

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

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Attorneys for Applicant
Department of Fish and Game

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STATE OF MONTANA

IN THE MATTER OF APPLICATIONS FOR)
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6294-r, 8476-r, 9442-r, 9646-r,) PROPOSED FINDINGS OF
9931-r, 9933-r, 9934-r, 9935-r,) FACT AND CONCLUSIONS
9937-r, 9938-r, 9939-r, 9940-r,) OF LAW FOR APPLICANT
9941-r, 9942-r, 9943-r, 9944-r,) NO. 1781-r - MONTANA
9945-r, 9946-r, 9947-r, 9948-r) DEPARTMENT OF FISH
9949-r, 9951-r, 9952-r, 9953-r,) AND GAME
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.)

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 con-
clusion 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, here-
inafter 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

1 Proposed Findings of Fact and Conclusions of Law relating
2 to the said Fish and Game's application for water reser-
3 vation in the Yellowstone River Basin as attached hereto
4 and as therein stated and respectfully submitted herewith.

5 Dated this 25 day of May, 1978.

6
7 F Woodside Wright
8 F. Woodside Wright

9
10 Clayton R. Herron
11 Clayton R. Herron

12 by Clayton R. Herron
13 Attorneys for Applicant
14 Department of Fish and Game
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16 Helena, MT 59601
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1 BEFORE THE BOARD OF
2 NATURAL RESOURCES AND CONSERVATION
3 OF THE STATE OF MONTANA

4 -----
5 IN THE MATTER OF APPLICATION FOR) FINDINGS OF FACT AND
6 RESERVATION OF WATER NO. 1781-r) CONCLUSIONS OF LAW AS
7 BY THE MONTANA FISH AND GAME) TO APPLICATION OF
8 COMMISSION) DEPARTMENT OF FISH AND
9) GAME
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11 The above-entitled matter came on regularly for hearing
12 on or about August 17, 1977, in Billings, Montana, before
13 the Montana Board of Natural Resources and Conservation and
14 its duly appointed Hearing Examiner, James Driscoll. The
15 Applicant appeared by and through its counsel of record, F.
16 Woodside Wright and Clayton R. Herron. The Montana Depart-
17 ment of Natural Resources and Conservation appeared by and
18 through its counsel of record, Richard Gordon. The fourteen
19 applicant conservation districts appeared by and through
20 their counsel of record, Gary Spaeth. The City of Billings
21 appeared by and through its counsel of record, Calvin Calton.
22 Utah International, Inc., appeared by and through its counsel
23 of record, Urban Roth. The Intake Water Company appeared by
24 and through its counsel of records, Henry Loble and Boyd
25 Henderson. The Montana Power Company appeared by and
26 through its counsel of record, Robert Woodahl. The Montana
27 Water Development Association appeared without benefit of
28 counsel. The Great Western Sugar Company appeared by and
29 through its counsel of record, Richard McCann. Trout Un-
30 limited and the Federation of Fly Fishermen appeared by and

1 through their counsel of record, James Goetz. The Montana
2 Wildlife Federation appeared by and through its counsel of
3 record, William Madden. The Environmental Information Center
4 appeared by and through its counsel of record William Leap-
5 hart. Witnesses were duly sworn, and oral and documentary
6 evidence was introduced.

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

10 FINDINGS OF FACT

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

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

18 Armstrong Spring Creek

19 Bear Creek

20 Big Creek

21 Billman Creek

22 Brackett Creek

23 Cedar Creek

24 Cinnabar Creek

25 Coke Creek

26 Eight Mile Creek

27 Emigrant Spring Creek

- 1 Flathead Creek
- 2 Fleshman Creek
- 3 Fridley Creek
- 4 Little Mission Creek
- 5 McDonald Spring Creek
- 6 Mill Creek
- 7 Mission Creek
- 8 Hol Heron Creek
- 9 Nelson Spring Creek
- 10 Rock Creek (Shields Drainage)
- 11 Rock Creek (of the Yellowstone)
- 12 Shields River
- 13 Sixmile Creek
- 14 Smith Creek
- 15 Suce Creek
- 16 Tom Miner Creek
- 17 Trail Creek
- 18 Yellowstone River (Main Channel, Gardiner to Boulder
- 19 River)
- 20 MIDDLE YELLOWSTONE BASIN (Boulder River to Bighorn River)
- 21 Mid-Big Timber Creek
- 22 Lower Big Timber Creek
- 23 Upper Bluewater Creek
- 24 Middle Bluewater Creek
- 25 Lower Bluewater Creek
- 26 Bridger Creek
- 27 Boulder River (Sweet Grass County)
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1 Boulder River (Sweet Grass and Park Counties)
2 Boulder River (Sweet Grass County)
3 Upper Butcher Creek
4 Lower Butcher Creek
5 Castle Creek (Stillwater County)
6 Castle Creek (Stillwater and Sweet Grass Counties)
7 Clarks Fork Yellowstone River
8 Lower Clarks Fork Yellowstone River
9 Clear Creek
10 Dry Creek
11 East Boulder River (Sweet Grass County)
12 Fishtail Creek (Stillwater County)
13 West Fishtail Creek (Stillwater County)
14 Little Rocky Creek (Stillwater County)
15 Lower Deer Creek
16 Picket Pin Creek (Stillwater and Sweet Grass Counties)
17 Mid-Red Lodge Creek
18 Lower Red Lodge Creek
19 Rock Creek
20 Mid-Rock Creek
21 Lower Rock Creek
22 Lower East Rosebud Creek
23 West Rosebud Creek
24 Lower West Rosebud Creek
25 Sage Creek
26 Stillwater River (Stillwater County)
27 Mid-Sweet Grass Creek

1 Lower Sweet Grass Creek
2 Upper Deer Creek
3 Lower West Boulder River
4 West Fork Stillwater River (Stillwater County)
5 West Fork Stillwater River (Sweet Grass County)
6 Mid-Willow Creek
7 Lower Willow Creek
8 Yellowstone River (Main Channel, Boulder River to
9 Bighorn River)

10 LOWER YELLOWSTONE BASIN

11 Bighorn River
12 Tongue River
13 Hanging Woman Creek
14 Otter Creek
15 Pumpkin Creek
16 Powder River
17 Rosebud Creek
18 Yellowstone River (Big Horn River to Montana-North)
19 Dakota State Line (Exh. DFG 1781-r pii & iii)

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

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

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

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

9 5. The applicant, Fish and Game has established to
10 the satisfaction of the board that there is a need for
11 the reservation of waters in the said respective reaches
12 and tributaries of the Yellowstone River Basin as herein-
13 after stated and the amounts necessary therefor as herein-
14 after stated.

15 6. The reservation of waters for the uses, purposes
16 and needs hereinafter provided for are in the public in-
17 terest. Those public interests and benefits are:

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

20 (b) prevention of the gradual depletion of stream-
21 flows currently enjoyed by the public for recreational uses:

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

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

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

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

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

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

23 There are no environmental detriments that result
24 from granting the flows requested by Fish and Game, and
25 hereinafter granted, other than those that occur as a
26 result of granting flow "numbers", which detriments are
27 based on the assumption that all water over and above Fish
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1 and Game requests would be allocated and eventually withdrawn
2 from the stream for other uses, and no longer would be
3 available for fish and wildlife purposes. (Exh.DFG 1781-r-1
4 P. 9 to 12)

5 9. Specific economic values of the fish and wild-
6 life and aquatic ecosystem and the recreational aspects
7 of streams in the Yellowstone River Basin are unavailable
8 and unquantifiable in specific terms using present day
9 methodologies. (TR. Vol. 32 p. 20 Lanou; TR. Vol. 13 p.
10 72, 93, 94 Long; TR. Vol. 9 test. Stroup p. 2; TR. Vol.
11 9 p. 143 Stroup; TR. Vol. 11 p. 27, 36, 38, 39 Stroup;
12 TR. Vol. 18 test. Power p. 16). However, conservative
13 estimates of the value of Yellowstone River waters
14 for recreation indicate that the Fish and Game in-
15 stream reservation request may well represent the
16 most economically rational use of the remaining Yellow-
17 stone water.
18 (TR. Vol. 18 test. Power p. 16, 17).

19 The value of the existing fishery and aquatic
20 ecosystem in the Yellowstone River Basin, while in-
21 calculable in present economic terms, has signi-
22 ficance in its own right and must be recognized in
23 consideration of an application for water in the
24 Yellowstone River Basin.

25 (TR. Vol. 11, p. 28, Stroup, TR. Vol. 9, Test, Stroup
26 p. 2)

27 There will be recreational economic losses, both

1 in income and employment, to all persons who supply
2 goods and services to users of the river if the Fish
3 and Game application is not granted.
4 (Exh. DFG-1781-r-1, P. 268)

5 10. There have not been shown herein any demon-
6 strable, non-speculative adverse economic effects to
7 the granting of the application of the Fish and
8 Game as hereinafter stated.

9 11. The application of the Fish and Game for
10 reservation of flows, is in excess of, and exclusive
11 of, flows of water required to fulfill and provide
12 for existing and established rights to water. Granting
13 of said application for such reservation of flows
14 as hereinafter provided will .
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1 not interfere with, depreciate, deplete or adversely affect
2 any existing and established rights to water.

3 12. There has not been shown herein that any future
4 needs for waters for the Yellowstone River Basin, or any
5 of its reaches or tributaries for any beneficial use will
6 be interefered with, depreciated, depleted or adversely
7 affected by granting of the non-consumptive reservation
8 of flows applied for by Fish and Game as hereinafter stated.
9 Such future needs for such beneficial uses as have been
10 suggested or advanced and supported by credible and pro-
11 bative testimony and evidence in the cases of domestic and
12 municipal uses will not be interfered with or adversely
13 affected by granting the application of the Fish and Game
14 as hereinafter stated. Future needs for such beneficial
15 uses as have been advanced or suggested for domestic, muni-
16 cipal and irrigation needs beyond those herein stated have
17 been only speculative and argumentative and without proof
18 of reasonable expectation of such needs coming into being.
19 As to suggested or advanced needs for irrigation which could,
20 conceivable conflict with the application of the Fish and
21 Game herein, there has been no, or insufficient, proof of
22 suitability of lands to need or to sustain irrigation; no,
23 or insufficient, proof of availability of financing or in-
24 vestment for construction or development of facilities for
25 same; no, or insufficient, proof of any currently existing
26 and viable, plans or schedules for development of such needs
27 or facilities to serve the same; and no, or insufficient,

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

20 21. An essential part of the habitat for fishery and
21 other components of the aquatic ecosystem is the channel
22 configuration and physical characteristics of the stream,
23 in particular the sinuosity, the islands, the riffles,
24 the pools, the deep channels, the spring floods, and the
25 summer low flows. All of these play an important role in
26 the fishery and aquatic ecosystem, and sufficient water
27 should be reserved to ensure that these components are not
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1 detrimentally affected by dewatering now or in the future.

2 (Tr. Vol. 18, Test. Reichmuth and Vol. 17 Test. Marcoux P. 2)

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

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

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

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

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

17 27. The amount of dissolved oxygen in the water has
18 a direct relationship upon the ability of the aquatic
19 resource and fishery to exist in the water. The higher
20 the amount of effluent and other pollutants in the water
21 the lower the level of dissolved oxygen. (Tr. Vol.2, p.
22 94-96 Knudson)

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

26 29. The quantity of dissolved oxygen in the waters
27 of the Yellowstone River Basin is governed by the amount of
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1 algal growth in those particular waters: the greater the
2 algal growth, the greater the potential for dissolved oxygen
3 fluctuations and resultant reduction of oxygen for consumption
4 by aquatic life. (Tr. Vol. 17, Test. Knudson)

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

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

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

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

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

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

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

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

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

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

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

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

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

1 water needs to sustain existing aquatic and/or ter-
2 restrial ecosystems at the desired and necessary levels.

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

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

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

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

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

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

19 46. If sufficient water is not supplied for the
20 natural life cycle of the fishery and other living
21 components of the aquatic ecosystem, there will be a
22 diminution within the fishery and ecosystem of the Yellow-
23 stone River Basin. The diminution will be caused in
24 direct part by the decrease in the amount of water avail-
25 able for the livelihood of the fishery and other components
26 of the ecosystem.

27 47. The results of tampering with ecosystems have

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

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

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

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

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

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

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

11 54. The Yellowstone River is of great importance as
12 a sport fishery and can be divided into three general
13 zones of fish distribution: (1) the upper river from
14 Gardiner to Big Timber (111 miles) supports cold water
15 salmonid populations of national significance and has
16 been classified as a blue-ribbon trout stream. Large
17 populations of a relatively small number of fish species
18 characteristic of cold, clear water rivers inhabit this
19 reach; (2) the middle river from Big Timber to the Bighorn
20 River (160 miles) is a transition zone between the primarily
21 cold water environment of the upper river and the warm
22 water environment of the lower river. Both cold and warm
23 water fishes are present; and (3) the lower Yellowstone
24 extends from the mouth of the Bighorn River to the Montana-
25 North Dakota state line (295 miles). This reach supports
26 a diverse aquatic ecosystem containing a wide variety of
27 species commonly called warm water fishes. (Exh.DFG 1781-
28
29

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

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

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

1 during the daylight periods. Aquatic communities depend
2 on a proper balance between algae production, water
3 temperature and dissolved oxygen. The more plant life
4 present in a stream the more potential there is for
5 fluctuations in dissolved oxygen - higher values would
6 occur during the day and lower values at night. Excessive
7 lowering of dissolved oxygen concentrations causes stress
8 to aquatic populations and can result in death of these
9 living organisms. (Tr. Vol. 17, Test. Ken Knudson, P. 1-6;
10 Tr. Vol. 17, Addendum to Test. Ken Knudson, P. 1-8; Tr. Vol
11 17, Knudson Cross ex., P. 133-134)

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

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

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

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

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

1 optimum conditions (one part of oxygen to 100,000 parts
2 of water) compared to terrestrial systems, where similar
3 diel activities of plants are hardly noticed by oxygen-
4 dependent organisms. (Tr. Vol. 17, Test. Ken Knudson, P.
5 2-3; Addendum to Test. Ken Knudson, P. 2-3)

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

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

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

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

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

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

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

27 Incremental reductions in flow are not on a "one-

1 to-one" relationship with the fishery value. At a flow
2 of 4,500 cfs. the fishery value is "good." However, a
3 50 percent reduction in this amount drops the fishery
4 value from "good" to "hardly existing." A reduction to
5 1,200 cfs. would reduce the fishery value to "nonexistent."
6 (Tr. Vol. 17, P. 6 of Addendum to Test. Ken Knudson)

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

14 57. Brown trout are the most abundant trout species in
15 the Shields River below the headwaters basin, while mountain
16 whitefish are the most abundant fish species in that reach
17 of stream. Cutthroat trout and mottled sculpin are the only
18 fish species found in the headwaters basin of the Shields
19 River. The Shields River has a number of serious environ-
20 mental problems, not the least of which is extensive with-
21 drawal of water from stream channels during the irrigation
22 season, which has reduced habitat for salmonids and their
23 food organisms. The Shields River has unstable age class
24 structures of the salmonid fish populations due to environ-
25 mental problems; these problems are most detrimental to the
26 young-of-the-year and 1-year old trout, which are practically
27 nonexistent in the Shields River; this suggests that salmonid

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

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

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

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

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

24 61. The stream classification system developed in
25 Montana is a professional one, verified by studies and
26 which can be fully justified. It has been adopted in other
27 areas such as Wyoming. This classification system designates
28
29

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

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

18 63. Few, if any, major rivers in the United States
19 remain as close to their natural condition as does the
20 Yellowstone. The upper Yellowstone Basin is most valuable
21 and unique for its scenic, aesthetic, and recreational
22 features, including fish and wildlife habitat. (Tr. Vol.
23 18, Test. Dana, P. 1)

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

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

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

11 66. A segment of the Yellowstone Cutthroat trout
12 population migrate from the mainstem of the Yellowstone
13 River into tributary streams to spawn. Migrations of
14 Cutthroat trout in the upper Yellowstone Basin were confirmed
15 by observing the occurrence of trout in tributaries which
16 were tagged in the mainstem of the Yellowstone River.
17 Studies were conducted in 1973, 1974 and 1975 in the lower
18 reaches of numerous tributaries to the Yellowstone River to
19 document the possible presence of Cutthroat spawning runs.
20 Confirmed spawning run were documented in 9 of 16 tributar-
21 ies as follows: Cedar, Mol Hern, Tom Miner, Rock, Big,
22 Mill, Emigrant Spring, McDonald Spring, and Nelson Spring
23 Creeks. Studies were made of brown and rainbow trout
24 spawning in 13 upper Yellowstone River tributaries in 1974
25 and 1975. Spawning runs were observed in 4 of the 13
26 tributaries as follows: Armstrong, Spring, Nelson Spring,
27 McDonald Spring, and Emigrant Spring Creeks. These are the
28

1 only major spring creeks in the upper Yellowstone River.

2 (Exh.DFG 1781-r-2, P. 24-32)

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

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

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

27 70. Yellowstone Cutthroat trout and mountain whitefish

1 appear to be particularly dependent on the tributaries of
2 the Yellowstone River for spawning. (Exh.DFG 1781-r-2, P.
3 78)

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

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

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

23 74. The purpose of reservation for each stream reach
24 requested by Fish and Game is to provide for a minimum
25 flow, level, and quality of water for the beneficial uses
26 of fish and wildlife and recreation for each month of the
27 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:

1 Water Surface Profile Program (WSP)

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

21 Dominant Discharge

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

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

9 The dominant discharge quantity was requested only in
10 those stream reaches where USGS streamflow records were
11 available and of sufficient length to allow calculation of
12 this quantity.

13 (Exh. DFG-1781-r-1, P. 291)

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

1 flows can occur.

2 (Exh. DFG-1781-r-1, P. 291, 292)

3 Shields River hydrographs at gaged sites were used to
4 determine the time interval for dominant discharges to
5 occur on tributaries to the Shields. Yellowstone River
6 mainstem hydrographs were used for tributaries to that
7 stream.

8 (Exh. DFG-1781-r-1, P. 292)

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

15 Blue Ribbon Classification

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

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

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

23 Flow Duration Hydrographs

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

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

9 Physical, Chemical, Biological Data Collection

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

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

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

1 and Geology.

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

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

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

14 Observations, Analyses, Judgement
15 and Opinions of Trained and
16 Qualified Professional Personnel

17
18 Low-Flow Photography

19
20 Sediment Studies

21
22 Other Professionally Acceptable Procedures

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

27 One or more of the above evaluations and procedures

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

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

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

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

10 C. One cubic foot per second of flow of water in a
11 stream flowing past any given point for a 24 hour
12 period equals 1.983 acre-feet; the same quantity

13 flowing for a full year would equal 724 acre feet;

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

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

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

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

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

10 Based upon the documentation, evidence and testimony
11 put forth and received herein and upon demonstration made
12 herein, it is hereby found to the satisfaction of the board
13 that as to the particular reaches and tributaries of the
14 Yellowstone River; as to public fish, wildlife and
15 recreational resources present therein, the needs of which
16 will be served by reservation of instream flows in each
17 of such reaches and streams, respectively,; and as to
18 the amounts of instream flows of water which should be re-
19 served to meet the purposes and needs to serve the beneficial
20 uses as set forth in the application of Fish and Game, as
21 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 aquatic 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;

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

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

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

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

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

25 (Exh.DFG-1781-r-1,P.22&23)
26
27
28
29

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

9 ARMSTRONG SPRING CREEK

10 (Mouth to Origin)

11 Fish species present:

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

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

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

17 The wildlife species present:

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

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

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

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

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

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

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

9 BEAR CREEK

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

11 Fish species present:

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

14 B. Migratory transient game fish - cutthroat and
15 rainbow trout and rainbow cutthroat hybrid trout.

16 (Exh.DFG-1781-r-1,P.24)

17 The wildlife species present:

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

20 B. Migratory transient - ducks and bald eagles.

21 (Exh.DFG-1781-r-1,P.24)

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

24 The dominant discharge required in this stream reach
25 for one 24-hour period between May 11 and August 10 is
26 presently unquantified but is needed to maintain channel
27

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

2 Flows are necessary to maintain a resident trout
3 population and to maintain potential spawning runs of cut-
4 throat, rainbow, brown trout and whitefish from the Yellow-
5 stone River. (Exh.DFG-1781-r-1,P.24)

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

10 BEAR CREEK

11 (North Fork of Bear Creek to Fish Lake)

12 Fish species present:

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

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

17 Wildlife species present:

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

20 B. Migratory transient - ducks and bald eagles.

21 (Exh.DFG01781-r-1,P.25)

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

25 The dominant discharge required in this stream reach
26 for one 24-hour period between May 11 and August 10 is
27

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

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

8 BIG CREEK

9 (Mouth to Millfork Creek)

10 Fish species present:

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

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

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

17 The wildlife species present:

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

20 B. Migratory transient - ducks and bald eagles.

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

22 This stream supports cutthroat trout and mountain white-
23 fish spawning runs from the Yellowstone River and has potential
24 as a rainbow and brown trout spawning and rearing area.

25 (Exh. DFG-1781-4-1,P.26)

26 Flows as herein stated, are needed to be reserved to
27
28
29

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

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

6 There should be reserved therein the instantaneous
7 streamflow for the periods of January 1 - May 10 and August
8 11 - December 31 of each year, subject to existing lawfully
9 appropriated water rights.

10 BIG CREEK

11 (Millfork Creek to Bark Cabin Creek)

12 Fish species present:

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

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

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

20 Wildlife species present:

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

23 B. Migratory transient - ducks and bald eagles.

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

25 The flows are necessary to allow potential passage,
26 spawning, and recruitment of trout from the lower reaches
27

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

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

6 The instantaneous streamflow subject to existing law-
7 fully appropriated water rights, is the required flow for
8 the periods of January 1 to May 10 and August 11 to December
9 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.27)

10 BILLMAN CREEK

11 (Mouth to the Mouth of Coke Creek)

12 Fish species present:

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

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

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

20 Wildlife species present:

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

23 B. Migratory transient - ducks and bald eagles.

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

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

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

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

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

10 BILLMAN CREEK

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

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

15 Fish species present:

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

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

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

24 Wildlife species present:

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

27 B. Migratory transient - ducks and bald eagles.

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

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

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

9 The instantaneous streamflow, subject to existing lawfully
10 appropriated water rights, is the required flow for the
11 periods of January 1 to May 10 and August 11 to December
12 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.29)

13 BRACKETT CREEK

14 (Mouth to Sheep Creek)

15 Fish species present:

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

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

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

24 Wildlife species present:

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

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

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

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

13 There should be reserved in this stream the dominant
14 discharge for one 24-hour period between April 16 and July
15 31 which is 151cfs and is needed to maintain channel form
16 and processes. (Exh.DFG-1781-r-1,P.30)

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

21 BRACKETT CREEK

22 (Sheep Creek to Skunk Creek)

23 Fish species present:

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

26 B. Migratory transient game fish - cutthroat, rainbow,
27
28
29

1 and brown trout and whitefish may enter this reach
2 from downstream reaches for spawning purposes.

3 (Exh.DFG-1781-r-1,P.31)

4 Wildlife species present:

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

7 B. Migratory transient - ducks and bald eagles.

8 (Exh.DFG-1781-r-1,P.31)

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

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

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

22 BRACKETT CREEK

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

24 Fish species present:

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

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

5 Wildlife species present:

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

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

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

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

19 The instantaneous streamflow, subject to existing law-
20 fully appropriated water rights, is the required flow for
21 the periods of January 1 to March 31 and July 21 to December
22 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.32)

23 CEDAR CREEK

24 (Mouth to Second Fork of Cedar Creek)

25 Fish species present:

26 A. Resident game fish - cutthroat, rainbow, brown,
27
28
29

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

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

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

8 Wildlife species present:

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

11 B. Migratory transient - ducks and bald eagles.

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

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

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

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

growth

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1 the periods of January 1 to May 10 and August 11 to December
2 31 of each year and should be reserved. (Exh.DFG-1781-r-1,P.34)

3 CINNABAR CREEK

4 (Mouth to Cottonwood Creek)

5 Fish species present:

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

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

12 (Exh.DFG-1781-r-1,P.35)

13 Wildlife species present:

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

16 B. Migratory transient - ducks and bald eagles.

17 (Exh.DFG-1781-r-1,P.35)

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

22 The dominant discharge required in this stream reach
23 for one 24-hour period between May 11 and August 10 is
24 presently unquantified but is needed to maintain channel
25 form and processes and should be reserved. (Exh.DFG-1781-
26 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

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

4 There should be reserved in this stream the instantaneous
5 streamflow during the periods of January 1 to May 10 and August
6 11 to December 31 of each year, subject to existing lawfully
7 appropriated water rights. (Exh.DFG-1781-r-1,P.36)

1 COKE CREEK

2 (Mouth to Minor Creek)

3 Fish species present:

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

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

11 Wildlife species present:

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

13 B. migratory transient - ducks and bald eagles;

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

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

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

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

1 COTTONWOOD CREEK

2 (Mouth to Little Cottonwood Creek)

3 Fish species present:

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

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

10 Wildlife species present:

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

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

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

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

22 The instantaneous streamflow, subject to existing
23 lawfully appropriated water right is the required flow for
24 the periods of January 1 to March 31 and July 21 to December
25 31 of each year and should be reserved. (Exh. DFG-1781-r-1
26 P. 38)

1 COTTONWOOD CREEK

2 (Little Cottonwood Creek to Trespass Creek)

3 Fish species present:

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

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

10 Wildlife species present:

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

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

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

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

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

EIGHT MILE CREEK

(Mouth to Eig 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)

1 The instantaneous streamflow, subject to existing law-
2 fully appropriated water rights, is the required flow during
3 the periods of January 1 - May 10 and August 11 - December
4 31 of each year and should be reserved. (Exh. DFG-1781-r-1,
5 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

1 for the periods January 1 to May 10 and August 11 to
2 December 31 of each year and should be reserved.

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

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1 EMIGRANT SPRING CREEK

2 (Mouth to origin)

3 Fish species present:

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

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

11 Wildlife species present:

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

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

16 Flows are necessary to maintain this highly produc-
17 tive spring creek and the excellent trout population it
18 supports; flows are also needed to maintain documented
19 spawning runs of cutthroat, rainbow, and brown trout from
20 the Yellowstone River and for potential spawning runs of
21 whitefish; this stream is well known for its challenge
22 to fly fishermen.

23 (Exh. DFG-1781-r-1, p. 42)

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

1 FLATHEAD CREEK

2 (Mouth to Muddy Creek)

3 Fish species present:

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

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

10 Wildlife species present:

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

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

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

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

23 The instantaneous streamflow, subject to existing law-
24 fully appropriated water rights, is the required flow for the
25 periods of January 1 to March 31 and July 21 to December
26 31 and should be reserved. (Exh. DFG-1781-r-1, P. 43)

1 FLATHEAD CREEK

2 (Muddy Creek to Cache Creek)

3 Fish species present:

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

6 B. migratory transient game fish - cutthroat and
7 brown trout and whitefish may enter the reach from
8 downstream reaches for spawning purposes. (Exh. DFG
9 1781-r-1, P. 44)

10 Wildlife species present:

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

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

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

19 The dominant discharge required in this stream reach
20 for one 24-hour period between April 1 and July 20 is
21 presently unquantified but is needed to maintain channel
22 form and processes and should be reserved. (Exh. DFG-1781-r-
23 1, P. 44)

24 The instantaneous streamflow, subject to existing law-
25 fully appropriated water rights, is the required flow for
26 the periods of January 1 to March 31 and July 21 to December
27 31 of each year and should be reserved. (Exh. DFG-1781-r-1, P. 44)

1 FLATHEAD CREEK

2 (Cache Creek to South Fork of Flathead Creek)

3 Fish species present:

4 A. resident game fish - cutthroat and brook trout;

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

9 Wildlife species present:

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

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

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

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

22 The instantaneous streamflow subject to existing law-
23 fully appropriated water rights is the required flow for
24 the periods of January 1 to March 31 and July 21 to December
25 31 of each year and should be reserved. (Exh. DFG-1781-r-1,
26 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

1 lawfully appropriated water rights, is the required flow
2 for the periods of January 1 to May 10 and August 11 to
3 December 31 of each year and should be reserved. (Exh.
4 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

1 the periods of January 1 to May 10 and August 11 to December
2 31 of each year and should be reserved. (Exh. DFG-1781-r-1,
3 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-r-1, P. 50)

The fishery and aquatic resource in this stream

1 reach are of such good quality, statewide importance, and
2 national prominence that the instantaneous streamflow
3 subject to existing lawfully appropriated water rights
4 is the required flow for the period January 1 to December
5 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

1 lawfully appropriated water rights, is the required flow
2 for the periods of January 1 - May 10 and August 11 -
3 December 31 of each year and should be reserved. (Exh.
4 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

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

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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

1 31 of each year and should be reserved. (Exh. DFG-1781-r-
2 1, P. 55)

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1 MOL HERON CREEK

2 (Mouth to Cinnabar Creek)

3 Fish species present:

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

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

12 Wildlife species present:

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

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

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

22 The dominant discharge required in this stream reach
23 for one 24-hour period between May 11 and August 10 is
24 presently unquantified but is needed to maintain channel
25 form and processes and should be reserved. (Exh. DFG-1781-r-
26 1, P. 56)

27 The instantaneous streamflow, subject to existing

1 lawfully appropriated water rights, is the required
2 flow for the period of January 1 to May 10 and August 11 to
3 December 31 of each year and should be reserved. (Exh. DFG
4 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

1 for the periods of January 1 to May 10 and August 11 to De-
2 cember 31 of each year and should be reserved. (Exh. DFG-1781-
3 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 law-
fully 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)

1 ROCK CREEK OF THE YELLOWSTONE

2 (Mouth to Steele Creek)

3 Fish species present:

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

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

12 Wildlife species present:

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

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

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

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

28 The instantaneous streamflow, subject to existing

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

1 ROCK CREEK (SHIELDS DRAINAGE)

2 (Mouth to Forest Service

3 West Boundary in Section 8)

4
5 Fish species present:

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

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

14 Wildlife soecies present:

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

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

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

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

27 The instantaneous streamflow, subject to existing

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

1 ROCK CREEK (SHIELDS DRAINAGE)

2 (Forest Service west boundary in Section 8

3 to Smeller Creek)

4 Fish species present:

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

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

11 Wildlife species present:

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

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

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

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

24 The instantaneous streamflow subject to existing law-
25 fully appropriated water rights is the required flow for the
26 periods of January 1 to March 31 and July 21 to December 31
27 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 whitefish;

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

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

2	April	1-15	99	June	1-10	325
3		16-30	156		11-20	278
4	May	1-10	240		21-30	151
5		11-20	319	July	1-10	80
6		21-31	287			

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

10 The dominant discharge required in this stream reach
11 for one 24-hour period between April 1 and July 10 is 774
12 cfs. (1,535 acre feet) and is needed to maintain channel
13 form and processes and should also be reserved. (Exh. DFG-
14 1781-r-1, P. 62)

15 The instantaneous streamflow, subject to existing law-
16 fully appropriated water rights, is the required flow for
17 the period of January 1 to March 31 and July 11 to December
18 31 of each year and should also be reserved. (Exh. DFG-1781-
19 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)

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

3	April	16-30	39	June	1-10	189
4	May	1-10	83		11-20	157
5		11-20	137		21-30	105
6		21-31	184	July	1-10	56
7					11-20	36

8 These flows equal 20,308 acre feet per year excluding
9 the dominant discharge, and should be reserved. The
10 dominant discharge required in this stream reach for one
11 24-hour period between April 15 and July 31 is 457 cfs.
12 (906 acre feet) and is needed to maintain channel form and
13 processes and should, also, be reserved. (Exh. DFG-1781-r-1,
14 P. 63)

15 The instantaneous streamflow, subject to existing
16 lawfully appropriated water rights is the required flow
17 for the periods of January 1 to April 15 and July 21 to
18 December 31 of each year and should also be reserved.
19 (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

1 for the periods of January 1 to March 31 and July 21 to
2 December 31 of each year and should be reserved. (Exh.
3 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 to 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

1 the periods of January 1 to May 10 and August 11 to December
2 31 of each year and should be reserved. (Exh. DFG-1781-r-1,
3 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 from 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 maintain 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)

1 SUCE CREEK

2 (Mouth to Lost Creek)

3 Fish species present:

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

7 B. migratory transient game fish which may migrate
8 into this reach from downstream reaches to spawn
9 are cutthroat, rainbow and brown trout, rainbow-
10 cutthroat hybrids and whitefish. (Exh. DFG-1781-r-
11 1, P. 67)

12 Wildlife species present:

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

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

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

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

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

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

1 TOM MINER CREEK

2 (Mouth to Canyon Creek)

3 Fish species present:

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

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

11 Wildlife species present:

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

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

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

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

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

1 TOM MINER CREEK

2 (Canyon Creek to Trail Creek)

3 Fish species present:

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

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

12 Wildlife species present:

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

15 B. migratory transient - ducks and bald eagles;
16 (Exh. DFG-1781-r-1, P. 69)

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

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

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

1 the periods of January 1 to May 10 and August 11 to December
2 31 of each year and should be reserved. (Exh. DFG-1781-r-1,
3 P. 69)

1 TRAIL CREEK

2 (Mouth to West Pine Creek)

3 Fish species present:

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

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

12 Wildlife species present:

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

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

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

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

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

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

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1 TRAIL CREEK

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

3 Fish species present:

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

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

10 Wildlife species present:

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

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

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

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

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

1 YELLOWSTONE RIVER

2 (Main stream of the Yellowstone River from
3 Gardiner to Tom Miner Creek)
4

5 Fish species present in this stream reach are:

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

9 B. migratory transient game fish - brook trout.

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

11 Wildlife species present:

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

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

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

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

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

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

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

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

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

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

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

13	May 11-20	2900	July 1-10	5700
14	21-31	5500	11-20	4000
15	June 1-10	7800	21-31	2900
16	11-20	8700	Aug. 1-10	2200
17	21-30	7700		

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

21 The dominant discharge required in this stream reach
22 for one 24-hour period between May 11 and August 10 is
23 15,000 cfs (29,752 acre feet) and is needed to maintain
24 channel form and processes and also, should be reserved.
25 (Exh. DFG-1781-r-1, p. 73)

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

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

1 YELLOWSTONE RIVER

2 (Main stream of the Yellowstone River from
3 Tom Miner Creek to Big Creek.)
4

5 Fish species present:

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

9 B. Migratory transient game fish - brook trout.
10 (Exh. DFG-1781-r-1, P. 74)

11 Wildlife species present:

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

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

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

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

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

24 Evaluations of the flow requirements for this
25 stream reach include streamflow frequency and hydrograph data.
26 Flow requests are based on streamflow frequency data at the
27

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

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

7 A. for nest establishment - during the period February
8 15 to March 15;

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

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

13	May	11-20	1700	July	1-10	4500
14		21-31	4300		11-20	2800
15	June	1-10	6600		21-31	2000
16		11-20	7500	Aug.	1-10	1000
17		21-30	6500			

18 These flows equal 744,396 acre feet per year exclusive of the
19 dominant discharge. The dominant discharge required in this
20 stream reach for one 24-hour period between May 11 and August
21 10 is 15,000 cfs. (29,752 acre feet) and is needed to
22 maintain channel form and processes and should, also, be
23 reserved. (Exh. DFG-1781-r-1, P. 75)

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

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

1 YELLOWSTONE RIVER

2 (Main stream of the Yellowstone River
3 from Big Creek to the Shields River)
4

5 Fish species present:

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

9 B. migratory transient game fish - brook trout
10 (Exh. DFG-1781-r-1, P. 76)

11 Wildlife species present:

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

15 B. migratory transient - numerous species of ducks,
16 Canada geese, bald eagles and great blue heron;
17 (Exh. DFG-1781-r-1, P. 76)

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

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

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

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

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

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

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

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

12	May	11-20	1900	July	1-10	5400
13		21-31	4700		11-20	3800
14	June	1-10	7700		21-31	2500
15		11-20	9000	Aug.	1-10	1600
16		21-30	8000			

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

20 The dominant discharge required in this stream reach
21 for one 24-hour period between May 11 and August 10 is
22 18,200 cfs. (36,099 acre feet) and is needed to maintain
23 channel form and processes and should be reserved. (Exh.
24 DFG-1781-r-1, P.77)

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

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

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1 YELLOWSTONE RIVER

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

4
5 Fish species present:

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

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

11 Wildlife species present:

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

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

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

22 Evaluations of the flow requirements for this
23 stream reach include use of streamflow frequency data
24 and current biological data, examination of streamflow
25 frequency data from the U. S. Geological Survey, consid-
26 eration of the applicants' existing rights in the
27 Yellowstone River in this reach, and recognition of

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

4
5 The periods of the year when flows are required for
6 Canada geese nesting in the reach are as follows:

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

10 The instream flow required for the stream reach in
11 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		

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

20 The dominant discharge required in this stream reach
21 for one 24-hour period between May 11 and August 10 is
22 18,200 cfs (36,099 acre feet) and is necessary to maintain
23 channel form and processes and should also be reserved.
24 (Exh. DFG-1781-r-1, p. 79)

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

1 existing lawfully appropriated water rights, is the required
2 flow for the periods of January 1 to May 10 and August 11
3 to December 31 of each year and should be reserved. (Exh.
4 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

1 Hawley Creek)

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

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

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

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

9 West Fork Stillwater River (Mouth to Castle Creek)

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

12 Stillwater River (Rosebud River to West Fork Stillwater
13 River)

14 Stillwater River (Mouth to Rosebud River)

15 Fish Tail Creek

16 East Fishtail Creek

17 West Fishtail Creek

18 Little Rocky Creek

19 Picket Pin Creek

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

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

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

1 MID BIG TIMBER CREEK

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

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

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

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

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

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

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

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

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

14 C. for mountain whitefish: for spawning, during
15 the months of September through November; for incuba-
16 tion, during the months of September through May; and
17 for rearing, during the months of January through
18 December.

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

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

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

1 LOWER BIG TIMBER CREEK

2 (Swamp Creek to the Yellowstone River)

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

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

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

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

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

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

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

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

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

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

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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

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

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

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

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

17	Jan.	9.5	May	9.5	Sept.	9.5
18	Feb.	9.5	June	9.5	Oct.	9.5
19	Mar.	9.5	July	9.5	Nov.	9.5
20	Apr.	9.5	Aug.	9.5	Dec.	9.5

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

1 MIDDLE BLUEWATER CREEK

2 (Bluewater Springs Trout Hatchery to McDowell Coulee)

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

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

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

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

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

15 Lesser flows would cause increased sediments deposition
16 and adversely effect the fishery. Evaluations to determine
17 the flow requirements for this stream reach are based
18 upon water discharge measurements and photographs, fishery
19 data collections, sediment investigations, professional
20 judgment, flow duration curves, and aquatic insect studies.
21 (Tr. Vol. 17, P. 1-48, Exh. DFG-1781-r-1, P. 89, Exh. DFG-
22 1781-r-7)

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

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

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

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

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

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

10	Jan.	26	May	26	Sept.	26
11	Feb.	26	June	26	Oct.	26
12	Mar.	26	July	26	Nov.	26
13	Apr.	26	Aug.	26	Dec.	26

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

1 LOWER BLUEWATER CREEK

2 (McDowell Coulee to mouth)

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

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

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

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

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

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

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

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

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

3 Jan.	20	May	20	Sept.	20
4 Feb.	20	June	20	Oct.	20
5 Mar.	20	July	20	Nov.	20
6 Apr.	20	Aug.	20	Dec.	20

7 These flows equal 14,479 acre feet per year and should be
8 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

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

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

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

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

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

20 This stream reach has a significant aesthetic value
21 and the streamflow which protects that value is 10-20 cfs
22 in the upper and middle reaches. The lower reach has no
23 aesthetic value due to a wide, gravel-laden channel.

24 (Exh. DFG-1781-r-1, P.93)

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

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

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

1 BOULDER RIVER IN SWEET GRASS COUNTY

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

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

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

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

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

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

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

24 B. for rainbow trout: for spawning, during the
25 months of April to mid-May; for incubation, during
26 the months of April through June; and for rearing,
27 during the months of January through December. (Exh.

28 DFG-1781-r-1,P.96)

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

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

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

1 BOULDER RIVER IN SWEET GRASS & PARK COUNTIES

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

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

5 Resident wildlife species present: for this stream
6 reach are beaver, muskrat, mink, and raccoon. (Exh.DFG-
7 1781-r-1, P.97)

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

13 Evaluations of flow requirements for this stream
14 reach are based upon USGS flow data, low flow photography,
15 fish population and life history data obtained by electro-
16 fishing. (Exh.DFG-1781-r-1,P.97;Exh.DFG-1781-r-9, Tr.Vol.
17 16, P.53-80)

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

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

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

1 the months of January through December;

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

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

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

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

1 BOULDER RIVER IN SWEET GRASS COUNTY

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

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

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

7 Flows requested for the high flow portions of the year
8 approximate average monthly minimum flows which have histor-
9 ically occurred. These flows are conservative statements
10 of flows needed for channel flushing and maintenance.

11 (Tr. Vol. 16, Test. Stewart, P. 3)

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

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

19 A. for brook trout: for spawning, during the months
20 of October; for incubation, during the months of Oct-
21 ober through mid-March; and for rearing, during the
22 months of January through December;

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

27 C. for cutthroat trout: for spawning, during the

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

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

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

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

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

1 UPPER BUTCHER CREEK

2 (Headwaters to West Butcher Creek.)

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

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

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

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

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

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

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

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

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

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

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

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

1 LOWER BUTCHER CREEK

2 (West Butcher Creek to the Mouth)

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

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

7 The requested flows will barely maintain the existing
8 fishery, based upon physical channel measurements. (Exh.DFG-
9 1781-r-1, P.103)

10 Evaluations of the flow requirements for this stream
11 reach are based upon water surface profile, water discharge
12 measurements and photographs, judgment of qualified pro-
13 fessional personnel, fisheries data collections, and
14 physical measurements of depths, overhanging vegetation,
15 and undercut banks. (Exh.DFG-1781-r-1, P.103; Exh.DFG-
16 1781-r-7; Tr. Vol. 17. Test. Marcuson, P.1-48)

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

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

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

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

2 In this stream reach the fishery suffers severe
3 degradation when the streamflow is below 10 cfs. (Exh.DFG-
4 1781-r-1,P.103)

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

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

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

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1 CASTLE CREEK

2 (Mouth to the mouth of Lodgepole Creek.)

3 Resident game fish species present: brown trout.

4 (Exh.DFG-1781-r-1,P.105)

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

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

13 For this reach of stream, 20 cfs is the minimum flow
14 required for brown trout spawning in November. (Exh.DFG-
15 1781-r-1,P.105)

16 Evaluations of the flow requirements for this stream
17 reach are based upon water surface profile program, USGS flow
18 data, Fish and Game gauging data, low flow photography,
19 spawning redd velocity measurements, and fish population
20 and life history data obtained by electrofishing. (Exh.DFG-
21 1781-r-1, P.105; Exh.DFG-1781-r-9; Tr. Vol. 16, P.53-80)

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

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

1 during the months of January through December;

2 (Exh.DFG-1781-r-1,P.106)

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

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

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

1 CASTLE CREEK

2 (Lodgepole Creek to Picket Pin Creek.)

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

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

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

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

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

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

27 The instream flow required for the stream reach,

1 in cfs, by month of the year is as follows:

2	Jan.	8	May	10	Sept.	10
3	Feb.	8	June	40	Oct.	9
4	Mar.	8	July	20	Nov.	8
5	Apr.	8	Aug.	12	Dec.	8

6 These flows equal 8,983 acre feet per year and should be
7 reserved. (Exh.DFG-1781-r-1,P.107)

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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 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 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

1 of November through March; and for rearing, during
2 the months of January through December. (Exh.DFG-
3 1781-r-1,P.110)

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

6	Jan.	1	May	2	Sept.	2
7	Feb.	1	June	8	Oct.	2
8	Mar.	1	July	5	Nov.	1
9	Apr.	1	Aug.	3	Dec.	1

10 These flows equal 1,691 acre feet per year, and should be
11 reserved. (Exh.DFG-1781-r-1,P.109)

1 CLARK'S FORK YELLOWSTONE RIVER

2 (Montana-Wyoming State Line to Bluewater Creek)

3 Resident game fish species present: cutthroat,
4 rainbow, and brown trout and mountain whitefish.
5 (Exh.DFG-1781-r-1,P.111)

6 Resident wildlife species present: beaver, muskrat,
7 mink, raccoon, and otter. (Exh.DFG-1781-r-1,P.111)

8 Evaluations of the flow requirements for this stream
9 reach are based upon water surface profile, water discharge
10 measurements, judgment of qualified professional personnel
11 and fisheries data collections. (Exh. DFG-1781-r-1, P. 111;
12 Exh.DFG-1781-r-7; Tr. Vol. 17, P.1-48)

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

16 A. for cutthroat trout: for spawning, during
17 the months of June and July; for incubation, during
18 the months of June through September 7; and for
19 rearing, during the months of January through
20 December;

21 B. for rainbow trout: for spawning, during the
22 months of June and July; for incubation, during the
23 months of June through September 7; and for rearing,
24 during the months of January through December;

25 C. for brown trout: for spawning, during the
26 months of October and November; for incubation,
27 during the months of October through mid-May; and

1 for rearing, during the months of January through
2 December;

3 D. for mountain whitefish: for spawning, during
4 the months of September through November; for in-
5 cubation, during the months of September through
6 April 7; and for rearing, during the months of
7 January through December. (Exh.DFG-1781-r-1,P.112)

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

10	Jan.	160	May	1100	Sept.	250
11	Feb.	150	June	2900	Oct.	200
12	Mar.	150	July	1400	Nov.	200
13	Apr.	200	Aug.	450	Dec.	175

14 These flows equal 429,353 acre feet per year and should
15 be reserved. (Exh.DFG-1781-r-1,P.111)

1 LOWER CLARK'S FORK YELLOWSTONE RIVER

2 (Bluewater Creek to the Mouth)

3 Resident game fish species present: brown trout,
4 mountain whitefish, and sauger. (Exh.DFG-1781-r-1,P.113)

5 Resident wildlife species present: beaver, muskrat,
6 mink, raccoon, and otter. (Exh.DFG-1781-r-1,P.113)

7 Evaluations of the flow requirements for this stream
8 reach are based upon water discharge measurements, judgment
9 of qualified professional personnel and fisheries data
10 collections. (DFG-1781-r-1,P.113; Exh.DFG-1781-r-7; Tr.
11 17,P.1-48)

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

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

19 B. for whitefish: for spawning, during the months
20 of September through November; for incubation, during
21 the months of September through April 7; and for
22 rearing, during the months of January through December;

23 C. for sauger: for spawning, during the months of
24 May and June; for incubation, during the months of
25 May and June; and for rearing, during the months of
26 January through December. (Exh.DFG-1781-r-1,P.114)

27 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)

1 CLEAR CREEK

2 (Headwaters to Mouth)

3 Resident game fish species present: rainbow, brown
4 and brook trout and mountain whitefish. (Exh. DFG-r-1, P.
5 115)

6 Resident wildlife species present: beaver, muskrat,
7 mink, and raccoon. (Exh. DFG-r-1, P. 115)

8 Evaluations of the flow requirements for this stream
9 reach are based upon water surface profile, water discharge
10 measurements and photographs, judgment of qualified pro-
11 fessional personnel and fisheries data collections. (Exh.
12 DFG-r-1, P. 115; Exh. DFG-1781-r-7; Tr. Vol. 17, P. 1-48)

13 There is recreational use of this reach of the stream
14 by fishermen. (Exh. DFG-1781-r-1, P. 115)

15 The periods of the year when flows are required by the
16 fish species found in this stream reach for spawning, incuba-
17 tion and rearing are:

18 A. for rainbow trout: for spawning, during the months
19 of June and July; for incubation, during the months of
20 June through September 7; and for rearing during the
21 months of January through December;

22 B. for brown trout: for spawning, during the months
23 of October and November; for incubation, during the
24 months of October through mid-May; and for rearing,
25 during the months of January through December;

26 C. for brook trout: for spawning, during the months
27 of October and November; for incubation, during the

1 months of October through mid-May; and for rearing,
2 during the months of January through December;
3 D. for whitefish: for spawning, during the months of
4 September through November; for incubation, during
5 the months of September through April 7; and for
6 rearing, during the months of January through Decem-
7 ber. (Exh. DFG-1781-r-1, P. 116)

8 In this stream reach the fishery and aquatic ecosystem
9 suffer severe degradation when the streamflow is below 10
10 cfs. (Exh. DFG-1781-r-1, P. 115)

11 Fishermen interviews indicate preferences for stream-
12 flow of 20 to 30 cfs. (Exh. DFG-1781-r-1, P. 115)

13 This stream reach has a significant aesthetic value and
14 the streamflow which protects that value is 20 to 30 cfs.
15 (Exh. DFG-1781-r-1, P. 115)

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

18	Jan.	15	May 1-21	15	Aug.	20
19	Feb.	15	May 21-31	30	Sept.	20
20	Mar.	15	June	30	Oct.	20
21	Apr.	15	July 1-21	30	Nov.	18
22			July 21-31	20	Dec.	15

23 These flows equal 13,874 acre feet per year and should be
24 reserved. (Exh. DFG-1781-r-1, P. 115)

1 DRY CREEK

2 (Headwaters to Mouth)

3 Resident game fish species present: brown and brook
4 trout. (Exh. DFG-1781-r-1, P. 117)

5 Resident wildlife species present: beaver, muskrat,
6 mink, and raccoon. (Exh. DFG-1781-r-1, P. 117)

7 Evaluations of the flow requirements for this stream
8 reach are based upon creel census and judgment of qualified
9 professional personnel. (Exh. DFG-1781-r-1, P. 117; Exh.
10 DFG-1781-r-7; Tr. Vol. 17, P. 1-48)

11 There is significant recreational use of this reach
12 of the stream by fishermen. (Exh. DFG-1781-r-1, P. 117)

13 The periods of the year when flows are required by the
14 fish species found in this stream reach for spawning, incuba-
15 tion, and rearing are:

16 A. for brown trout: for spawning, during the months
17 of October and November; for incubation, during the
18 months of October through April; and for rearing,
19 during the months of January through December.

20 B. for brook trout: for spawning, during the months
21 of October and November; for incubation, during the
22 months of October through April; and for rearing,
23 during the months of January through December. (Exh.
24 DFG-1781-r-1, P. 117)

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

1	Jan	2	May	2	Sept.	2
2	Feb.	2	June	2	Oct.	2
3	Mar.	2	July	2	Nov.	2
4	Apr.	2	Aug.	2	Dec.	2

5 These flows equal 1,448 acre feet per year and should be
6 reserved. (Exh. DFG-1781-r-1, P. 117)

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1 EAST BOULDER RIVER

2 (Mouth to Dry Fork Creek)

3 Resident game fish species present: brown and
4 rainbow trout. (Exh. DFG-1781-r-1, P. 119)

5 Resident wildlife species present: beaver, muskrat,
6 mink and raccoon. (Exh. DFG-1781-r-1, P. 119)

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

12 Evaluations of the flow requirements for this stream
13 reach are based upon USGS flow data, Fish and Game flow data,
14 low flow photography, fish population and life history data
15 obtained by electrofishing. (Exh. DFG-1781-r-1,
16 P. 119; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

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

20 A. for brown trout: for spawning, during the month
21 of November; for incubation, during the months of
22 November through April; and for rearing, during the
23 months of January through December;

24 B. for rainbow trout: for spawning, during the
25 months of April through May; for incubation, during
26 the months of April through mid-July; and for rearing,
27 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)

1 EAST BOULDER RIVER

2 (Dry Fork to Brownlee Creek)

3 Resident game fish species present: brown, rainbow
4 and rainbow-cutthroat hybrid trout. (Exh. DFG-1781-r-1, P.
5 121)

6 Resident wildlife species present: beaver, muskrat
7 and mink. (Exh. DFG-1781-r-1, P. 121)

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

13 Evaluations of the flow requirements for this stream
14 reach are based upon USGS flow data and fish population
15 and life history data obtained by electrofishing. (Exh.
16 DFG-1781-r-1, P. 121; Exh. DFG-1781-r-9; Tr. Vol. 16, P. 53-80)

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

20 A. for brown trout: for spawning, during the month
21 of November; for incubation, during the months of
22 November through April; and for rearing, during
23 the months of January through December;

24 B. for rainbow trout: for spawning, during the
25 months of mid-May through June; for incubation,
26 during the months of mid-May through mid-August;
27 and for rearing, during the months of January through

1 December. (Exh. DFG-1781-r-1, P. 122)

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

4	Jan.	10	May	14	Sept.	14
5	Feb.	10	June	120	Oct.	13
6	Mar.	10	July	36	Nov.	10
7	Apr.	10	Aug.	16	Dec.	10

8 These flows equal 16,421 acre feet per year and should be
9 reserved. (Exh. DFG-1781-r-1, P. 121)

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1 FISHTAIL CREEK

2 (From the confluence of east and west Fishtail Creeks to Mouth)

3 Resident game fish species present: brown and rain-
4 bow trout and mountain whitefish. (Exh.DFG-1781-r-1,P.123)

5 Resident wildlife species present: beaver, muskrat,
6 mink and raccoon. (Exh.DFG-1781-r-1,P.123)

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

12 Evaluations of the flow requirements for this stream
13 reach are based upon low flow stream gauging by Fish and Game,
14 low flow photography, correlation of flow with a nearby
15 USGS gauge, and fish population and life history data ob-
16 tained by electrofishing. (Exh.DFG-1781-r-1,P.123; Exh.
17 DFG-1781-r-9; Tr.16,P.53-80)

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

- 21 A. for brown trout: for spawning, during the
22 month of November; for incubation, during the months
23 of November through mid-April; and for rearing,
24 during the months of January through December;
25 B. for rainbow trout: for spawning, during the
26 months of mid-April through May; for incubation,
27 during the months of mid-April through mid-July;

1 and for rearing, during the months of January
2 through December. (Exh.DFG-1781-r-1,P.124)

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

5 Jan.	10	May	14	Sept.	10
6 Feb.	10	June	24	Oct.	10
7 March	10	July	14	Nov.	10
8 April	10	Aug.	10	Dec.	10

9 These flows equal 8,563 acre feet per year and should
10 be reserved. (Exh.DFG-1781-r-1,P.123)

1 EAST FISHTAIL CREEK

2 (West Fishtail Creek to its East Fork)

3 Resident game fish species present: brook, brown and
4 rainbow trout. (Exh.DFG-1781-r-1.P.125)

5 Resident wildlife species present: beaver, muskrat,
6 mink and raccoon. (Exh.DFG-1781-r-1,P.125)

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

12 Evaluations of the flow requirements for this stream
13 reach are based upon low flow stream gauging by Fish and
14 Game, low flow photography, correlation of low flow with
15 a nearby USGS gauge, fish population and life history data
16 obtained by electrofishing. (Exh. DFG-1781-r-1, P. 125;
17 Exh. DFG-1781-r-9; Tr. 16, P.53-80)

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

- 21 A. for brook trout: for spawning, during the
22 month of October; for incubation, during the months
23 of October through mid-March; and for rearing,
24 during the months of January through December;
25 B. for brown trout: for spawning, during the
26 month of November; for incubation, during the
27 months of November through April; and for rearing,

1 during the months of January through December;

2 C. for rainbow trout: for spawning, during the
3 months of May through mid-June; for incubation,
4 during the months of May through July; and for
5 rearing, during the months of January through
6 December. (Exh.DFG-1781-r-1,P.126)

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

9 Jan.	4	May	7	Sept.	4
10 Feb.	4	June	12	Oct.	4
11 March	4	July	4	Nov.	4
12 April	4	Aug.	4	Dec.	4

13 These flows equal 3,740 acre feet per year and should be
14 reserved. (Exh.DFG-1781-r-1,P.125)

1 WEST FISHTAIL CREEK

2 (East Fishtail Creek to Richmond-Kennedy Ditch)

3 Resident game fish species present: brook, brown
4 and rainbow trout. (Exh.DFG-1781-r-1,P.127)

5 Resident wildlife species present: beaver, muskrat,
6 mink and raccoon. (Exh.DFG-1781-r-1,P.127)

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

12 Evaluations of the flow requirements for this stream
13 reach are based upon low flow stream gauging by Fish and Game,
14 low flow photography, correlation of low flow with a nearby
15 USGS gauge, and fish population and life history data ob-
16 tained by electrofishing. (Exh.DFG-1781-r-1,P.127; Exh.
17 DFG-1781-r-9; Tr.16,P.53-80)

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

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

26 B. for brown trout: for spawning, during the
27 month of November; for incubation, during the

1 months of November through mid-April; and for
2 rearing, during the months of January through
3 December;

4 C. for rainbow trout: for spawning, during the
5 months of May through mid-June; for incubation,
6 during the months of May through July; and for
7 rearing, during the months of January through
8 December. (Exh.DFG-1781-r-1,P.128)

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

11	Jan.	4	May	10	Sept.	4
12	Feb.	4	June	20	Oct.	4
13	March	4	July	10	Nov.	4
14	April	4	Aug.	4	Dec.	4

15 These flows equal 4,586 acre feet per year and should be
16 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;

1 and for rearing, during the months of January
2 through December. (Exh. DFG-1781-r-1, P. 130)

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

5	Jan.	4	May	6	Sept.	4
6	Feb.	4	June	8	Oct.	4
7	Mar.	4	July	6	Nov.	4
8	Apr.	4	Aug.	4	Dec.	4

9 These flows equal 3,380 acre feet per year and should be
10 reserved. (Exh. DFG-1781-r-1, P. 129)

1 LOWER DEER CREEK

2 (Headwaters to Interstate Highway 90)

3 Resident game fish species present: brown, rainbow,
4 brook and cutthroat trout. (Exh. DFG-1781-r-1, P. 131)

5 Resident wildlife species present: beaver, muskrat,
6 mink, and reccoon. (Exh. DFG-1781-r-1, P. 131)

7 A flow of at least 10 cfs is necessary to maintain
8 adequate nursery areas, fish cover, depths and velocities;
9 however, existing irrigation rights and demands do not
10 allow the occurrence of this flow during the summer months.
11 (Exh. DFG-1781-r-1, P. 131)

12 The headwaters portion of this stream reach contains
13 small numbers of indigenous cutthroat trout. (Exh. DFG-
14 1781-r-1, P. 131)

15 Evaluations of the flow requirements for this stream
16 reach are based upon water surface profile, water discharge
17 measurements and photographs, professional judgment and
18 fish data collections. (Exh. DFG-1781-r-1, P. 131)

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

22 A. for cutthroat trout: for spawning, during the
23 months of June and July; for incubation, during the
24 months of June through September 7; and for rearing,
25 during the months of January through December;

26 B. for rainbow trout: for spawning, during the
27 months of June and July; for incubation, during
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1 the months of June through September 7; and for
2 rearing, during the months of January through
3 December;

4 C. for brown trout: for spawning, during the
5 months of October and November; for incubation,
6 during the months of October through mid-May; and
7 for rearing, during the months of January through
8 December;

9 D. for brook trout: for spawning, during the
10 months of October and November; for incubation,
11 during the months of October through mid-May; and
12 for rearing, during the months of January through
13 December. (Exh. DFG-1781-r-1, P. 132)

14 The upper portion of this stream reach has a
15 significant aesthetic value as well as being an excellent
16 fishing stream. (Exh. DFG-1781-r-1, P. 131)

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

19	Jan.	5	May 1-20	5	Sept.	5
20	Feb.	5	21-31	25	Oct.	5
21	Mar.	5	June	25	Nov.	5
22	Apr.	5	July	8	Dec.	5
23			Aug.	8		

24 These flows equal 5,615 acre feet per year and should
25 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

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

3 (Exh. DFG-1781-r-1, P. 134)

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

6	Jan.	5	May	7	Sept.	6
7	Feb.	5	June	25	Oct.	6
8	Mar.	5	July	10	Nov.	5
9	Apr.	5	Aug.	8	Dec.	5

10 These flows equal 5,546 acre feet per year and should be
11 reserved. (Exh. DFG-1781-r-1, P. 133)

1 MID RED LODGE CREEK

2 (Custer National Forest boundary to the conference
3 with east and west Red Lodge Creeks)

4 Resident game fish species present: brown, rainbow,
5 brook and cutthroat trout and mountain whitefish. (Exh.
6 DFG-1781-r-1, P. 135)

7 Resident wildlife species present: beaver, muskrat,
8 mink and raccoon. (Exh. DFG-1781-r-1, P. 135)

9 This stream reach provides a varied and excellent
10 fishing and recreational area. (Exh. DFG-1781-r-1, P. 135)

11 Evaluations of the flow requirements for this stream
12 reach are based on water discharge measurements, judgment
13 of qualified professional personnel, fisheries data
14 collections and measurements of channel physical para-
15 meters.

16 (Exh. DFG-1781-r-1, P. 1-48)

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

20 A. for brown trout: for spawning, during the
21 months of October and November; for incubation,
22 during the months of October through April; and
23 for rearing, during the months of January through
24 December;

25 B. for brook trout: for spawning, during the
26 months of October and November; for incubation,
27 during the months of October through April; and

1 for rearing, during the months of January through
2 December;

3 C. for rainbow trout: for spawning, during the
4 month of June; for incubation, during the months
5 of June through September 7; and for rearing,
6 during the months of January through December;

7 D. for cutthroat trout: for spawning, during the
8 month of June; for incubation, during the months of
9 June through September 7; and for rearing, during
10 the months of January through December;

11 E. for whitefish: for spawning, during the months
12 of September through November; for incubation, during
13 the months of September through May; and for rearing,
14 during the months of January through December. (Exh.
15 DFG-1781-r-1, P. 136)

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

18	Jan.	10	May	1-20	10	Aug.	20
19	Feb.	10		21-31	25	Sept.	15
20	Mar.	10	June		25	Oct.	10
21	Apr.	10	July	1-20	25	Dec.	10
				21-31	20		

22 These flows equal 9,803 acre feet per year and should be
23 reserved. (Exh. DFG-1781-r-1, P. 135)

1 LOWER RED LODGE CREEK

2 (Confluence of east and west Red Lodge Creeks
3 to Cooney Reservoir)

4 Resident game fish species present: brown, rainbow
5 brook and cutthroat trout and mountain whitefish. (Exh.
6 DFG-1781-r-1, P. 137)

7 Resident wildlife species present: beaver, muskrat,
8 mink and raccoon. (Exh. DFG-1781-r-1, P. 137)

9 Seasonal irrigation withdrawals prevent this stream
10 reach from reaching its potential as a fishery. (Exh.
11 DFG-1781-r-1, P. 137)

12 The flows requested by Fish and Game are less than
13 optimum, but are adequate to maintain the fishery at pre-
14 sent fishing levels. (Exh. DFG-1781-r-1, P. 137)

15 Evaluations of the flow requirements for this stream
16 reach are based upon water discharge measurements and photo-
17 graphs, professional judgment, fisheries data collections,
18 and water surface profiles. (Exh. DFG-1781-r-1, P.137; Exh.
19 DFG-1781-r-7; Tr. Vol. 17, Test. Marcuson P. 1-48)

20 This stream reach is a popular fishing spot. (Exh.
21 DFG-1781-r-1, P. 137)

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

25 A. for brown trout: for spawning, during the months
26 of October and November; for incubation, during the
27 months of October through April; and for rearing,

1 during the months of January through December;

2 B. for brook trout: for spawning, during the
3 months of October and November; for incubation,
4 during the months of October through April; and
5 for rearing, during the months of January through
6 December;

7 C. for rainbow trout: for spawning, during the
8 months of May and June; for incubation, during the
9 months of May through late August; and for rearing,
10 during the months of January through December;

11 D. for whitefish: for spawning, during the months
12 of October and November; for incubation, during the
13 months of October through April; and for rearing,
14 during the months of January through December;

15 E. for cutthroat trout: for rearing, during the
16 months of January through December. (Exh. DFG-1781-r-
17 1, P. 138)

18 This stream reach is subject to extreme dewatering
19 during the irrigation period each year. (Exh. DFG-1781-r-1,
20 P. 137)

21 In this stream reach fly fishermen prefer a streamflow
22 of 50 to 70 cfs. (Exh. DFG-1781-r-1, P. 137)

23 This stream reach has a significant aesthetic value
24 and the streamflow which protects that value is 75 cfs
25 or more. (Exh. DFG-1781-r-1, P. 137)

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

1	Jan.	12	May	1-20	40	Aug.	25
2	Feb.	22		21-31	60	Sept.	36
3	Mar.	28	June		100	Oct.	32
4	Apr.	40	July		62	Nov.	24
5						Dec.	16

6 These flows equal 26,779 acre feet per year and should be
7 reserved. (Exh. DFG-1781-r-1, P. 137; Tr. Vol 17, P. pre-
8 ceding P. 2)

1 ROCK CREEK

2 (Custer National Forest boundary to West Fork
3 Rock Creek)

4 Resident game fish species present: cutthroat,
5 rainbow, brook and brown trout. (Exh. DFG-1781-r-1, P. 139)

6 Resident wildlife species present: beaver, muskrat
7 and mink. (Exh. DFG-1781-r-1, P. 139)

8 Evaluation of the flow requirements for this stream
9 reach are based upon water discharge measurements and
10 photographs, judgment of qualified professional personnel
11 fisheries data collections, Rock Creek Flood Plain Study,
12 drainage inventory of streams and lakes. (Exh. DFG-1781-r-1,
13 P. 139; Exh. DFG-1781-r-7; Tr. Vo. 17, Test. Marcuson, P.1-48)

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

17 A. for cutthroat trout: for spawning, during the
18 months of June and July; for incubation, during the
19 months of June through September 7; and for rearing,
20 during the months of January through December;

21 B. for rainbow trout: for spawning, during the
22 months of June and July; for incubation, during the
23 months of June through September 7; and for rearing,
24 during the months of January through December;

25 C. for brown trout: for spawning, during the
26 months of October and November; for incubation,
27 during the months of October through mid-May; and

1 for rearing, during the months of January through
2 December;

3 D. for brook trout: for spawning, during the
4 months of October and November; for incubation,
5 during the months of October through mid-May; and
6 for rearing, during the months of January through
7 December. (Exh. DFG-1781-r-1, P. 140)

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

10	Jan.	15	May	45	Sept.	70
11	Feb.	15	June	220	Oct.	44
12	Mar.	15	July	220	Nov.	25
13	Apr.	15	Aug.	135	Dec.	20

14 These flows equal 26,888 acre feet per year and should be
15 reserved. (Exh. DFG-1781-r-1, P. 139)

1 MID ROCK CREEK

2 (West Fork Rock Creek to Bailey Ditch)

3 Resident game fish species present: cutthroat,
4 rainbow, brook and brown trout. (Exh.DFG-1781-r-1,P.141)

5 Resident wildlife species present: beaver, muskrat,
6 and raccoon. (Exh.DFG-1781-r-1,P.141)

7 Evaluations of the flow requirements for this stream
8 reach are based upon water discharge measurements and
9 photographs, judgment of qualified professional personnel,
10 fisheries data collections, Rock Creek Flood Plain Study,
11 drainage inventory of streams and lakes. (Exh.DFG-1781-r-1,
12 P.141; Exh.DFG-1781-r-7; Tr. Vol. 17, Test. Marcuson, P. 1-48)

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

16 A. for cutthroat trout: for spawning, during the
17 months of June and July; for incubation, during
18 the months of June through September 7; and for
19 rearing, during the months of January through
20 December;

21 B. for rainbow trout: for spawning, during the
22 months of June and July; for incubation, during
23 the months of June through September 7; and for
24 rearing, during the months of January through
25 December;

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

1 during the months of October through mid-May;
2 and for rearing, during the months of January
3 through December;

4 D. for brook trout: for spawning, during the
5 months of October and November; for incubation,
6 during the months of October through mid-May;
7 and for rearing, during the months of January
8 through December. (Exh.DFG-1781-r-1,P.142)

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

11	Jan.	25	May	60	Sept.	80
12	Feb.	25	June	295	Oct.	55
13	March	20	July	295	Nov.	35
14	April	20	Aug.	170	Dec.	25

15 These flows equal 66,941 acre feet per year and should be
16 reserved. (Exh.DFG-1781-r-1,P.141)

1 LOWER ROCK CREEK

2 (Bailey Ditch to Mouth)

3 Resident game fish species present: rainbow, brown
4 and brook trout and mountain whitefish. (Exh.DFG-1781-r-1,
5 P.143)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon. (Exh.DFG-1781-r-1,P.143)

8 Stream reach has excellent brown trout populations
9 where the stream channel is unaltered, however, few of
10 these unaltered areas now exist. (Exh.DFG-1781-r-1,P.143)

11 Spring spawning fish species do not exist in this
12 reach because there is a lack of water to incubate eggs
13 laid in redds, however, fall spawning brown and brook
14 trout are self-sustaining because they are able to use
15 post-irrigation season flows. (Exh.DFG-1781-r-1,P.143)

16 Evaluations of the flow requirements for this
17 stream reach are based upon water surface profiles, water
18 discharge measurements and photographs, judgment of qual-
19 ified professional personnel, fisheries data collections,
20 Rock Creek Flood Plain Study. (Exh.DFG-1781-r-1, P.143;
21 Exh.DFG-1781-r-7; Tr.Vol.17,P.1-48)

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

25 A. for rainbow trout: for spawning, during the
26 months of June and July; for incubation, during
27 the months of June through September 7; and for

1 rearing, during the months of January through
2 December;

3 b. for brown trout; for spawning, during the
4 months of October and November; for incubation,
5 during the months of October through mid-May;
6 and for rearing, during the months of January
7 through December;

8 C. for brook trout: for spawning, during the
9 months of October and November; for incubation,
10 during the months of October through mid-May;
11 and for rearing, during the months of January
12 through December;

13 D. for whitefish: for spawning, during the
14 months of September through November; for in-
15 cubation during the months of September through
16 April 7; and for rearing, during the months of
17 January through December. (Exh.DFG-1781-r-1,P.144)

18 This stream reach is subject to extreme dewatering
19 during the irrigation period each year. (Exh.DFG-1781-r-
20 1,P.143)

21 In this stream reach interviews indicate that fly
22 fishermen prefer a streamflow of 75-100 cfs, while lure
23 and bait fishermen prefer 100-200 cfs. (Exh.DFG-1781-4-1,
24 P.143)

25 This stream reach has a significant aesthetic value
26 and the streamflow which protects that value is 150-200
27 cfs. (Exh.DFG-1781-r-1,P.143)

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

3 Jan.	30	May	65	Sept.	50
4 Feb.	30	June	375	Oct.	40
5 March	30	July	310	Nov.	35
6 April	25	Aug.	95	Dec.	35

7 These flows equal 67,677 acre feet per year and should be
8 reserved. (Exh.DFG-1781-r-1,P.143)

1 LOWER EAST ROSEBUD CREEK

2 (Custer National Forest boundary to West Rosebud
3 Creek)

4 Resident game fish species present: cutthroat, brown,
5 rainbow and brook trout and mountain whitefish. (Exh. DFG-
6 1781-r-1, P. 145)

7 Resident wildlife species present: beaver, muskrat,
8 mink and raccoon. (Exh. DFG-1781-r-1, P. 145)

9 Evaluations of the flow requirements for this stream
10 reach are based upon water surface profile, water discharge
11 measurements and photographs, fish data collections, drain-
12 age stream and lake surveys. (Exh. DFG-1781-r-1, P. 145;
13 Exh. DFG-1781-r-7; Tr. Vol. 17, P.1-48)

14 There is significant recreational use of this reach
15 of the stream by fishermen, boater, hikers, and other
16 recreationists. (Exh. DFG-1781-r-1, P. 145)

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

20 A. for cutthroat trout: for spawning, during the
21 months of June and July; for incubation, during the
22 months of June through September 7; and for rearing,
23 during the months of January through December;

24 F. for rainbow trout: for spawning, during the
25 months of June and July; for incubation, during the
26 months of June through September 7; and for rearing,
27 during the months of January through December;

1 C. for brown trout: for spawning, during the
2 months of October to November; for incubation,
3 during the months of October through mid-May; and
4 for rearing, during the months of January through
5 December;

6 D. for brook trout: for spawning, during the months
7 of October and November; for incubation, during the
8 months of October through mid-May; and for rearing,
9 during the months of January through December. (Exh.
10 DFG-1781-r-1, P. 146)

11 In this stream reach it is indicated that, fishermen
12 prefer a streamflow of 100 to 125 cfs. (Exh. DFG-1781-r-1,
13 P. 145)

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

16	Jan.	60	May	50	Sept.	80
17	Feb.	60	June	200	Oct.	60
18	Mar.	60	July	200	Nov.	60
19	Apr.	60	Aug.	150	Dec.	60

20 These flows equal 55,809 acre feet per year and should be
21 reserved. (Exh. DFG-1781-r-1, P. 145)

1 WEST ROSEBUD CREEK

2 (Custer National Forest boundary to Fiddler Creek)

3 Resident game fish species present: cutthroat, rainbow,
4 brown and brook trout and mountain whitefish. (Exh. DFG-
5 1781-r-1, P. 147)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon. (Exh. DFG-1781-r-1, P. 147)

8 Streamflow in this reach is partially controlled by
9 Montana Power Company at its Mystic Lake power plant.
10 (Exh. DFG-1781-r-1, P. 147)

11 Evaluations of the flow requirements for this stream
12 reach are based upon water discharge measurements (USGS flow
13 records), judgment of qualified personnel, fisheries data
14 collections, drainage inventory of streams and lakes.
15 (Exh. DFG-1781-r-1, P. 147; Tr. Vol. 17, Test. Marcuson,
16 P. 1-48)

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

20 A. for cutthroat trout: for spawning, during the
21 months of June and July; for incubation, during th
22 months of June through September 7; and for rearing,
23 during the months of January through December;

24 B. for rainbow trout: for spawning, during the
25 months of June and July; for incubation, during the
26 months of June through September 7; and for rearing,
27 during the months of January through December.

1 C. for brown trout: for spawning, during the
2 months of October and November; for incubation,
3 during the months of October through mid-May; and
4 for rearing, during the months of January through
5 December;

6 D. for brook trout: for spawning, during the
7 months of October and November; for incubation, dur-
8 ing the months of October through mid-May; and
9 for rearing, during the months of January through
10 December;

11 E. for whitefish: for spawning, during the
12 months of September through November; for incubation,
13 during the months of September through April 7;
14 and for rearing, during the months of January
15 through December. (Exh. DFG-1781-r-1, P. 147)

16 In this stream reach it is indicated, fishermen prefer
17 a streamflow of 50-75 cfs in the upper portion of this reach
18 and 75 to 200 cfs in the lower portion. (Exh. DFG-1781-r-1,
19 P. 147)

20 This stream reach has a significant aesthetic value
21 and the streamflow which protects that value is 200 cfs.
22 (Exh. DFG-1781-r-1, P. 147)

23 The instream flow required for the stream reach, in
24 cfs, by month of the year is as follows:
25
26
27
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1	Jan.	50	May	1-20	40	Aug.	150
2	Feb.	50		21-31	100	Sept.	90
3	Mar.	50	June		150	Oct.	50
4	Apr.	40	July		200	Nov.	50
5						Dec.	50

6 These flows equal 58,214 acre feet per year and should be
7 reserved. (Exh. DFG-1781-r-1, P. 147)

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1 LOWER WEST ROSEBUD CREEK

2 (Rosebud Creek from Fiddler Creek to Mouth)

3 Resident game fish present: cutthroat, rainbow,
4 brown and brook trout and mountain whitefish. (Exh.DFG-
5 1781-r-1,P.149)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon. (Exh.DFG-1781-r-1,P.149)

8 Evaluations of the flow requirements for this stream
9 reach are based upon water surface profile, water discharge
10 measurements and photographs, judgment of qualified pro-
11 fessional personnel and fisheries data collections. (Exh.
12 DFG-1781-r-1,P.149; Exh.DFG-1781-r-7; Tr. Vol. 17, Marcuson
13 P. 1-48)

14 There is considerable recreational use of this reach
15 of the stream by fishermen and other persons seeking water-
16 based recreation. (Exh.DFG-1781-r-1,P.149)

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

20 A. for cutthroat trout: for spawning, during the
21 months of June and July; for incubation, during the
22 months of June through September 7; and for rearing,
23 during the months of January through December;

24 B. for rainbow trout: for spawning, during the
25 months of June and July; for incubation, during the
26 months of June through September 7; and for rearing
27 during the months of January through December.

1 C. for brown trout: for spawning, during the
2 months of October and November; for incubation,
3 during the months of October through mid-May; and
4 for rearing, during the months of January through
5 December;

6 D. for brook trout: for spawning, during the
7 months of October and November; for incubation,
8 during the months of October through mid-May; and
9 for rearing, during the months of January through
10 December;

11 E. for whitefish: for spawning, during the
12 month of September through November; for incubation,
13 during the months of September through April 7;
14 and for rearing, during the months of January
15 through December. (Exh. DFG-1781-r-1, P. 148)

16 This stream reach has good quality water and this
17 water is necessary to maintain good quality water in those
18 stream reaches below it in the Yellowstone Basin. (Exh.
19 DFG-1781-r-1, P. 149)

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

1	Jan.	65	May	1-20	50	Sept.	120
2	Feb.	65		21-31	130	Oct.	65
3	Mar.	65	June		195	Nov.	65
4	Apr.	50	July		260	Dec.	65
5			Aug.		145		

6 These flows equal 61,537 acre feet per year and should
 7 be reserved. (Exh. DFG-1781-r-1, P. 149)

1 SAGE CREEK

2 (Headwaters to Crow Indian Reservation)

3 Resident game fish species present: brook and rain-
4 bow trout. (Exh. DFG-1781-r-1, P. 151)

5 Resident wildlife species present: beaver, mink
6 and muskrat. (Exh. DFG-1781-r-1, P. 151)

7 Evaluations of the flow requirements for this stream
8 reach are based upon water surface profile, fish data
9 collections, and judgment of qualified professional personnel.
10 (Exh. DFG-1781-r-1, P. 151; Exh. DFG-1781-r-7; Tr. Vol. 17,
11 Marcuson, P. 1-48)

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

15 A. for rainbow trout: for spawning, during the
16 months of June and July; for incubation; during
17 the months of June through September 7; and for
18 rearing, during the months of January through Dec-
19 ember;

20 B. for brook trout: for spawning, during the
21 months of October and November; for incubation,
22 during the months of October through mid-May; and
23 for rearing, during the months of January through
24 December. (Exh. DFG-1781-r-1, P. 152)

25 Fishermen interviews indicate preference for stream-
26 flow of 15 to 20 cfs. (Exh. DFG-1781-r-1, P. 151)

27 This stream reach has a significant aesthetic value

1 and the streamflow which protects that value is 15 to 20
2 cfs. (Exh. DFG-1781-r-1, P. 151)

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

5	Jan.	15	May	15	Sept.	15
6	Feb.	15	June	15	Oct.	15
7	Mar.	15	July	15	Nov.	15
8	Apr.	15	Aug.	15	Dec.	15

9 These flows equal 10,866 acre feet per year and should
10 be reserved. (Exh. DFG-1781-r-1, P. 151)

1 STILLWATER RIVER

2 (Mouth to Rosebud River)

3 Resident game fish species present: brown and rainbow
4 trout and mountain whitefish. (Exh.DFG-1781-r-1,P.153)

5 Wildlife species present:

6 A. resident - beaver, muskrat, mink and raccoon;

7 B. migratory transient - bald eagles;

8 (Exh.DFG-1781-r-1,P153)

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

14 Evaluations of the flow requirements for this stream
15 reach are based upon USGS gauging data, low flow photography,
16 extrapolation of fish population and life history data from
17 an adjacent reach of the Stillwater River. (Exh.DFG-1781-r-
18 1, P.153; Exh.DFG-1781-r-9; Tr. Vol. 16, Test. Stewart
19 P. 53-80)

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

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

27 B. for rainbow trout: for spawning, during the

1 months of April through mid-May; for incubation,
2 during the months of April through June; and for
3 rearing, during the months of January through
4 December. (Exh.DFG-1781-r-1,P.154)

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

7 Jan.	225	May	560	Sept.	630
8 Feb.	225	June	2075	Oct.	440
9 March	225	July	1480	Nov.	225
10 April	225	Aug.	740	Dec.	225

11 These flows equal 438,827 acre feet per year and should
12 be reserved. (Exh.DFG-1781-r-1,P.153)

1 STILLWATER RIVER

2 (Rosebud River to West Fork Stillwater River)

3 Resident game fish species present: brown and rain-
4 bow trout and mountain whitefish. (Exh. DFG-1781-r-1, P.
5 155)

6 Wildlife species present:

7 A. resident - beaver, muskrat, mink and raccoon;

8 B. migratory transient - bald eagle;

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

14 Evaluations of the flow requirements for this stream
15 reach are based upon USGS gauging data, low flow photo-
16 graphy, fish population and life history data obtained
17 by electrofishing. (Exh. DFG-1781-r-1, P. 155; Exh. DFG-
18 1781-r-9; Tr. Vol. 16, P. 53-80)

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

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

26 B. for rainbow trout: for spawning, during the
27 months of April through mid-May; for incubation,

1 during the months of April through June; and for
2 rearing, during the months of January through
3 December. (Exh. DFG-1781-r-1, P. 154)

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

6	Jan.	75	May	190	Sept.	275
7	Feb.	75	June	1200	Oct.	180
8	Mar.	75	July	760	Nov.	75
9	Apr.	75	Aug.	350	Dec.	75

10 These flows equal 205,699 acre feet per year and should
11 be reserved. (Exh. DFG-1781-r-1, P. 155)

1 STILLWATER RIVER

2 (West Fork Stillwater River to the north end of
3 Sioux Charlie Lake)

4 Resident game fish species present: brook, brown
5 and rainbow trout and mountain whitefish. (Exh. DFG-1781-r-
6 1, P. 157)

7 Wildlife species present:

8 A. resident - beaver, muskrat, mink, raccoon and
9 otter;

10 B. migratory transient - bald eagle;
11 (Exh. DFG-1781-r-1, P. 157)

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

17 Evaluations of the flow requirements for this stream
18 reach are based upon USGS gauging data; low flow photo-
19 graphy and fish population and life history data obtained
20 by electrofishing. (Exh. DFG-1781-r-1, P. 157; Exh. DFG-
21 1781-r-9; Tr. Vol. 16, P. 53-80)

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

25 A. for brook trout: for spawning during the month
26 of October; for incubation during the months of
27 October through mid-March; and for rearing during

1 the months of January through December.

2 B. for brown trout: for spawning during the
3 month of November; for incubation during the months
4 of November through April; and for rearing during
5 the months of January through December.

6 C. for rainbow trout: for spawning during the months
7 of May through mid-June; for incubation during the
8 months of May through July; and for rearing during
9 the months of January through December. (Exh. DFG-
10 1781-r-1, P. 158)

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

13 Jan.	45	May	150	Sept.	120
14 Feb.	45	June	710	Oct.	100
15 Mar.	45	July	480	Nov.	45
16 Apr.	45	Aug.	175	Dec.	45

17 These flows equal 121,252 acre feet per year and should
18 be reserved. (Exh. DFG-1781-r-1, P. 157)

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2 MID-SWEET GRASS CREEK

3 (Forest Service boundary to Lake Adam diversion)

4 Resident game fish species present: rainbow, brook
5 and brown trout and mountain whitefish. (Exh.DFG-1781-r-1,
6 P.159)

7 Resident wildlife species present: beaver, muskrat,
8 mink and raccoon. (Exh.DFG-1781-r-1, P.159)

9 This reach of Sweet Grass Creek is most productive
10 for fish and fishing recreation. (Exh.DFG-1781-r-1,P.159)

11 Flows in this reach are already heavily appropriated
12 for irrigation. (Exh.DFG-1781-r-1,P.159)

13 Considerable fish habitat degradation occurs in
14 this reach when flows are reduced from 75 to 21 cfs.
15 (Exh.DFG-1781-r-1,P.159)

16 The requested flows are considerably less than
17 flows which would optimize the fishery in the summer
18 months, but flows which would be optimum are not available
19 due to current irrigation demands. (Exh,DFG-1781-r-1,P.159)

20 Evaluations of the flow requirements for this stream
21 reach are based upon water discharge measurements, photo-
22 graphs and USGS records, professional judgment and fisheries
23 data collections and creel census. (Exh.DFG-1781-r-1,P.159;
24 Exh.DFG-1781-r-7; Tr.Vol.Test.Marcuson,P.1-48)

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

1 A. for rainbow trout: for spawning during the
2 months of June and July; for incubation during the
3 months of June through September; and for rearing
4 during the months of January through December.

5 B. for brook trout: for spawning during the months
6 of October and November; for incubation during the
7 months of October through April; and for rearing
8 during the months of January through December.

9 C. for brown trout: for spawning during the months
10 of October and November; for incubation during the
11 months of October through April; and for rearing
12 during the months of January through December.

13 D. for whitefish: for spawning during the months
14 of September through November; for incubation during
15 the months of September through May; and for
16 rearing during the months of January through
17 December. (Exh.DFG-1781-r-1,P.160)

18 In this stream reach 75 cfs is necessary to maintain
19 the fishery and aquatic ecosystem at its optimum level.
20 (Exh.DFG-1781-r-1,P.159)

21 A flow of 15 cfs is the minumum which will maintain
22 the fishery during winter months. (Exh.DFG-1781-r-1,P.159)

23 The instream flow required for the stream reach,
24 in cfs, by month of the year is as follows:
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1	Jan.	15	May 1-20	25	Sept.	25
2	Feb.	15	21-31	100	Oct.	25
3	March	15	June	200	Nov.	25
4	April	15	July	100	Dec.	25
5			Aug.	45		

6 These flows equal 27,218 acre feet per year and should be
7 reserved. (Exh.DFG-1781-r-1,P.159)

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1 LOWER SWEET GRASS CREEK

2 (Lake Adam diversion to Mouth)

3 Resident game fish species present: brown trout and
4 mountain whitefish. (Exh.DFG-1781-r-1,P.161)

5 Resident wildlife species present: beaver, muskrat,
6 mink and raccoon. (Exh.DFG-1781-r-1,P.161)

7 This stream reach has a large channel with extreme
8 flow fluctuations due to irrigation withdrawals. Irriga-
9 tion return flows are of poor quality and the fishery has
10 only those flows left over from irrigation demands to
11 maintain itself during this time of year. (Exh.DFG-1781-r-
12 1,P.161)

13 Evaluations of the flow requirements for this stream
14 reach are based upon Water Surface Profile, water discharge
15 measurements and photographs and judgment of qualified pro-
16 fessional personnel. (Tr.17,P.1-49; Exh.DFG-1781-r-1,P.161;
17 Exh.DFG-1781-r-7)

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

21 A. for brown trout: for spawning during the
22 months of October and November; for incubation
23 during the months of October through April; and
24 for rearing during the months of January through
25 December.

26 B. for whitefish: for spawning during the months
27 of September through November; for incubation

1 during the months of September through May; and
2 for rearing during the months of January through
3 December. (Exh.DFG-1781-r-1,P.162)

4 In this stream reach fishermen interviews indicate
5 a preference for a streamflow of 100-150 cfs during the
6 summer fishing season and good aesthetic values require at
7 least 100 cfs. Neither of these conditions exist during the
8 irrigation season. (Exh.DFG-1781-r-1,P.161; Tr.Vol.17,
9 Test. Marcuson,P. 1-76)

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

12	Jan.	20	May 1-20	40	Sept.	40
13	Feb.	20	21-31	100	Oct.	40
14	March	20	June	200	Nov.	20
15	Apr.	20	July 1-20	100	Dec.	20
16			21-31	60		
17			Aug.	60		

18 These flows equal 36,644 acre feet per year and should be
19 reserved. (Exh.DFG-1781-r-1,P.161)

1 UPPER DEER CREEK

2 (Headwaters to a point upstream from I-90 bridge

3 where low flows disappear into streambed)

4 Resident game fish species present: cutthroat, brown
5 and brook trout. (Exh.DFG-1781-r-1,P.163)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon. (Exh.DFG-1781-r-1,P.163)

8 Flows in this reach of stream fluctuate widely
9 during the year. Low flows are caused by both natural
10 and man-made conditions. The lower 1½ miles of this stream
11 are dewatered completely by irrigation withdrawals, and,
12 also during the low flow period, water is lost into the
13 streambed due to natural conditions. (Exh.DFG-1781-r-1,
14 P.163)

15 Evaluations of the flow requirements for this stream
16 reach are based upon Water Surface Profile, water discharge
17 measurements and photographs, judgment of qualified pro-
18 fessional personnel and fish data collections. (Tr.Vol.17-
19 Test.Marcuson. p.1-49; Exh.DFG-1781-r-1,P.163; Exh.DFG-1781-
20 r-7)

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

24 A. for cutthroat trout: for spawning during the
25 months of June and July; for incubation during the
26 months of June through mid-September; for rearing
27 during the months of January through December.

1 B. for brown trout: for spawning during the months
2 of October and November; for incubation during the
3 months of October through May 7; and for rearing
4 during the months of January through December.

5 C. for brook trout: for spawning during the months
6 of October and November; for incubation during the
7 months of October through May 7; and for rearing
8 during the months of January through December.

9 (Exh.DFG-1781-r-1,P.164)

10 In this stream reach fishermen prefer a summer
11 streamflow of 10-20 cfs. (Exh.DFG-1781-r-1,P.163)

12 This stream reach has aesthetic values which are
13 best maintained at a flow of 15 cfs in the summer. (Exh.
14 DFG-1781-r-1,P. 163)

15 The upper reaches of this stream provide excellent
16 small stream fishing.

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

19 Jan.	5	May 1-20	5	Sept.	5
20 Feb.	5	21-31	25	Oct.	5
21 March	5	June	25	Nov.	5
22 Apr.	5	July	8	Dec.	5
23		Aug.	8		

24 These flows equal 5,614 acre feet per year and should be
25 reserved. (Exh.DFG-1781-r-1,P.163)

1 LOWER WEST BOULDER RIVER

2 (Gallatin National Forest Boundary to Mouth)

3 Resident game fish species present: cutthroat,
4 rainbow, brown and brook trout and mountain whitefish.
5 (Exh.DFG-1781-r-1,P.165)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon.
8 (Exh.DFG-1781-r-1,P.165)

9 Evaluations of the flow requirements for this stream
10 reach are based upon Water Surface Profile, fish data
11 collections, and judgment of qualified professional
12 personnel. (Exh.DFG-1781-r-1,P.165; Exh.DFG-1781-r-7;
13 Tr. Vol. 17, Test. Marcuson, P.1-48)

14 There is recreational use of this reach of the
15 stream by fishermen. (Exh.DFG-1781-r-1,P.165)

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

19 A. for cutthroat trout: for spawning during the
20 months of June and July; for incubation during the
21 months of June through September 7; and for rearing
22 during the months of January through December.

23 B. for rainbow trout: for spawning during the
24 months of June and July; for incubation during the
25 months of June through September 7; and for rearing
26 during the months of January through December.

27 C. for brown trout: for spawning during the months

1 of October and November; for incubation during the
2 months of October through mid-May; and for rearing
3 during the months of January through December.

4 D. for brook trout: for spawning during the months
5 of October and November; for incubation during the
6 months of October through mid-May; and for rearing
7 during the months of January through December.

8 E. for whitefish: for spawning during the months of
9 September and October; for incubation during the
10 months of September through April 7; and for
11 rearing during the months of January through
12 December. (Exh.DFG-1781-r-1,P.166)

13 In this stream reach fishermen prefer a streamflow
14 of 125-200 cfs. (Exh.DFG-1781-r-1,P.165)

15 This stream reach has a significant aesthetic value
16 and the streamflow which protects that value is 250 cfs
17 or more. (Exh.DFG-1781-r-1,P.165)

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

20	Jan.	50	May 1-20	50	Sept.	75
21	Feb.	50	21-31	300	Oct.	75
22	March	50	June	300	Nov.	60
23	April	50	July 1-20	300	Dec.	50
24			21-31	200		
25			Aug.	75		

26 These flows equal 74,096 acre feet per year and should be
27 reserved. (Exh.DFG-1781-r-1,P.165)

1 WEST FORK STILLWATER RIVER

2 (Mouth to Castle Creek)

3 Resident game fish species present: brown and
4 rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1,
5 P. 167)

6 Wildlife species present:

7 A. resident - beaver, muskrat, mink and raccoon;

8 B. migratory transient - bald eagle;

9 (Exh. DFG-1781-r-1, P. 167)

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

15 For this stream reach 50 cfs in November is a minimum
16 requirement for brown trout spawning. (Exh. DFG-1781-r-1,
17 P. 167)

18 Evaluations of the flow requirements for this stream
19 reach are based upon USGS and Fish and Game gauging data,
20 Water Surface Profile Program, low flow photography, fish
21 populations and life history data obtained by electrofishing.
22 (Exh. DFG-1781-r-1, P. 167; Exh. DFG-1781-r-9; Tr. Vol. 16,
23 P. 53-80)

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

27 A. for brown trout: for spawning during the month

1 of November; for incubation during the months of
2 November through March; and for rearing during the
3 months of January through December.

4 B. for rainbow trout: for spawning during the
5 months of mid-April through May; for incubation
6 during the months of mid-April through mid-July;
7 and for rearing during the months of January through
8 December. (Exh. DFG-1781-r-1, P. 168)

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

11 Jan.	35	May	70	Sept.	60
12 Feb.	35	June	350	Oct.	50
13 Mar.	35	July	125	Nov.	50
14 Apr.	35	Aug.	75	Dec.	35

15 These flows equal 57,530 acre feet per year and should be
16 reserved. (Exh. DFG-1781-r-1, P. 167)

1 WEST FORK STILLWATER RIVER

2 (Castle Creek to Stillwater-Sweetgrass County
3 line)

4 Resident game fish species present: brown and
5 rainbow trout and mountain whitefish. (Exh. DFG-1781-r-1,
6 P. 169)

7 Wildlife species present:

8 A. resident - beaver, muskrat, mink and raccoon;

9 B. migratory transient - bald eagle;

10 (Exh. DFG-1781-r-1, P. 169)

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

16 Evaluations of the flow requirements for this stream
17 reach are based upon Fish and Game gauging data, Water
18 Surface Profile Program, low flow photography, fish pop-
19 ulation and life history data obtained by electrofishing.
20 (Exh. DFG-1781-r-1, P. 169; Exh. DFG-1781-r-9; Tr. Vol.
21 16, P. 53-80)

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

25 A. for brown trout: for spawning during the
26 month of November; for incubation during the months
27 of November through April; and for rearing during

1 the months of January through December.

2 B. for rainbow trout: for spawning during the
3 months of mid-May through June; for incubation
4 during the months of mid-May through mid-August; and
5 for rearing during the months of January through
6 December. (Exh. DFG-1781-r-1, P. 170)

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

9 Jan.	30	May	60	Sept.	50
10 Feb.	30	June	300	Oct.	45
11 Mar.	30	July	110	Nov.	30
12 Apr.	30	Aug.	65	Dec.	30

13 These flows equal 48,814 acre feet per year and should
14 be reserved. (Exh. DFG-1781-r-1, P. 169)

1 WEST FORK STILLWATER RIVER

2 (Sweetgrass-Stillwater County line to Tumble Creek)

3 Resident game fish species present: brown and rainbow
4 trout. (Exh.DFG-1781-r-1, P. 171)

5 Resident wildlife species present: beaver, muskrat
6 and mink. (Exh. DFG-1781-r-1, P. 171)

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

12 Evaluations of the flow requirements for this stream
13 reach are based upon Fish and Game and U. S. Forest Service
14 gauging data, Water Surface Profile Program, low flow photo-
15 graphy, fish population and life history data obtained by
16 electrofishing. (Exh. DFG-1781-r-1, P. 171; Exh. DFG-1781-
17 r-9; Tr. Vol. 16, P. 53-80)

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

21 A. for brown trout: for spawning during the month
22 of November; for incubation during the months of
23 November through mid-May; and for rearing during
24 the months of January through December.

25 B. for rainbow trout: for spawning during the
26 months of mid-May through June; for incubation
27 during the months of mid-May through mid-August;

1 for rearing during the months of January through
2 December. (Exh. DFG-1781-r-1, P. 172)

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

5	Jan.	25	May	25	Sept.	25
6	Feb.	25	June	200	Oct.	25
7	Mar.	25	July	100	Nov.	25
8	Apr.	25	Aug.	40	Dec.	25

9 These flows equal 34,047 acre feet per year and should
10 be reserved. (Exh. DFG-1781-r-1, P. 171)

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1 LOWER WILLOW CREEK

2 (Forest boundary to Cooney Reservoir)

3 Resident game fish species present: rainbow, brown
4 and brook trout and mountain whitefish. (Exh.DFG-1781-r-1,
5 P.175)

6 Resident wildlife species present: beaver, muskrat,
7 mink and raccoon. (Exh.DFG-1781-r-1,P.175)

8 Considerable irrigation occurs in this reach, but
9 is usually well supplemented by subsurface flows caused by
10 water diverted from the Rock Creek drainage onto the gravelly
11 soils of the East Bench. (Exh.DFG-1781-r-1,P.175)

12 Evaluations of the flow requirements for this
13 stream reach are based upon Water Surface Profile,
14 water discharge measurements and photographs, judgment of
15 qualified professional personnel and fisheries data collec-
16 tions. (Exh.DFG-1781-r-1,P.175; Exh.DFG-1781-r-7; Tr.Vol.
17 17,Test. Marcuson,P.1-48)

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

21 A. for cutthroat trout: for spawning, during the
22 months of June and July; for incubation, during the
23 months of June through September 7; and for rearing,
24 during the months of January through December;

25 B. for rainbow trout: for spawning, during the
26 months of June and July; for incubation, during the
27 months of June through September 7; and for rearing,

1 during the months of January through December;

2 C. for brown trout: for spawning, during the
3 months of October and November; for incubation,
4 during the months of October through mid-May; and
5 for rearing, during the months of January through
6 December;

7 D. for brook trout: for spawning, during the
8 months of October and November; for incubation,
9 during the months of October through mid-May; and
10 for rearing, during the months of January through
11 December;

12 E. for whitefish: for spawning, during the
13 month of September through November; for incubation,
14 during the months of September through April 7;
15 and for rearing, during the months of January
16 through December. (Exh.DFG-1781-r-1,P.148)

17 In this stream reach the fishery and aquatic
18 ecosystem suffer severe degradation when the streamflow
19 is below 25 cfs. (Exh.DFG-1781-r-1,P.175)

20 In this stream reach fishermen prefer a streamflow
21 of 40 cfs. (Exh.DFG-1781-r-1,P.175)

22 Spring-spawning trout are limited in their ability
23 to reproduce in this stream reach because of silt deposition.
24 (Exh.DFG-1781-r-1,P.175)

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

1	Jan.	3	May	17	Sept.	16
2	Feb.	5	June	23	Oct.	12
3	March	6	July	21	Nov.	9
4	Apr.	12	Aug.	16	Dec.	7

5 These flows equal 8,890 acre-feet per year and should be
6 reserved. (Exh.DFG-1781-r-1,P.175; Tr.17, P. preceding
7 P.2)

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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:

1	January	0	July	1-10	6,800
2	February	0		11-20	4,500
3	March	200		21-31	2,800
4	April	1-15	400	August	1-10
5		16-30	0		11-31
6	May	1-10	500	September	300
7		11-20	2,600	October	0
8		21-31	5,900	November	600
9	June	1-10	10,200	December	300
10		11-20	11,600		
11		21-30	9,100		

12 These flows equal 1,262,081 acre feet per year and should
 13 be reserved. (Exh.DFG-1781-r-1,P.178)

14 The dominant discharge required in this stream reach
 15 for one 24-hour period between May 11 and August 10 is
 16 23,578 cfs, (46,766 acre feet) which is necessary to
 17 maintain channel maintenance processes. This, also should
 18 be reserved. (Exh.DFG-1781-r-1,P.178)

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1 YELLOWSTONE RIVER

2 (Stillwater River to the north-south

3 Carbon-Stillwater county lines)

4 Resident game fish species present: rainbow and
5 brown trout, mountain whitefish and burbot. (Exh.DFG-
6 1781-r-1,P.179)

7 The wildlife species present:

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

10 B. Migratory transient - numerous ducks, Canada
11 geese, bald eagles and great blue heron.

12 (Exh.DFG-1781-r-1,P.179)

13 Evaluations of the flow requirements for this stream
14 reach are based upon examination of discharge frequency
15 data from the U.S. Geological Survey, dominant discharge,
16 consideration of the existing water rights of Fish and
17 Game in the Yellowstone River in this reach, current biolog-
18 ical data obtained from the middle and lower reaches of
19 the Yellowstone River, and recognition of flow requirements
20 in the lower reaches of the Yellowstone River. The request
21 is based upon 50 percent and 70 percent exceedance flows
22 minus Fish and Game's existing water rights in the reach.
23 (Exh.DFG-1781-r-1,P.179)

24 The instream flow required for the stream reach,
25 in cfs, by month of the year is as follows:
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1	January	100	July 1-10	9,000
2	February	100	11-20	5,900
3	March	300	21-31	3,600
4	April 1-15	500	August 1-10	2,100
5	16-30	0	11-31	1,400
6	May 1-10	600	September	500
7	11-20	3,100	October	100
8	21-31	7,000	November	800
9	June 1-10	12,100	December	400
10	11-20	14,000		
11	21-30	11,300		

12 These flows equal 1,550,082 acre feet per year and should
 13 be reserved. (Exh.DFG-1781-r-1,P.181)

14 The dominant discharge required in this stream reach
 15 for one 24-hour period between May 11 and August 10 is
 16 29,486 (58,485 acre feet) which is needed to perform
 17 channel maintenance processes. This also should be
 18 reserved. (Exh.DFG-1781-r-1,P.179,180)

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1 YELLOWSTONE RIVER

2 (North-South Carbon-Stillwater county lines to
3 Clarks Fork of the Yellowstone River)

4 Resident game fish species present: brown and
5 rainbow trout, mountain whitefish, channel catfish, sauger
6 and burbot. (Exh.DFG-1781-r-1,P.181)

7 Resident wildlife species present: ducks, Canada
8 geese, bald eagles and great blue heron. (Exh.DFG-1781-r-1
9 P.181)

10 Evaluations of the flow requirements for this stream
11 reach are based upon examination of discharge frequency
12 data from the U.S. Geological Survey, dominant discharge,
13 current biological data obtained from the middle and lower
14 reaches of the Yellowstone River, and recognition of flow
15 requirements in the lower reaches of the Yellowstone River.
16 The request is based upon the 50 percent and 70 percent
17 exceedance flows. The department has no "existing right"
18 in this reach and therefore no water quantities have been
19 subtracted from the 50 percent and 70 percent exceedance
20 flows. (Exh.DFG-1781-r-1,P.177,181)

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

24 A. for rainbow trout: for spawning, during the
25 months of mid-May through mid-August; for incubation
26 during the months of mid-May through September;
27 for rearing, during the months of January through

1 December.

2 B. for brown trout: for spawning, during the months
3 of September through November; for incubation, during
4 the months of September through March; for rearing,
5 during the months of January through December.

6 C. for whitefish: for spawning, during the months
7 of September through mid-December; for incubation,
8 during the months of September through March; for
9 rearing, during the months of January through
10 December.

11 D. for sauger: for spawning, during the months of
12 April and May; for incubation, during the months of
13 April and May; for rearing, during the months of
14 January through December.

15 E. for burbot: for spawning, during the months
16 of February and March; for rearing, during the
17 months of January through December. (Exh.DFG-
18 1781-r-1,P.22 & 184)

19 The instream flow required for the stream reach, in
20 cfs, by month of the year is as follows:
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1	January	1,600	July 1-10	11,600
2	February	1,600	11-20	8,500
3	March	1,800	21-31	6,200
4	April 1-15	2,000	August 1-10	4,700
5	16-30	2,600	11-31	4,000
6	May 1-10	3,200	September	3,000
7	11-20	5,700	October	2,700
8	21-31	10,000	November	2,300
9	June 1-10	14,700	December	1,900
10	11-20	16,600		
11	21-31	13,900		

12 These flows equal 3,118,013 acre feet per year and should
 13 be reserved. (Exh.DFG-1781-r-1.P.182)

14 The dominant discharge required in this stream reach
 15 for one 24-hour period between May 11 and August 10 is
 16 29,486 (58,485 acre feet) which is necessary to perform
 17 channel maintenance processes and this should also be
 18 reserved. (Exh.DFG-1781-r-1, P.182)

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1 YELLOWSTONE RIVER

2 (Clarks Fork of the Yellowstone River to Bighorn
3 River)

4 Resident game fish species present: rainbow and brown
5 trout, mountain whitefish, channel catfish, sauger, walleye
6 ling (burbot) and white crappie. (Exh. DFG-1781-r-1, P. 183)

7 Wildlife species present:

8 A. resident - beaver, muskrat, marten, mink, raccoon,
9 pheasants, white-tailed deer, ducks and raptors.

10 B. migratory transient - bald eagles, Canada geese,
11 ducks, great blue heron, whistling swan and sandhill
12 crane. (Exh. DFG-1781-r-1, P. 183)

13 Evaluations of the flow requirement for this stream
14 reach are based upon examination of discharge frequency
15 data from the U. S. Geological Survey, dominant discharge,
16 current biological data obtained from the middle and lower
17 reaches of the Yellowstone River, and recognition of flow
18 recommendations in the lower reaches of the Yellowstone
19 River. The request is based on the 50 percent and 70 per-
20 cent exceedance flows as measured at the USGS gauge "Yellow-
21 stone River near Billings." The department has no "existing
22 right" in this reach and therefore, no water quantities
23 have been subtracted from the 50 percent and 70 percent
24 exceedance flows. (Exh. DFG-1781-r-1, P. 177, 183)

25 The periods of the year when flows are required by the
26 fish species found in this stream reach for spawning, incu-
27 bation and rearing are as follows:

1 A. for rainbow trout: for spawning, during the month
2 of mid-May through mid-August; for incubation, during
3 the months of mid-May through September; for rearing,
4 during the months of January through December.

5 B. for brown trout: for spawning, during the months
6 of September through November; for incubation, during
7 the months of September through March; for rearing,
8 during the months of January through December.

9 C. for sauger and walleye: for spawning, during the
10 months of April and May; for incubation, during the
11 months of April and May; for rearing, during the months
12 of January through December.

13 D. for burbot: for spawning, during the months of
14 February and March; for rearing, during the months
15 of January through December. (Exh. DFG-1781-r-1, P.
16 184)

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

19	Jan.	2,500	July	1-20	11,100
20	Feb.	2,500		21-31	6,300
21	Mar.	2,900	Aug.		4,800
22	Apr.	3,600	Sept.		3,700
23	May 1-20	6,100	Oct.		3,600
24	21-31	12,500	Nov.		3,500
25	June 1-7	17,900	Dec.		2,800
26	8-30	19,700			

27 These flows equal 4,041,913 acre feet per year and should

1 be reserved. (Exh/ DFG-1781-r-1, P. 183)

2 The dominant discharge required in this stream reach
3 for one 24-hour period between May 1 and July 31 is 34,500
4 cfs (68,430 acre feet) which is necessary to allow channel
5 maintenance processes to occur and this, also, should be
6 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,

1 which aids the Canada geese in their nesting activities
2 the following spring. (Exh.DFG-1781-r-1,P.186)

3 Evaluations of the flow requirements for this stream
4 reach are based upon comparison of USGS gauging data at
5 stations on the Bighorn River at Yellowtail Dam, at the
6 mouth of the Bighorn River and the Yellowstone River at
7 Miles City from 1968-1975 (post-Yellowtail Dam) and
8 utilizing the lower of the flows occurring on a monthly
9 basis as reflected by the operation of Yellowtail Dam.
10 (Exh.DFG-1781-r-1,P.186,254)

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

14 A. for rainbow trout: for spawning, during the
15 months of mid-March through April and October
16 through mid-November; for incubation, during the
17 months of mid-March through mid-June and October
18 through mid-December; for rearing, during the months
19 of January through December.

20 B. for brown trout: for spawning, during the months
21 of mid-October through December; for incubation,
22 during the months of mid-October through March;
23 for rearing, during the months of January through
24 December.

25 C. for burbot: for passage, during the months of
26 October through March; for spawning, during the
27 months of February through March 7; for incubation,

1 during the months of February through April.

2 D. for sauger: for spawning, during the months of
3 mid-April through May; for incubation, during the
4 months of mid-April through mid-June. (Exh.DFG-
5 1781-r-1,P.188)

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

8	January	3,300	July 1-20	3,800
9	February	3,200	21-31	3,200
10	March	4,000	August	2,800
11	April	3,600	September	2,600
12	May 1-20	3,800	October	2,700
13	21-31	3,800	November	3,100
14	June 1-7	5,200	December	3,200
15	8-30	5,200		

16 These flows equal 2,484,187 acre feet per year and should
17 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 Kempf 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-

1 lizing the lower of the flows occurring on a monthly
2 basis as reflected by the operation of Yellowtail Dam.
3 (Exh.DFG-1781-r-1,P.189,254)

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

7 A. for channel catfish: for passage, during the
8 months of August through October; for spawning, dur-
9 ing the months of mid-August through September 7;
10 for incubation, during the months of mid-August
11 through mid-September; for rearing, during the
12 months of January through December.

13 B. for burbot: for passage, during the months of
14 October through April; for spawning, during the
15 months of February through March 7; for incubation,
16 during the months of February through April.

17 C. for sauger: for spawning, during the months of
18 mid-April through May; for incubation, during the
19 months of mid-April through mid-June. (Exh.DFG-
20 1781-r-1,P.188,191)

21 The instream flow required for the stream reach,
22 in cfs, by month of the year is as follows:
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1	January	3,300	July 1-20	3,800
2	February	3,200	21-31	3,200
3	March	4,000	August	2,800
4	April	3,600	September	2,600
5	May 1-20	3,800	October	2,700
6	21-31	3,800	November	3,100
7	June 1-7	5,200	December	3,200
8	8-30	5,200		

9 These flows equal 2,484,187 acre feet per year and should
 10 be reserved. (Exh.DFG-1781-r-1,P.189)

1 TONGUE RIVER

2 (Montana-Wyoming state line to the Tongue River Reservoir)

3 The fish species present are:

4 A. Resident game fish - sauger, walleye, smallmouth
5 bass, rock bass and channel catfish.

6 B. Migratory transient game fish - sauger and
7 walleye (Exh.DFG-1781-r-1,P.195,196)

8 Evaluations of the flow requirements for this stream
9 reach are based upon Northern Great Plains Resource Pro-
10 gram (NGPRP) estimates as the basis for the low flow re-
11 quests. Field work on the stream fish populations authen-
12 ticated the use of these flows. USGS flow duration data
13 were used for May and June. These flows were also authen-
14 ticated by field observations of the river at known gauged
15 flows. (Exh.DFG-1781-r-1,P.196, Tr.Vol. 14,Elser, P.49)

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

19 A. for sauger: for passage, during the months of
20 mid-April through June; for spawning, during the months
21 of mid-April through June; for rearing, during the
22 months of January through December.

23 B. for walleye: for passage, during the months of
24 mid-April through June; for spawning, during the
25 months of mid-April through June; for rearing,
26 during the months of January through December.

27 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)

1 TONGUE RIVER

2 (Tongue River Dam to Four Mile Creek)

3 Resident game fish species: brown trout, northern
4 pike, walleye, black crappie and white crappie. (Exh.DFG-
5 1781-r-1, P.195,196)

6 Evaluations of the flow requirments for this stream
7 reach are based upon water temperature data and depth and
8 velocity criteria for spawning and incubation flows as
9 suggested by Bovee (1974) and Stalmaker and Arnette (1976),
10 used in conjunction with the Water Surface Profile Program;
11 wetted perimeter output from the Water Surface Profile
12 Program was used to determine rearing flows; Bovee's (1975)
13 indicator species method was used for rearing flows for
14 stonecats. (Exh.DFG-1781-r-1,P.199,201)

15 The Tongue River immediately downstream from the Tongue
16 River Dam represents the only stream trout fishery in the
17 area. While catchable rainbow trout are stocked annually
18 by Fish and Game, brown trout are reproducing in the
19 stream. Fish population sampling revealed that while the
20 brown trout population is not large, it is a fishable
21 population. Each year, a few "trophy" sized browns are
22 taken. Therefore, it is important to recognize and protect
23 this remnant trout population.

24 The Tongue River Reservoir creel census conducted in
25 1975 and 1976 also interviewed anglers fishing the river
26 downstream from the dam. In 1975, 70.2 percent of the
27 recorded catch below the dam was crappie. Walleye made up

1 15.3 percent of the catch and northern pike added about
2 2.0 percent. This reach of the Tongue River is important
3 from a sport fishing standpoint and the populations of
4 sport fish present should be protected. (Exh.DFG-1781-r-1
5 P.201)

6 The periods of the year when flows are required by the
7 fish species found in this stream reach for spawning, in-
8 cubation and rearing are as follows:

9 A. for brown trout: for spawning, during the
10 months of October and November; for incubation,
11 during the months of November through December;
12 for rearing, during the months of January through
13 December.

14 B. for northern pike: for rearing, during the
15 months of January through December.

16 C. for walleye: for rearing, during the months
17 of January through December.

18 D. for black and white crappie: for spawning,
19 during the months of May through July; for rearing,
20 during the months of January through December.

21 E. for the stonecat: for rearing, during the
22 months of January through December. (Exh.DFG-1781-
23 r-1, P.200, Tr. Vol. 14, Test. Elser, P.51)

24 The instream flow required for the stream reach, in
25 cfs, by month of the year is as follows:
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1	Jan.	150	May	700	Aug.	150
2	Feb.	150	June	700	Sept.	150
3	March	150	July 1-15	700	Oct.	190
4	April	150	July 16-31	150	Nov.	190
5					Dec.	150

6 These flows equal 196,480 acre feet per year and should be
 7 reserved. (Exh.DFG-1781-r-1,P.198, Tr. Vol. 14, Test.

8 Elser P.56-57)

1 TONGUE RIVER

2 (Four Mile Creek to S-H Diversion)

3 Resident game fish species present: smallmouth bass,
4 rock bass, northern pike, sauger and walleye. (Exh.DFG-
5 1781-r-1,P.201)

6 Evaluations of the flow requirments for this stream
7 reach are based upon water temperature data, depth and
8 velocity criteria for spawning and incubation flows as
9 suggested by Bovee (1975), Coble (1975) and Scott and
10 Crossman (1973); water surface profile program (WSP);
11 wetted perimeter method used in conjunction with WSP was
12 used for rearing flows for all species. (Exh.DFG-1781-r-1,
13 P.203; Tr. Vol. 14, Test. Elser P. 56-57)

14 Fish population sampling on the Tongue River near
15 Birney and Ashland indicates an excellent population of
16 smallmouth bass. Anglers take many smallmouth, with fish
17 ranging to 3 pounds reported. Reproductive success in
18 the Birney area depends on flow conditions. The total number
19 of age 0 smallmouth bass collected at Birney ranged from
20 28 in the fall of 1974 to 4 in the fall of 1975.. Flows
21 should be stabilized for smallmouth bass spawning.

22 Sauger and northern pike are popular with fishermen
23 in the Birney-Ashland area and provide excellent fishing
24 in the spring. The Tongue River supports the only rock
25 bass population in Montana, which should be protected.
26 (Exh.DFG-1781-r-1,P.205)

27 The periods of the year when flows are required by

1 the fish species found in this stream reach for spawning
2 and rearing are as follows:

3 A. for smallmouth bass: for spawning, during the
4 months of mid-May through mid-July; for rearing,
5 during the months of January through December.

6 B. for sauger: for spawning, during the months
7 of April and May; for rearing, during the months
8 of January through December.

9 C. for northern pike: for rearing, during the
10 months of January through December.

11 D. for rock bass: for spawning, during the months
12 of mid-May through mid-July; for rearing, during the
13 months of January through December.

14 E. for stonecat: for rearing, during the months
15 of January through December. (Exh.DFG-1781-r-1,
16 P.204)

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

19	Jan.	150	July 1-15	700
20	Feb.	150	16-31	150
21	March	150	Aug.	150
22	April	150	Sept.	150
23	May 1-20	390	Oct.	150
24	21-31	700	Nov.	150
25	June	700	Dec.	150

26 These flows equal 193,430 acre feet per year and should
27 be reserved. (Exh.DFG-1781-r-1, P.198)

1 TONGUE RIVER

2 (Tongue River from S-H Diversion to T & Y Diversion)

3 Resident game fish species present: sauger, small-
4 mouth bass, channel catfish and rock bass. (Exh.DFG-1781-
5 r-1,P.205)

6 Evaluations of the flow requirements for this stream
7 reach are based upon water temperature data and depth and
8 velocity criteria for spawning and incubation flows as
9 reported by Bovee (1974) and Scott and Crossman (1975),
10 used in conjunction with the Water Surface Profile program
11 (WSP); wetted perimeter method from the WSP program was
12 used for rearing flows. (Exh.DFG-1781-r-1,P.205,207; Tr.
13 Vol. 14, Test. Elser, P.56-57)

14 Sport fishing in this reach, particularly immediately
15 downstream from the S-H Diversion is becoming increasingly
16 popular. Sauger, channel catfish and smallmouth bass are
17 favorite targets of anglers from Miles City, Ashland,
18 Forsyth, and the surrounding area. Fish population
19 sampling shows fair concentrations of smallmouth bass and
20 sauger and an excellent catfish population. Baited traps
21 fished for channel catfish result in a catch of almost
22 5 cats per trap. Catfish average 17.8 inches and 2.35
23 pounds. Flow levels indicated are important in maintaining
24 the sport fish potential of this reach of the Tongue River.
25 (Exh.DFG-1781-r-1,P.207)

26 The periods of the year when flows are required by
27 the fish species found in this stream reach for spawning

1 and rearing are as follows:

2 A. for sauger: for spawning, during the months of
3 April and May; for rearing, during the months of
4 January through December.

5 B. for smallmouth bass: for spawning, during the
6 months of mid-May through mid-July; for rearing,
7 during the months of January through December.

8 C. for rock bass: for spawning, during the months
9 of mid-May through mid-July; for rearing, during the
10 months of January through December.

11 D. for stonecat: for rearing, during the months of
12 January through December.

13 E. for channel catfish: for spawning, during the
14 months of July and August; for rearing, during the
15 months of January through December. (Exh.DFG-1781-r-1,
16 P.206)

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

19 Jan.	190	May 1-20	400	Aug.	190
20 Feb.	190	21-31	700	Sept.	190
21 March	190	June	700	Oct.	190
22 April	400	July 1-15	700	Nov.	190
23		16-31	190	Dec.	190

24 These flows equal 214,960 acre feet per year and should be
25 reserved. (Exh.DFG-1781-r-1,P.198)

1 TONGUE RIVER

2 (T & Y Diversion to the Yellowstone River)

3 Fish species present:

4 A. resident game fish - sauger and channel catfish.

5 B. migratory transient game fish - paddlefish, shovel-
6 nose sturgeon, sauger, walleye and burbot.

7 (Exh.DFG-1781-r-1, P.207)

8 Evaluations of the flow requirements for this stream
9 reach are based upon indicator species method as suggested
10 by Bovee (1974); water temperature data and depth and
11 velocity criteria, used in conjunction with the Water
12 Surface Profile (WSP) Program for determining passage and
13 spawning flows. Criteria were according to Bovee (1974);
14 rearing flows were derived by using the wetted perimeter
15 method in conjunction with the WSP program (Exh.DFG-1718-
16 r-1, P.207,208)

17 Migrations of spawning populations of shovelnose
18 sturgeon, sauger and channel catfish into the Tongue
19 River are important to the integrity of the Yellowstone
20 River. Passage and spawning flows identified for these
21 species are important not only to the Tongue River, but
22 to the Yellowstone River as well. (Exh.DFG-1781-r-1, P.
23 209,210)

24 The periods of the year when flows are required by
25 the fish species found in this stream reach for passage,
26 spawning and rearing are as follows:

27 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 through 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)

1 HANGING WOMAN CREEK

2 (East Fork to the Tongue River)

3 Fish species present:

4 A. resident game fish - smallmouth bass and sauger.

5 B. migratory game fish - northern pike and channel
6 catfish. (Exh. DFG-1781-r-1, P. 211)

7 Evaluations of the flow requirements for this stream reach
8 are based on migrant fish trap data, USGS stream discharge
9 records and streamflow monitoring. (Exh. DFG-1781-r-1, P.
10 211, Tr. Vol. 14, Test. Elser, P. 53-54, 56)

11 Northern pike and channel catfish provide a good deal
12 of the sport fishing potential for the Tongue River in the
13 Birney area. Since both species, as well as non-sport
14 species, utilize Hanging Woman Creek as a spawning and
15 nursery stream, it is important to maintain flows adequate
16 to insure continued production in the stream. In order
17 to maintain the integrity of the Tongue River itself, the
18 integrity of tributaries must also be preserved. (Exh. DFG-
19 1781-r-, P. 211)

20 The periods of the year when flows are required by the
21 fish species found in this stream reach for passage and
22 spawning are as follows:

23 A. for northern pike: for passage, during the months
24 of April to mid-May; for spawning, during the months
25 of April to mid-May.

26 B. for channel catfish: for passage, during the
27 months of mid-May to mid-July; for spawning, during

1 months of mid-May to mid-July. (Exh. DFG-1781-r-1,
2 P. 213; Tr. Vol. 14, Test. Elser, P. 53-54)

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

5
6 Jan. -- May 1-15 15 Sept. --
7 Feb. -- 16-31 4.5 Oct. --
8 Mar. -- June 4.5 Nov. --
9 Apr. 15 July 1-15 4.5 Dec. --
10 Aug. --

11 These flows equal 1,883 acre feet per year and should be
12 reserved. (Exh. DFG-1781-r-1, P. 214)

1 OTTER CREEK

2 (Bear Creek to the Tongue River)

3 Fish species present:

4 A. resident game fish - white crappie and smallmouth
5 bass.

6 B. migratory transient game fish - northern pike and
7 channel catfish. (Exh. DFG-1781-r-1, P. 212,215)

8 Evaluations of the flow requirements for this stream
9 reach are USGS gauging records on Otter Creek, field ob-
10 servations of northern pike and channel catfish use of the
11 Tongue River near the mouth of Otter Creek, and knowledge
12 of professional personnel of stream morphology of Otter
13 Creek. (Exh. DFG-1781-r-1, P. 215; Tr. Vol. 14, Test. Elser,
14 P. 54-56)

15 Stream is important as spawning and nursery area for
16 fishery of Tongue River. (Exh. DFG-1781-r-1, P. 217)

17 The periods of the year when flows are required by the
18 fish species found in this stream reach for passage, and
19 spawning are as follows:

20 A. for northern pike: for passage, during the months
21 of April through mid-May; for spawning, during the
22 months of April through mid-May.

23 B. for channel catfish: for passage, during the
24 months of mid-May to mid-July; for spawning, during
25 the months of mid-May to mid-July. (Exh. DFG-1781-r-1,
26 P. 216; Tr. Vol. 14, Test. Elser, P. 54-55)

27 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

1 the fish species found in this stream reach for passage
2 and spawning are as follows:

3 A. for sauger: for passage, during the months of
4 March through May; for spawning during the months of
5 March through May.

6 B. for white crappie: for passage, during the months
7 of May and June; for spawning, during the months of
8 May and June.

9 C. for channel catfish: for passage, during the months
10 of June through August; for spawning, during the months
11 of June through August. (Exh. DFG-1781-r-1, P. 218;
12 Tr. Vol. 14, Test. Elser, P. 54-55)

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

15 Jan.	--	May	35	Sept.	--
16 Feb.	--	June	35	Oct.	--
17 Mar.	20	July	5	Nov.	--
18 Apr.	20	Aug.	5	Dec.	--

19 These flows equal 7,268 acre feet per year and should be
20 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

1 January through December.

2 D. for channel catfish: for spawning, during the months
3 of June and July; for rearing, during the months of
4 January through December.

5 E. for stonecat: for rearing, during the months
6 of January through December. (Exh. DFG-1781-r-1,
7 P. 225, 226)

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

10	Jan.	15	May	50	Sept.	5
11	Feb.	15	June	10	Oct.	5
12	Mar.	15	July	10	Nov.	5
13	Apr.	50	Aug.	5	Dec.	5

14 These flows equal 11,452 acre feet per year and should be
15 reserved. (Exh. DFG-1781-r-1, P. 223)

1 YELLOWSTONE RIVER MAINSTREAM

2 (Bighorn River to the Montana-North Dakota state
3 line)

4 The fish species present in this stream reach are
5 as shown in Table 1, attached. (Exh. DFG-1781-r-1, P. 230)

6 Fish species shown in Table 1 which are resident
7 game fish are: pallid sturgeon, shovelnose sturgeon,
8 rainbow trout, brown trout, northern pike, smallmouth
9 bass, largemouth bass, sauger and walleye, burbot and
10 channel catfish. (Exh. DFG-1781-r-1, P. 229, 230)

11 Fish species shown in Table 1, which are migratory
12 transient game fish, are: paddlefish and walleye. (Exh.
13 DFG-1781-r-1, P. 229, 230)

14 The resident and migratory wildlife species present
15 for this stream reach are as given in Tables 2 and 3,
16 attached. (Exh. DFG-1781-r-1, P. 231-233)

17 Evaluations of the flow requirements used for this stream
18 reach are as follows for specific times of the year:

19 A. March and April - field study of Canada goose
20 nesting and production on the Yellowstone River, part-
21 icularly on the islands which are the preferred
22 nesting areas;

23 B. May, June and July - field study of high flows
24 needed for paddlefish migration around the Intake
25 Diversion Dam on the Yellowstone River; dominant
26 discharge;

27 C. August through November - wetted perimeter/discharge

1 curve used in conjunction with the water surface
2 profile program;

3 D. December, January and February - USGS stream
4 discharge records and flow duration data. (Exh.
5 DFG-1781-r-1, P. 235-252; Tr. Vol 13, P. 175-196;
6 Tr. Vol. 14, P. 1-18)

7 In addition, extensive sampling of fish populations
8 for relative abundance and distribution was conducted in
9 the river. Sampling was done by electrofishing, gill nets
10 and seines. Movements of fish were monitored by tagging
11 individual fish with numbered fish tags. (Exh. DFG-1781-
12 r-4, P. 11-17; P. 18)

13 There is substantial recreational use of this reach of
14 the stream by fishermen, boaters, hikers, and other recrea-
15 tionists. (Tr. Vol. 14, Test. Erickson, P. 109-144)

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

19 A. for paddlefish: for passage, during the period
20 of April 21 to July 31; for spawning, during the
21 period of April 21 to July 31; for passage around
22 Intake Diversion, during the period of June 8 to June
23 30;

24 B. for shovelnose sturgeon: for migration, during
25 the period of April 15 to August 7; for spawning, during
26 the period of April 15 to August 7; for rearing,
27 during the period of January through December;

1 C. for walleye and sauger: for spawning, during
2 the period of April 1 through May 30; for incubation,
3 during the period of April 1 through May 30; for rear-
4 ing, during the period of January through December;
5 D. for burbot (ling): for spawning, during the period
6 of December 15 through February; for rearing, during
7 the period of January through December. (Exh. DFG-1781-
8 r-1, P. 234, 235)

9 The periods of the year when flows are required by
10 the waterfowl species found in this reach for nest establish-
11 ment and egg incubation are as follows:

12 A. for Canada goose: for nest establishment, during
13 the period of March 1 to April 30; for egg incubation,
14 during the period of April 5 to June 1;

15 B. for mallard: for nest establishment, during the
16 period of April 21 to June 7; for egg incubation,
17 during the period of May 18 to July 5. (Exh. DFG-
18 1781-r-1, P. 235; Tr. Vol. 16, Test. Hinz, P. 11-52)

19 Flows for March and April are required for successful
20 Canada goose reproduction on the lower Yellowstone. An
21 estimated 30 percent of the breeding population of Canada
22 geese in the surveyed areas of the central flyway portion
23 of Montana nest in the Yellowstone River mainstem. The
24 period from March 1 to April 30 encompasses goose nest
25 initiation. A flow of 11,000 cfs during this period will
26 prevent excessive destruction of nests by predators. Flows
27 higher than 12,000 cfs may produce nest flooding. (Exh.

1 DFG-1781-r-1, P. 237-238; Tr. Vol. 16, Test. Hinz, P. 11-52)

2 Flows for May, June and July are required to stimulate
3 and allow passage of paddlefish beyond the diversion dam
4 at Intake. Although the shovelnose sturgeon also migrates
5 during this period, the paddlefish was selected as the in-
6 dicator species because of its large size and importance
7 as a sport fish. If paddlefish passage requirements are
8 met, requirements of the other species will also be met.
9 Flows during this period are also required to maintain
10 the existing channel morphology of the river. (Exh. DFG-
11 1781-r-1, P. 238-240)

12 The paddlefish inhabits the Yellowstone only seasonally,
13 spending most of the time in Garrison Reservoir, North
14 Dakota. Paddlefish migrate up the river as far as Forsyth.
15 However, to reach that point they must negotiate the
16 diversion dam at Intake. If they can get past this diver-
17 sion dam, an additional 166 miles of main river and two
18 major tributaries (Tongue and Powder Rivers) are available
19 for spawning. (Exh. DFG-1781-r-1, P. 240-241)

20 A natural side channel around the Intake diversion
21 allows paddlefish passage. This channel is dry except
22 during spring runoff. Field observations of paddlefish
23 movement through the side channel show that 45,000 cfs is
24 required to allow passage from June 8 to June 30. (Exh.
25 DFG-1781-r-1, P. 240-241)

26 The lower Yellowstone has a diversity of aquatic and
27 wildlife habitats because of its numerous channel features

1 such as islands and gravel bars. These characteristics are
2 caused and maintained by the annual flood flows of the river.
3 It is the higher spring flows which determine the form of
4 the channel, not the average or lower flows, because the
5 higher flows transport the major amount of suspended
6 sediment and bedload material. (Exh. DFG-1781-r-1, P.
7 238-239; Tr. Vol. 13, Test. Peterman, P. 144 et seq.)

8 Changes in spring flood flows would cause habitat
9 changes which in turn would cause changes in fish and wild-
10 life habitat. The flood flow most important in determining
11 channel formation processes is the "bank full" flow. So
12 that these processes and thus the channel morphology can
13 be maintained, a bank full flow should be reserved for a
14 24-hour period between June 8 and June 30. (Exh. DFG-1781-
15 r-1, P. 238-240, 253) (See Peterman Test, supra)

16 Flows requested during the period August through
17 November are for purposes of fish rearing. Rearing refers
18 to the life cycle period between the time a given species
19 hatches and the time it is capable of spawning. Young
20 fish reach adult size during this period. The successful
21 rearing of fishes is dependent on an adequate food supply,
22 adequate habitat area and suitable water quality. During
23 this period, most, if not all, of the fish species in the
24 lower Yellowstone feed on aquatic insects. Food production
25 takes place primarily in riffle areas. Riffle areas are
26 also most easily affected by flow reduction since they
27 are the shallowest areas of a stream. Food production can

1 best be maintained by maximizing the wetted perimeter, or
2 wetted area, where insects live. If suitable riffle con-
3 ditions can be maintained in food production, suitable
4 pool conditions will also be maintained as fish habitat.
5 (Tr. Vol 13, P. 195-196; Exh. DFG-1781-r-1, P. 242-243)

6 The wetted perimeter/discharge relationship used in
7 conjunction with the Water Surface Profile Program was used
8 to establish the rearing flows required in the lower Yellow-
9 stone River. (Tr. Vol. 14, Test. Peterman, P. 1-3)

10 The USGS - Washington Department of Fisheries method of
11 recommending rearing flows assumes that rearing capability
12 is proportional to food production, which in turn is pro-
13 portional to the amount of wetted area (wetted perimeter)
14 in riffles. Wetted perimeter is plotted against discharge
15 (flow) and the smallest flow which maximizes wetted peri-
16 meter was picked as the requested flow. (Exh. DFG-1781-r-1,
17 P. 242-243)

18 Flows for December through February are required to
19 maintain aquatic life through the winter months which are
20 periods of greatest stress to these organisms. This period
21 is also the time of lowest flow during the year. Natural
22 mortality is greatest during this period. Factors to
23 consider during this period are spawning by burbot, the effects
24 of ice on aquatic habitat (both anchor ice and the specta-
25 cular ice jams which occur in the lower river), and the
26 reduction of habitat for fish and aquatic life due to low
27 flow conditions even without ice formation. Significant

1 water depletion at this time could produce severe impacts
2 on aquatic life and furbearers. Although quantitative
3 data on the causes of winter mortality and the flows necessary
4 to minimize this mortality are limited, the median flows,
5 based on USGS records from 1936-1974 were believed to
6 represent the most suitable winter flows. (Exh. DFG-
7 1781-r-1, P. 249, 252)

8 The shovelnose sturgeon is a popular game fish in
9 the lower Yellowstone River. It also occurs in portions
10 of the Mississippi, Missouri and Ohio river drainages, but
11 the Yellowstone is the only river system left where their
12 habitat has not been altered by dam construction and/or
13 channelization. (Exh. DFG-1781-r-4, P. 17)

14 Shovelnose sturgeon are common in the Yellowstone from
15 Forsyth to the Missouri River, a distance of about 240 river
16 miles. (Exh. DFG-1781-r-4, P. 4, 18)

17 Shovelnose sturgeon are known to migrate from the
18 Yellowstone into the Tongue River to spawn during the
19 spring. (Exh. DFG-1781-r-4, P. 18)

20 Data indicate the shovelnose also migrate from the
21 Yellowstone into the Powder River to spawn. (Exh. DFG-
22 1781-r-4, P. 19; Tr. Vol. 13, P. 164-165)

23 Shovelnose found migrating into the Tongue River are
24 significantly larger than those reported from other loca-
25 tions in the Missouri-Mississippi drainages. Sizes in the
26 Tongue River ranged between 1.5 and 15.5 pounds with the
27 major portion of the fish weighing between 2.5 and 5.5 pounds.

1 Average size of sturgeon from the Mississippi-Missouri
2 drainage was about 1 to 1.5 pounds with few fish weighing
3 4 pounds or more. (Exh. DFG-1781-r-4, P. 21-22)

4 The pallid sturgeon occurs in the lower Yellowstone
5 and Mississippi-Missouri River drainages, but occurs only
6 rarely. (Exh. DFG-1781-r-4, P. 17)

7 The sauger and walleye are two of the most important
8 sport fish in the lower Yellowstone. Popular fishing sites
9 are at the mouths of major tributaries such as the Bighorn
10 and Tongue Rivers and below diversion dams. The sauger
11 is a native Montana fish. The walleye is not native but
12 has been widely introduced in Montana. The distribution
13 of both species is probably similar although sauger are
14 more abundant. (Exh. DFG-1781-r-4, P. 22-23)

15 Spawning areas used by sauger and walleye are gravel
16 to sand stream bottom with water depths of 15-24 inches.
17 There are numerous sites which meet these criteria in the
18 lower Yellowstone although only limited investigations
19 have been done to document the presence of these spawning
20 fish in the lower Yellowstone. (Exh. DFG-1781-r-4, P. 26-29)

21 Extensive movement of sauger occurs in the lower Yellow-
22 stone as determined by tagging studies. Some fish moved
23 as far as 68 miles from the site where originally tagged.
24 (Exh. DFG-1781-r-4, P. 30-31)

25 The burbot is a native Montana fish and is relatively
26 common in the Yellowstone River from Big Timber to the
27 Missouri River including the Tongue and Bighorn Rivers.

1 Angling for this fish is popular in the late winter and
2 early spring along the Yellowstone below diversion dams
3 and at the mouths of tributary streams. Good catches
4 are made by anglers from late February through April,
5 mostly during late evening hours. Few burbot are caught
6 during daylight hours. Burbot have been caught of a size
7 up to 27 inches in length and weighing nearly 3 pounds
8 apiece. Burbot spawn in the winter during January and
9 February. (Exh. DFG-1781-r-4, P. 33-34)

10 Channel catfish are native to Montana and are common
11 in the lower Yellowstone below the Huntley diversion. They
12 are one of the most important game fish in this area and
13 make up as much as 25 percent of the anglers catch. (Exh.
14 DFG-1781-r-4, P. 37)

15 It is indicated that channel catfish prefer backwater
16 areas of the Yellowstone rather than main channel areas
17 during late summer and fall. Spawning occurs at this time
18 and there is indicated a preference for these backwaters
19 for spawning sites due to optimum temperature conditions
20 and suitable nest sites such as cut banks, rocks, log jams,
21 and beaver caches and dens. (Exh. DFG-1781-r-4, P. 38-39)

22 It is indicated that channel catfish undergo movement
23 in the Yellowstone as far as 60 to 92 miles. (Exh. DFG-
24 1781-r-4, P. 40)

25 Migratory catfish caught in the Tongue River reached a
26 size of over 30 inches and weight of 17 pounds. Average
27 sizes are approximately 22 inches and 5.5 pounds. Catfish

1 caught in the Yellowstone have ranged up to 28 inches in
2 length and 6.5 pounds with average sizes between 16-17
3 inches and 1.5 to 1.9 pounds. (Exh. DFG-1781-r-4, P. 38, 40)

4 There are numerous species of forage fish in the
5 lower Yellowstone upon which both sport and nonsport fish
6 depend for an adequate food supply. (Exh. DFG-1781-r-4, P.
7 40-42)

8 Techniques used in conducting lower Yellowstone River
9 fishery studies were those commonly used or suggested for
10 use on large river systems. Fish collection, data analysis
11 and research techniques employed were those commonly used
12 by fishery scientists involved in those research activities.
13 (Tr. Vol. 13, Test. Peterman, P. 4)

14 If flows less than those requested for the lower Yellow-
15 stone River occur with a greater frequency than has been
16 experienced in the past, there will be a decrease in the
17 quantity and quality of the aquatic and wildlife resources
18 of the lower Yellowstone River. (Tr. Vol. 13, Test. Peterman,
19 P. 4; Tr. Vol 13, Test. Peterman, P. 163, 170-171)

20 Although precise quantitative incremented changes in
21 flow are difficult to predict, qualitative assessments of
22 the impacts of changed stream flow can be shown, such as
23 the species affected and the times of year when the impacts
24 would be greatest. (Tr. Vol. 13, P. 160-161, 170-173)

25 There has been personal observation by qualified
26 professional personnel of flows required for paddlefish
27 migration in the lower Yellowstone River. (Tr. Vol. 13,
28
29
30

1 Test. Peterman, P. 187-188)

2 Aquatic populations in the lower Yellowstone experience
3 the greatest mortality over the winter period. (Tr. Vol.
4 13, Test. Peterman, P. 178)

5 The present flow regime and river morphometry of the
6 Yellowstone River downstream from Billings supports a
7 large variety of migratory water bird populations through
8 much of the year. Certain species are present all year
9 while others make only temporary use of the river. (Tr.
10 Vol. 16, Test. Hinz, P. 2)

11 The dominant discharge as it presently occurs in the
12 lower Yellowstone is very important in the ecology of ducks
13 and geese on the river. Any change in this regime would
14 impact the duck and goose populations, both resident and
15 migratory. (Tr. Vol. 16, Test. Hinz, P. 3)

16 Geese begin nesting on islands of the Yellowstone
17 River in early March and nesting lasts about 2 months.
18 Some geese nest early while others nest later in the period.
19 Some renesting occurs. (Tr. Vol. 16, Test. Hinz, P. 3)

20 Over 90 percent of goose nests are located on islands
21 in the river, especially smaller less densely vegetated
22 islands having no resident predator population; bird
23 predators are unimportant, whereas coyotes, raccoons and
24 red foxes are most important predators on the geese nesting
25 on islands. (Tr. Vol. 16, Test. Hinz, P. 204; Tr. Vol. 13,
26 Test. Peterman, P. 175-176)

27 Other ducks and waterfowl also used the open bars and

1 gravel islands which are largely unvegetated. (Tr. Vol.
2 16, Test. Hinz, P. 2)

3 The shallower and narrower the stream channel is
4 between islands and the mainland, the more predation occurs
5 on goose nests by mainland predators such as coyotes, raccoons
6 and red foxes. Generally if a predator does get to an island,
7 most or all nests on that island are destroyed, eliminating
8 or reducing goose production from that island. (Tr. Vol.
9 16, Test. Hinz, P. 3-4; Tr. Vol 16, Test. Hinz, P. 24-25)

10 Low stream flow in a given section of river during the
11 nest initiation period (March and April) and the early
12 part of incubation (mid-April) will result in a high loss
13 of goose nests to predators, which results in a lowering
14 of the resident population through poor production for
15 that year. Also, if the predation rate is sustained from
16 year to year by more frequent low flows, the goose popula-
17 tion of the Yellowstone River would ultimately be reduced.
18 (Tr. Vol. 16, Test. Hinz, P. 4)

19 During the summer period resident geese and ducks
20 require secure islands and gravel bars for loafing areas;
21 loss of loafing areas might cause geese and ducks to bypass
22 the Yellowstone River or to migrate earlier and this would
23 decrease the number of ducks and geese that are present
24 in the Yellowstone valley during the fall and would reduce
25 the hunting potential of the area as well as the opportunity
26 to observe these birds. (Tr. Vol. 16, Test. Hinz, P. 5)

27 The lower Yellowstone River is one of the most

1 attractive waterfowl hunting areas in southeastern Montana
2 and any change in the natural flow regimes of the lower
3 river would have an adverse effect on the Canada goose
4 population and on populations of other large migratory
5 birds. (Tr. Vol. 16, Test. Hinz, P. 5)

6 Reduction in winter flows can cause beaver caches
7 (food supplies) to freeze, making them inaccessible to use
8 by the beaver; entrance to lodge and bank dens may become
9 exposed or frozen shut, making the beaver vulnerable to
10 predation in the former case and subject to death by
11 starvation in the latter case. (Tr. Vol. 13, Test. Martin,
12 P. 4)

13 Between 1965 and 1974, following completion of the
14 Yellowtail Dam on the Bighorn River, the total area of the
15 river decreased 25.4 percent between Yellowtail Dam and the
16 mouth of the Bighorn River. This loss equaled 3,394 acres.
17 The total vegetated island and gravel bar area decreased
18 35.1 percent, or just over 3,000 acres. Breaking this
19 figure down further, there was a 23.1 percent loss in the
20 area of vegetated islands (1,469 acres) and a 77.2 percent
21 loss in island gravel bars (1,400 acres). There was a 34.0
22 percent loss of lateral gravel bars (131 acres). The
23 highest losses were near Yellowtail Dam with progressively
24 less change downstream. Further, the number of vegetated
25 islands decreased from 414 to 287 while the average size
26 of these islands increased from 15 to 17 acres. The number
27 of island gravel bars decreased from 619 to 301, and the

1 average size decreased from 3 to 1.5 acres. The number of
2 lateral gravel bars decreased from 122 to 111 and their
3 average size decreased from 3.2 to 2.3 acres per bar.
4 (Tr. Vol. 13, Test. Martin, P. 3-4)

5 Losses of islands and gravel bars eliminate wildlife
6 habitat by decreasing the amount of living space available
7 to furbearers and other riparian wildlife and by decreasing
8 the area capable of growing food for beaver. (Tr. Vol. 13,
9 Test. Martin, P. 2; P. 15; P. 27-28)

10 If the dominant discharge is eliminated in the lower
11 Yellowstone River, changes will occur in channel morphology
12 similar to changes which have been documented in the Bighorn
13 River - the number and area of islands will be reduced,
14 the number and area of gravel bars will be reduced and the
15 stream will change from a braided to a meandering system;
16 a braided system is necessary to protect wildlife and loss
17 of a braided system is detrimental to furbearers and other
18 wildlife. (Tr. Vol. 13, Test. Martin, P. 25; P. 31-32; P.1-6)

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

21 Section 1 - mouth of Bighorn River to mouth of Powder
22 River:

23	Jan.	4,800	May	21-31	17,000	Aug.	7,000
24	Feb.	5,500	June	1-7	25,000	Sept.	7,000
25	Mar.	11,000		8-30	42,000	Oct.	7,000
26	Apr.	11,000	July	1-20	17,000	Nov.	7,000
27	May 1-20	11,000		21-31	9,200	Dec.	5,600

1 These flows equal 7, 783,666 acre feet per year
2 excluding the dominant discharge and should be reserved.
3 (Exh. DFG-1781-r-1, P. 253)

4 Section 2 - mouth of Powder River to Montana-North
5 Dakota state line:

6 Jan.	4,900	May 21-31	20,000	Aug.	7,000
7 Feb.	5,900	June 1-7	26,000	Sept.	7,000
8 Mar.	11,000	8-30	45,000	Oct.	7,000
9 Apr.	11,000	July 1-20	20,000	Nov.	7,000
10 May 1-20	11,000	21-31	10,000	Dec.	5,700

11 These flows equal 8,103,583 acre feet per year,
12 excluding the dominant discharge and should be reserved.
13 (Exh. DFG-1781-r-1, P. 253)

14 The dominant discharge required in this stream reach
15 for one 24-hour period between June 8 and June 30 is as
16 follows:

17 Section 1 - mouth of Bighorn River to mouth of Powder
18 River:

19 47,000 cfs or 93,223 acre-feet;

20 Section 2 - mouth of Powder River to Montana-North
21 Dakota state line: 52,000 cfs or 103,140 acre-feet.

22 This should, also, be reserved. (Exh. DFG-1781-r-1,
23 P. 253)

24 The total reservation which should be effected for
25 this reach of stream is:

26 Section 1 - 7,876,889 acre-feet per year;

27 Section 2 - 8,206,723 acre-feet per year. (Exh. DFG-1781-
28 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:	Catfish Family:
Pallid sturgeon	Black bullhead
Shovelnose sturgeon	Channel catfish
	Stonecat
Paddlefish Family:	Codfish Family:
Paddlefish	Burbot
Mooneye Family	Sunfish Family:
Goldeye	Rock bass
Trout Family:	Green sunfish
Rainbow trout	Pumpkinseed
Brown trout	Bluegill
Pike Family:	Smallmouth bass
Northern Pike	Largemouth bass
	White crappie
	Black crappie
Minnow Family:	Perch Family:
Carp	Yellow perch
Goldfish	Sauger
Golden shiner	Walleye
Pearl dace	
Creek chub	Drum Family:
Flathead chub	Freshwater drum
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	

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	
Pintail	x	x		x	
Gadwall	x	x	x	x	
American widgeon	x	x		x	
Shoveler	x	x		x	
Blue-winged teal	x	x		x	
Wood duck	x	x		x	
Redhead	x	x		x	
Canvasback	x			x	
Red-necked duck	x			x	
Lesser scaup	x			x	
Common goldeneye	x			x	
Rufflehead	x			x	x
Ruddy duck	x		x	x	
Common merganser	x	x		x	
Red-breasted merganser	x				
Turkey vulture			x		
Rough-legged hawk	x				x
Red-tailed hawk	x	x			
Golden eagle		x			x
Bald eagle	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	
Great blue heron	x	x		x	
Black-crowned night heron	x	x			
Lesser sandhill crane	x			x	
American coot	x	x		x	
American avocet	x		x		
Black-bellied plover	x			x	
Killdeer	x	x			
Long-billed curlew	x				
Upland plover	x		x		
Spotted sandpiper	x	x		x	
Willet	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			
King-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

1 and rearing are as follows:

2 A. for sauger: for passage, during the months of March
3 and April; for spawning, during the months of March and
4 April; for rearing, during the months of October through
5 July.

6 B. for shovelnose sturgeon: for passage, during the months
7 of May and June; for spawning, during the month of June.

8 C. for channel catfish: for passage, during the months
9 of May through July; for spawning, during the months of
10 May through July; for rearing, during the months of October
11 through April.

12 D. for the sturgeon chub: for rearing, during the months
13 of January through December. (Exh.DFG-1781-r-1,P.221,222)

14 Qualified professional personnel in Fish and Game utilized
15 134 days on site-specific field work on the Powder River identify-
16 ing instream flow needs for the fish species present in this
17 stream using established sampling techniques. Biologist
18 employed by objector, Intake Water Company, utilized one (1)
19 day making general observations along the entire 200 miles of
20 the Powder River. (Tr. Vol. 14,Test., Rehwinkel,P.3; Tr.Vol.33,
21 Test.Erickson,P.2)

22 Said biologist of Intake conducted no field studies on
23 the Powder River. (Tr.Vol.33,Test.Erickson,P.116,125,126)

24 Intake's biologist stopped at 12 to 16 separate sites
25 along the Powder River and spent approximately 20 minutes at
26 each site making qualitative notes. The only study
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1 done by Intake's biologist was in the confines of his office.
2 (Tr.Vol.33,Test. Erickson, P.149; Tr.Vol.33,Test. Erickson
3 P.120-123)

4 About one-half of the Powder River is out-of-sight from
5 the highway along the river. Intake's biologist observed
6 the river only at sites accessible by automobile. (Tr.Vol.
7 33,Test. Erickson, P.129)

8 Fish and Game's flow request for the Powder River is
9 based on site-specific studies. (Tr.Vol.33, Test. Erickson,
10 P.147)

11 Intake's biologist's knowledge of the Powder River
12 is acknowledgedly limited to his one day automobile trip
13 along the Powder and reports he has read about studies other
14 scientists have conducted on the river. (Tr.Vol.33, Test.
15 Erickson)

16 Intake's biologist was unable to state that Fish and
17 Game's flow requests on the Powder River are inadequate to
18 maintain the fishery or whether they were too much, too
19 little, or just right. (Tr.Vol.33, Test. Erickson, P.138)

20 Fish and Game's application on the Powder River requests
21 less flow at Locate than at Moorhead during the months of
22 October through February. (Exh.DFG-1781-r-1,P.223) Utah's
23 Environmental Hydrologist stated "This is unrealistic for
24 a natural river regime which is supposed to accumulate flow
25 with distance". (Tr.Vol.31,Test. Krishnamurthi, P.7) According
26 to U.S. Geological Survey surface water records for "Pow-
27 der River at Moorhead" and "Powder River at Locate" the

1 Powder River did have less flow at Locate than at Moorhead
2 during the months of October, November, December and Jan-
3 uary for a majority of the years between 1939-1972 and 1975
4 and 1976, confirming that Fish and Game's request for those
5 months is realistic. (Tr.Vol.34,Test. Moore, P.76-82)

6 Testimony and evidence adduced by objectors to the
7 application of Fish and Game has not demonstrated that the
8 flows requested by Fish and Game are not necessary to the
9 needs and purposes supported by said application. The
10 evidence and testimony adduced by Fish and Game goes to
11 the preservation and conservation of fish, wildlife and
12 the ecosystem. Objectors testimony and evidence does not.

13 Forty-two percent of Powder River water is allocated to
14 Wyoming under the Yellowstone River Compact. However, all
15 of that quantity is not currently utilized by Wyoming and
16 thus flows into Montana and consequently has been available
17 for use by fish and aquatic life within Montana. (Tr. Vol.
18 72, Test. Spence, P.22)

19 Despite the projected, or possible, use by Wyoming of
20 its 42 percent of Powder River water, fish and wildlife
21 species currently are maintained by actual flows entering
22 Montana from Wyoming. (Tr.Vol.12,P.22-23 Spence)

23 Findings, to the reach of the Powder River from the
24 Wyoming State boundary to its junction with the Little
25 Powder River are as follows:

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

3	January	100	May	600	September	30
4	February	100	June	750	October	100
5	March	400	July	120	November	100
6	April	400	August	30	December	100

7 These flows equal 170,800 acre feet per year and should be
8 reserved. (Exh.DFG-1781-r-1,P.223)

9 Findings as to the reach of the Powder River from the
10 junction with the Little Powder River to the Yellowstone
11 River are as follows:

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

14	January	80	May	800	September	40
15	February	80	June	800	October	80
16	March	500	July	200	November	80
17	April	500	August	40	December	80

18 These flows equal 198,350 acre feet per year and should be
19 reserved. (Exh.DFG-1781-r-1,P.223)

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1 and seeking their safety, health and
2 happiness in all lawful ways. In enjoying
3 these rights, all persons recognize cor-
4 responding responsibilities.

5 C: Section 89-101.2, R.C.M. which states, in parts
6 pertinent to this application, as follows:

7 State necessity and policy. It is hereby
8 declared that:

9 (1) The general welfare of the people of
10 Montana, in view of the state's population
11 growth and expanding economy, requires that
12 water resources of the state be put to op-
13 timum beneficial use and not wasted.

14 (2) The public policy of the state is to
15 promote the conservation, development and
16 beneficial use of the state's water re-
17 sources to secure maximum economic and
18 social prosperity for its citizens.

19 (3) The state, in the exercise of its sov-
20 ereign power, acting through the department
21 of natural resources and conservation shall
22 co-ordinate the development and use of the
23 water resources of the state so as to effect
24 full utilization, conservation and protection
25 of its water resources.

26 (4) The development and utilization of
27 water resources, and the efficient, eco-
28 nomic distribution thereof, are vital to
29 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 ad-
equiate supplies for public recreational pur-
poses 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 pur-
pose of this act to encourage the wise use
of the state's water resources by making

1 them available for appropriation consistent
2 with this act, and to provide for the wise
3 utilization, development, and conservation
4 of the waters of the state for the maximum
5 benefit of its people with the least pos-
6 sible degradation of the natural aquatic
7 ecosystems. In pursuit of this policy, the
8 state encourages the development of facil-
9 ities which store and conserve waters for
10 beneficial use, for the maximization of the
11 use of those waters in Montana, for the
12 stabilization of stream flows, and for
13 groundwater recharge.

14 E: Section 89-867(2) which states as follows:

15 "Beneficial use" means a use of water for
16 the benefit of the appropriator, other
17 persons, or the public, including, but not
18 limited to, agricultural (including stock
19 water), domestic, fish and wildlife, in-
20 dustrial, irrigation, mining, municipal
21 power, and recreational uses;...

22 II

23 Fish and game is an agency of the State of Montana
24 and is authorized to make application to this board for res-
25 ervation of waters and for maintenance of flows in the
26 Yellowstone River Basin. The application of Fish and Game
27 herein is authorized and is for purpose of serving ex-
28 isting and future beneficial uses as provided by law.

29 III

30 The application of Fish and Game herein, and the
31 testimony, evidence, documentation, oral and written,
32 adduced herein by Fish and Game were proper and sufficient,
33 under applicable laws and regulations, to support said
34 application for reservation and to invoke the jurisdiction
35 of this board.

1 IV

2 The reservations applied for by Fish and Game herein,
3 and the granting thereof, do not in any manner impair the
4 obligations of the State of Montana under the Yellowstone
5 River Compact.

6 V

7 The waters, as to which application for reservation
8 herein is made by Fish and Game are waters of the state,
9 as defined in Section 89-867 R.C.M. and are water resources
10 of this state and this necessarily includes all of the
11 waters actually flowing into the State of Montana and in
12 the Yellowstone River Basin even though some portion
13 thereof is that which is not utilized by the State of
14 Wyoming pursuant to any rights that State may have under
15 the provisions of the Yellowstone River Compact.

16 VI

17 Waters, and instream flows thereof, reserved for the
18 beneficial use for the benefit of the public, fish,
19 wildlife and recreational uses are reserved for existing,
20 as well as future, beneficial uses and the use thereof for
21 such purposes, and to serve such immediate needs, does
22 not constitute an abandonment thereof nor any lack of
23 use thereof which would subject the same to loss to other
24 agencies, federal or state, under any applicable legal
25 doctrine, directive or policy. Reservation for future
26 beneficial, consumptive uses based upon speculation, no
27 matter how justifiable or upon contingencies, no matter

1 how remote or proximate, are not immediate "uses" until
2 the need therefor actually materializes and utilization
3 is accomplished.

4 VII

5 The protection and conservation of the water resources
6 of the state to assure adequate supplies for public rec-
7 reational purposes and for conservation of wildlife and
8 aquatic life, under existing laws and regulations can be
9 accomplished only by granting of reservation of waters,
10 and flows, as herein applied for. No other procedure
11 for reservation of instream flows for such, or any pur-
12 poses is provided for by law. Unless such a reservation
13 is granted for such purposes, neither Fish and Game nor
14 any other agency has authority or standing to object or
15 to be heard on behalf of the public's rights and interests
16 in fish, wildlife or recreational preservation, in any
17 proceedings relating to applications for diversionary
18 or consumptive uses under Sections 89-880 to 89-888,
19 inclusive, R.C.M. nor any other provision of law.

20 VIII

21 In view of the applicable constitutional and statutory
22 provisions hereinabove referred to, and the provisions of
23 Section 89-890, R.C.M., applications for reservation of
24 instream flows of waters in the Yellowstone River Basin
25 need not be justified on quantifiable economic bases and
26 said reservations for such purposes cannot be defeated
27 or denied because of lack of same either in the applications
28 therefor nor the documentation in support thereof.