4, P. 38, 40)

There are numerous species of forage fish in the lower Yellowstone upon which both sport and nonsport fish depend for an adequate food supply. (Exh. DFG-1781-r-4, P. 40-42)

Techniques used in conducting lower Yellowstone River fishery studies were those commonly used or suggested for use on large river systems. Fish collection, data analysis and research techniques employed were those commonly used by fishery scientists involved in those research activities. (Tr. Vol. 13, Test. Peterman, P. 4)

If flows less than those requested for the lower Yellowstone River occur with a greater frequency than has been experienced in the past, there will be a decrease in the quantity and quality of the aquatic and wildlife resources of the lower Yellowstone River. (Tr. Vol. 13, Test. Peterman, P. 4; Tr. Vol 13, Test. Peterman, P. 163, 170-171)

Although precise quantitative incremented changes in flow are difficult to predict, qualitative assessments of the impacts of changed stream flow can be shown, such as the species affected and the times of year when the impacts would be greatest. (Tr. Vol. 13, P. 160-161, 170-173)

There has been personal observation by qualified professional personnel of flows required for paddlefish migration in the lower Yellowstone River. (Tr. Vol. 13,

Test. Peterman, P. 187-188)

Aquatic populations in the lower Yellowstone experience the greatest mortality over the winter period. (Tr. Vol. 13, Test. Peterman, P. 178)

The present flow regime and river morphometry of the Yellowstone River downstream from Billings supports a large variety of migratory water bird populations through much of the year. Certain species are present all year while others make only temporary use of the river. (Tr. Vol. 16, Test. Hinz, P. 2)

The dominant discharge as it presently occurs in the lower Yellowstone is very important in the ecology of ducks and geese on the river. Any change in this regime would impact the duck and goose populations, both resident and migratory. (Tr. Vol. 16, Test. Hinz, P. 3)

Geese begin nesting on islands of the Yellowstone River in early March and nesting lasts about 2 months. Some geese nest early while others nest later in the period. Some renesting occurs. (Tr. Vol. 16, Test. Hinz, P. 3)

Over 90 percent of goose nests are located on islands in the river, especially smaller less densely vegetated islands having no resident predator population; bird predators are unimportant, whereas coyotes, raccoons and red foxes are most important predators on the geese nesting on islands. (Tr. Vol. 16, Test. Hinz, P. 204; Tr. Vol. 13, Test. Peterman, P. 175-176)

Other ducks and waterfowl also used the open bars and

gravel islands which are largely unvegetated. (Tr. Vol. 16, Test. Hinz, P. 2)

The shallower and narrower the stream channel is between islands and the mainland, the more predation occurs on goose nests by mainland predators such as coyotes, raccoons and red foxes. Generally if a predator does get to an island, most or all nests on that island are destroyed, eliminating or reducing goose production from that island. (Tr. Vol. 16, Test. Hinz, P. 3-4; Tr. Vol 16, Test. Hinz, P. 24-25)

Low stream flow in a given section of river during the nest initiation period (March and April) and the early part of incubation (mid-April) will result in a high loss of goose nests to predators, which results in a lowering of the resident population through poor production for that year. Also, if the predation rate is sustained from year to year by more frequent low flows, the goose population of the Yellowstone River would ultimately be reduced. (Tr. Vol. 16, Test. Hinz, P. 4)

During the summer period resident geese and ducks require secure islands and gravel bars for loafing areas; loss of loafing areas might cause geese and ducks to bypass the Yellowstone River or to migrate earlier and this would decrease the number of ducks and geese that are present in the Yellowstone valley during the fall and would reduce the hunting potential of the area as well as the opportunity to observe these birds. (Tr. Vol. 16, Test. Hinz, P. 5)

The lower Yellowstone River is one of the most

attractive waterfowl hunting areas in southeastern Montana and any change in the natural flow regimes of the lower river would have an adverse effect on the Canada goose population and on populations of other large migratory birds. (Tr. Vol. 16, Test. Hinz, P. 5)

Reduction in winter flows can cause beaver caches (food supplies) to freeze, making them inaccessible to use by the beaver; entrance to lodge and bank dens may become exposed or frozen shut, making the beaver vulnerable to predation in the former case and subject to death by starvation in the latter case. (Tr. Vol. 13, Test. Martin, P. 4)

Between 1965 and 1974, following completion of the Yellowtail Dam on the Bighorn River, the total area of the river decreased 25.4 percent between Yellowtail Dam and the mouth of the Bighorn River. This loss equaled 3,394 acres. The total vegetated island and gravel bar area decreased 35.1 percent, or just over 3,000 acres. Breaking this figure down further, there was a 23.1 percent loss in the area of vegetated islands (1,469 acres) and a 77.2 percent loss in island gravel bars (1,400 acres). There was a 34.0 percent loss of lateral gravel bars (131 acres). The highest losses were near Yellowtail Dam with progressively less change downstream. Further, the number of vegetated islands decreased from 414 to 287 while the average size of these islands increased from 15 to 17 acres. The number of island gravel bars decreased from 619 to 301, and the

average size decreased from 3 to 1.5 acres. The number of lateral gravel bars decreased from 122 to 111 and their average size decreased from 3.2 to 2.3 acres per bar. (Tr. Vol. 13, Test. Martin, P. 3-4)

Losses of islands and gravel bars eliminate wildlife habitat by decreasing the amount of living space available to furbearers and other riparian wildlife and by decreasing the area capable of growing food for beaver. (Tr. Vol. 13, Test. Martin, P. 2; P. 15; P. 27-28)

If the dominant discharge is eliminated in the lower Yellowstone River, changes will occur in channel morphology similar to changes which have been documented in the Bighorn River - the number and area of islands will be reduced, the number and area of gravel bars will be reduced and the stream will change from a braided to a meandering system; a braided system is necessary to protect wildlife and loss of a braided system is detrimental to furbearers and other wildlife. (Tr. Vol. 13, Test. Martin, P. 25; P. 31-32; P.1-6)

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

Section 1 - month of Bighorn River to mouth of Powder River:

Jan.	4,800	May	21-31	17,000	Aug.	7,000
Feb.	5,500	June	1-7	25,000	Sept.	7,000
Mar.	11,000		8-30	42,000	Oct.	7,000
Apr.	11,000	July	1-20	17,000	Nov.	7,000
May 1-20	11,000		21-31	9,200	Dec.	5,600

These flows equal 7, 783,666 acre feet per year excluding the dominant discharge and should be reserved. (Exh. DFG-1781-r-1, P. 253)

Section 2 - mouth of Powder River to Montana-North Dakota state line:

Jan.	4,900	May 21-31	20,000	Aug.	7,000
Feb.	5,900	June 1-7	26,000	Sept.	7,000
Mar.	11,000	8-30	45,000	Oct.	7,000
Apr.	11,000	July 1-20	20,000	Nov.	7,000
May 1-20	11,000	21-31	10,000	Dec.	5,700

These flows equal 8,103,583 acre feet per year, excluding the dominant discharge and should be reserved. (Exh. DFG-1781-r-1, P. 253)

The dominant discharge required in this stream reach for one 24-hour period between June 8 and June 30 is as follows:

Section 1 - mouth of Bighorn River to mouth of Powder River:

47,000 cfs or 93,223 acre-feet;

Section 2 - mouth of Powder River to Montana-North Dakota state line: 52,000 cfs or 103,140 acre-feet. This should, also, be reserved. (Exh. DFG-1781-r-1, P. 253)

The total reservation which should be effected for this reach of stream is:

Section 1 - 7,876,889 acre-feet per year;

Section 2 - 8,206,723 acre-feet per year. (Exh. DFG-1781-r-1, P. 253)

Table 1. Fish species recorded for the Yellowstone River from the mouth of the Bighorn River to its confluence with the Missouri River.

Sturgeon Family:
- Pallid sturgeon
- Shovelnose sturgeon

Paddlefish Family:
- Paddlefish

Mooneye Family
- Goldeye

Trout Family:
- Rainbow trout
- Brown trout

Pike Family:
- Northern Pike

Minnow Family:
- Carp
- Goldfish
- Golden shiner
- Pearl dace
- Creek chub
- Flathead chub
- Sturgeon chub
- Lake chub
- Emerald shiner
- Sand shiner
- Brassy minnow
- Plains minnow
- Silvery minnow
- Fathead minnow
- Longnose dace

Sucker Family:
- River carpsucker
- Blue sucker
- Smallmouth buffalo
- Shorthead redhorse
- Longnose sucker
- White sucker
- Mountain sucker

Catfish Family:
- Black bullhead
- Channel catfish
- Stonecat

Codfish Family:
- Burbot

Sunfish Family:
- Rock bass
- Green sunfish
- Pumpkinseed
- Bluegill
- Smallmouth bass
- Largemouth bass
- White crappie
- Black crappie

Perch Family:
- Yellow perch
- Sauger
- Walleye

Drum Family:
- Freshwater drum

Table 2. Selected species of birds observed in the Lower Yellowstone Valley from September 1974 to October 1976 (from Hinz 1976 - in progress).

	Spring Migrant	Breeding	Summering[1/]	Fall Migrant	Wintering
Common loon	x			x	
Western grebe	x		x	x	
Horned grebe	x		x	x	
Eared grebe	x		x	x	
Pied-billed grebe	x	x		x	
White pelican	x		x	x	
Double-crested cormorant	x	x		x	
Whistling swan	x			x	
Giant Canada goose	x	x		x	x
Great Basin Canada goose	x	x		x	x
Lesser Canada goose	x			x	
Richard's Canada goose	x			x	
White-fronted goose	x			x	
Snow goose	x			x	
Mallard	x	x		x	x
Pintail	x	x		x	
Gadwall	x	x	x		
American widgeon	x	x		x	x
Shoveler	x	x		x	
Blue-winged teal	x	x		x	
Wood duck	x	x		x	
Redhead	x			x	
Canvasback	x			x	
Red-necked duck	x			x	
Lesser scaup	x			x	
Common goldeneye	x			x	x
Rufflehead	x			x	
Ruddy duck	x		x	x	
Common merganser	x	x		x	x
Red-breasted merganser	x				
Turkey vulture			x		
Rough-legged hawk	x				x
Red-tailed hawk	x	x		x	
Golden eagle		x			x
Bald eagle	x	x		x	x

Table 2 continued. Selected species of birds observed in the Lower Yellowstone Valley from September 1974 to October 1976 (from Hinz 1976 - in progress).

	Spring Migrant	Breeding	Summering 1/	Fall Migrant	Wintering
Osprey	x			x	
Prairie falcon	x	x		x	
Great blue heron	x	x		x	
Black-crowned night heron	x				
Lesser sandhill crane	x			x	
American coot	x	x		x	
American avocet	x		x		
Black-bellied plover	x				
Killdeer	x	x		x	
Long-billed curlew	x				
Upland plover	x		x		
Spotted sandpiper	x	x		x	
Willett	x				
Greater yellowlegs	x				
Lesser yellowlegs	x				
Long-billed dowitcher	x				
Sanderling	x				
White-rumped sandpiper	x				
Least sandpiper	x				
Wilson's phalarope	x				
Common snipe	x	x			
Ring-billed gull	x		x		
Franklin's gull	x				
Common tern	x		x	x	
Forster's tern	x				
Black tern	x				
Great horned owl	x	x		x	
Snowy owl				x	
Belted kingfisher	x	x		x	
Black-billed magpie	x	x		x	x
Common crow	x		x	x	

1/ Present in summer but not known to breed in the area.

Table 3. Resident upland game birds, big game mammals and furbearers commonly occurring in and adjacent to the lower Yellowstone River.

Upland Game Birds

- Ring-necked pheasant
- Sharptailed grouse
- Gray partridge

Big Game Mammals

- Mule Deer
- White-tailed deer

Furbearers

- Beaver
- Mink
- Muskrat
- River otter

POWDER RIVER

(Wyoming State Line to Yellowstone River)

Findings as follows relate to the full reach of the Powder River within the State of Montana.

Evaluations of the flow requirements for the Powder River are based upon the Northern Great Plains Resource Program (NGPRP) estimates, which were used as the basis for all months except March, April, May and June. These estimates were verified by field observations and measurements by qualified professional personnel of Fish and Game. Flows for March through June are based upon USGS gauging data and field measurements of spawning fish together with observations of fish passage by qualified professional personnel of Fish and Game. (Exh.DFG-1781-r-1, P.220; Tr. Vol. 26, Redirect test. Rehwinkel, as corrected; Exh.DFG-1781-r-28 ; Tr.Vol.28,P.16,Rehwinkel)

Significant reduction in flows of the Powder River would detrimentally affect the habitat of beaver and other furbearers because the number and size of islands and gravel bars would be reduced and the stream morphology would change from a braided to a meandering stream having less habitat for these animals. (Exh.DFG-1781-r-1,P.23-26)

Resident fish species present in the Powder River include the sturgeon chub. Migratory transient game fish species present are sauger, shovelnose sturgeon and channel catfish. (Exh.DFG-1781-r-1,P.219-220)

The periods of the year when flows are required by the fish species found in this stream reach for passage, spawning

and rearing are as follows:

A. for sauger: for passage, during the months of March and April; for spawning, during the months of March and April; for rearing, during the months of October through July.

B. for shovelnose sturgeon: for passage, during the months of May and June; for spawning, during the month of June.

C. for channel catfish: for passage, during the months of May through July; for spawning, during the months of May through July; for rearing, during the months of October through April.

D. for the sturgeon chub: for rearing, during the months of January through December. (Exh.DFG-1781-r-1,P.221,222)

Qualified professional personnel in Fish and Game utilized 134 days on site-specific field work on the Powder River identifying instream flow needs for the fish species present in this stream using established sampling techniques. Biologist employed by objector, Intake Water Company, utilized one (1) day making general observations along the entire 200 miles of the Powder River. (Tr. Vol. 14,Test., Rehwinkel,P.3; Tr.Vol.33, Test.Erickson,P.2)

Said biologist of Intake conducted no field studies on the Powder River. (Tr.Vol.33,Test.Erickson,P.116,125,126)

Intake's biologist stopped at 12 to 16 separate sites along the Powder River and spent approximately 20 minutes at each site making qualitative notes. The only study

done by Intake's biologist was in the confines of his office. (Tr.Vol.33,Test. Erickson, P.149; Tr.Vol.33,Test. Erickson P.120-123)

About one-half of the Powder River is out-of-sight from the highway along the river. Intake's biologist observed the river only at sites accessible by automobile. (Tr.Vol. 33,Test. Erickson, P.129)

Fish and Game's flow request for the Powder River is based on site-specific studies. (Tr.Vol.33, Test. Erickson, P.147)

Intake's biologist's knowledge of the Powder River is acknowledgedly limited to his one day automobile trip along the Powder and reports he has read about studies other scientists have conducted on the river. (Tr.Vol.33, Test. Erickson)

Intake's biologist was unable to state that Fish and Game's flow requests on the Powder River are inadequate to maintain the fishery or whether they were too much, too little, or just right. (Tr.Vol.33, Test. Erickson, P.138)

Fish and Game's application on the Powder River requests less flow at Locate than at Moorhead during the months of October through February. (Exh.DFG-1781-r-1,P.223) Utah's Environmental Hydrologist stated "This is unrealistic for a natural river regime which is supposed to accumulate flow with distance". (Tr.Vol.31,Test. Krishnamurthi, P.7) According to U.S. Geological Survey surface water records for "Powder River at Moorhead" and "Powder River at Locate" the

Powder River did have less flow at Locate than at Moorhead during the months of October, November, December and January for a majority of the years between 1939-1972 and 1975 and 1976, confirming that Fish and Game's request for those months is realistic. (Tr.Vol.34,Test. Moore, P.76-82)

Testimony and evidence adduced by objectors to the application of Fish and Game has not demonstrated that the flows requested by Fish and Game are not necessary to the needs and purposes supported by said application. The evidence and testimony adduced by Fish and Game goes to the preservation and conservation of fish, wildlife and the ecosystem. Objectors testimony and evidence does not.

Forty-two percent of Powder River water is allocated to Wyoming under the Yellowstone River Compact. However, all of that quantity is not currently utilized by Wyoming and thus flows into Montana and consequently has been available for use by fish and aquatic life within Montana. (Tr. Vol. 72, Test. Spence, P.22)

Despite the projected, or possible, use by Wyoming of its 42 percent of Powder River water, fish and wildlife species currently are maintained by actual flows entering Montana from Wyoming. (Tr.Vol.12,P.22-23 Spence)

Findings, to the reach of the Powder River from the Wyoming State boundary to its junction with the Little Powder River are as follows:

The instream flow required for the stream reach, in cfs, by month of the year is as follows:

January	100	May	600	September	30
February	100	June	750	October	100
March	400	July	120	November	100
April	400	August	30	December	100

These flows equal 170,800 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.223)

Findings as to the reach of the Powder River from the junction with the Little Powder River to the Yellowstone River are as follows:

The instream flow required for this stream reach, in cfs, by month of the year is as follows:

January	80	May	800	September	40
February	80	June	800	October	80
March	500	July	200	November	80
April	500	August	40	December	80

These flows equal 198,350 acre feet per year and should be reserved. (Exh.DFG-1781-r-1,P.223)

CONCLUSIONS OF LAW

The board concludes that in considering the application of Fish and Game for reservation of waters and flows in the Yellowstone River and the streams and tributaries thereof, legal policies and principles apply herein, as hereinafter stated:

I

The application of Fish and Game is, and the deliberations and decisions of this board thereon must be, in keeping with lawfully established constitutional and legislative directives as follows:

A: Article IX, Section 1, Constitution of Montana, which provides:

> Section 1. Protection and improvement. (1) The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations.
>
> (2) The legislature shall provide for the administration and enforcement of this duty.
>
> (3) The legislature shall provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources.

B: Article II, Section 3, Constitution of Montana, which provides:

> Section 3. Inalienable rights. All persons are born free and have certain inalienable rights. They include the right to a clean and healthful environment and the rights of pursuing life's basic necessities, enjoying and defending their lives and liberties, acquiring, possessing and protecting property,

and seeking their safety, health and happiness in all lawful ways. In enjoying these rights, all persons recognize corresponding responsibilities.

C: Section 89-101.2, R.C.M. which states, in parts pertinent to this application, as follows:

> State necessity and policy. It is hereby declared that:
>
> (1) The general welfare of the people of Montana, in view of the state's population growth and expanding economy, requires that water resources of the state be put to optimum beneficial use and not wasted.
>
> (2) The public policy of the state is to promote the conservation, development and beneficial use of the state's water resources to secure maximum economic and social prosperity for its citizens.
>
> (3) The state, in the exercise of its sovereign power, acting through the department of natural resources and conservation shall co-ordinate the development and use of the water resources of the state so as to effect full utilization, conservation and protection of its water resources.
>
> (4) The development and utilization of water resources, and the efficient, economic distribution therof, are vital to the people in order to protect existing uses and to assure adequate future supplies for domestic, industrial, agricultural and other beneficial uses.
>
> (5) The water resources of the state must be protected and conserved to assure adequate supplies for public recreational purposes and for the conservation of wildlife and aquatic life....

Section 89-866(3), R.C.M. which states as follows:

> It is the policy of this state and a purpose of this act to encourage the wise use of the state's water resources by making

> them available for appropriation consistent with this act, and to provide for the wise utilization, development, and conservation of the waters of the state for the maximum benefit of its people with the least possible degradation of the natural aquatic ecosystems. In pursuit of this policy, the state encourages the development of facilities which store and conserve waters for beneficial use, for the maximization of the use of those waters in Montana, for the stabilization of stream flows, and for groundwater recharge.

E: Section 89-867(2) which states as follows:

> "Beneficial use" means a use of water for the benefit of the appropriator, other persons, or the public, including, but not limited to, agricultural (including stock water), domestic, fish and wildlife, industrial, irrigation, mining, municipal power, and recreational uses;...

II

Fish and game is an agency of the State of Montana and is authorized to make application to this board for reservation of waters and for maintenance of flows in the Yellowstone River Basin. The application of Fish and Game herein is authorized and is for purpose of serving existing and future beneficial uses as provided by law.

III

The application of Fish and Game herein, and the testimony, evidence, documentation, oral and written, adduced herein by Fish and Game were proper and sufficient, under applicable laws and regulations, to support said application for reservation and to invoke the jurisdiction of this board.

IV

The reservations applied for by Fish and Game herein, and the granting thereof, do not in any manner impair the obligations of the State of Montana under the Yellowstone River Compact.

V

The waters, as to which application for reservation herein is made by Fish and Game are waters of the state, as defined in Section 89-867 R.C.M. and are water resources of this state and this necessarily includes all of the waters actually flowing into the State of Montana and in the Yellowstone River Basin even though some portion thereof is that which is not utilized by the State of Wyoming pursuant to any rights that State may have under the provisions of the Yellowstone River Compact.

VI

Waters, and instream flows thereof, reserved for the beneficial use for the benefit of the public, fish, wildlife and recreational uses are reserved for existing, as well as future, beneficial uses and the use thereof for such purposes, and to serve such immediate needs, does not constitute an abandonment thereof nor any lack of use thereof which would subject the same to loss to other agencies, federal or state, under any applicable legal doctrine, directive or policy. Reservation for future beneficial, consumptive uses based upon speculation, no matter how justifiable or upon contingencies, no matter

how remote or proximate, are not immediate "uses" until the need therefor actually materializes and utilization is accomplished.

VII

The protection and conservation of the water resources of the state to assure adequate supplies for public recreational purposes and for conservation of wildlife and aquatic life, under existing laws and regulations can be accomplished only by granting of reservation of waters, and flows, as herein applied for. No other procedure for reservation of instream flows for such, or any purposes is provided for by law. Unless such a reservation is granted for such purposes, neither Fish and Game nor any other agency has authority or standing to object or to be heard on behalf of the public's rights and interests in fish, wildlife or recreational preservation, in any proceedings relating to applications for diversionary or consumptive uses under Sections 89-880 to 89-888, inclusive, R.C.M. nor any other provision of law.

VIII

In view of the applicable constitutional and statutory provisions hereinabove referred to, and the provisions of Section 89-890,R.C.M., applications for reservation of instream flows of waters in the Yellowstone River Basin need not be justified on quantifiable economic bases and said reservations for such purposes cannot be defeated or denied because of lack of same either in the applications therefor nor the documentation in support thereof.