

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

SUPPLEMENT TO
ENVIRONMENTAL ASSESSMENT
TUOLUMNE RIVER FLOW SCHEDULE REVISION
(CANYON POWER PROJECT)
CALIFORNIA

A supplement to the report by the U.S. Fish and Wildlife Service (dated February 6, 1981) on the Proposed Modification of Flow Requirements below O'Shaughnessy Dam, Yosemite National Park, California. Prepared with the assistance of the National Park Service, U.S. Forest Service, and the California Department of Fish and Game.

Approved: June 8, 1983
Date

By: [Signature]
Regional Director
Portland, Oregon

Acting

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	ii
PURPOSE AND NEED	1
NEW ALTERNATIVE	1
CONSEQUENCES	1
<u>Fishery Resources</u>	1
<u>Recreation-Esthetics</u>	10
<u>Water Supply</u>	10
<u>Hydroelectric Power Generation</u>	10
ADDITIONAL DISCUSSION	10
APPENDIX 1	
ATTACHMENT 1	

SUMMARY

The City and County of San Francisco have proposed an alternative schedule of releases to be made from O'Shaughnessy Dam (Hetch Hetchy Reservoir) to the Tuolumne River. The purpose of the release schedule (and certain associated stipulations) is to protect fishery, recreation and esthetic values of the Tuolumne River within Yosemite National Park and Stanislaus National Forest while minimizing impacts to municipal water supplies and hydroelectric generation. The schedule of releases proposed by the City and County of San Francisco is different from (but within the range of) alternatives addressed in a previous Environmental Assessment prepared by the U.S. Fish and Wildlife Service (February 1981). The proposed flow schedule would provide flows approximately 50% greater than the minimum flows which have been released over the past 15 years, but is less than the schedule previously recommended by the U.S. Fish and Wildlife Service.

PURPOSE AND NEED

Provisions for the long-term operation of the Canyon Power Project unit of Hetch Hetchy Water and Power System by the City and County of San Francisco require that streamflows be released to the Tuolumne River from Hetch Hetchy Reservoir (O'Shaughnessy Dam). The Reservoir is situated within Yosemite National Park and the purpose of the streamflow releases is to protect fishery, recreation and esthetic values of the Tuolumne River downstream of the reservoir.

The background of the Canyon Power Project is more thoroughly discussed in the Environmental Assessment for the Tuolumne River Flow Schedule Revision (U.S. Fish and Wildlife Service, February 6, 1981). This supplement addresses a specific new alternative within the range of those previously considered. This new alternative has been proposed by the City and County of San Francisco as a compromise between demands for utilization of Tuolumne flows for instream maintenance of fisheries, recreation and esthetics and offstream uses for hydroelectric power generation and municipal water supply.

NEW ALTERNATIVE

The alternative proposed by the City and County of San Francisco is considered to be the proposed action. The alternative consists of a 3-tiered flow schedule with different release levels for normal and better, dry, and critically dry water years (Table 1). Determining factors (rainfall and reservoir inflow) permit movement between the three release tiers if changing weather conditions within any one year warrant.

Based on over 60 years of record, normal year releases could be expected to occur about 60% of the time; dry years about 32% of the time; and critically dry years about 8%. The average annual release for all years would be increased by about 50%, from the existing rate of 36,305 acre-feet to 54,364 acre-feet.

A number of other stipulations are associated with the proposed flow schedule (Appendix 1). The stipulations are intended to moderate the operation of Canyon Power Project and Hetch Hetchy Reservoir to minimize adverse impacts to natural resources resulting from sudden changes in reservoir operations. The stipulations also provide for Department of the Interior review and approval of any significant changes in water and power facilities that could impact the Tuolumne River between Hetch Hetchy Reservoir and Early Intake, which is located 12 miles downstream from the reservoir.

Generally, these stipulations can be considered as additional safeguards to help insure that the proposed flow releases will benefit fishery resources as fully as possible without unduly impacting water and power operations.

CONSEQUENCES

Fishery Resources

The alternative proposed by the City and County of San Francisco will provide less fishery habitat than would be provided under the flow schedule recommended in the Tuolumne Flow Study Report (U.S. Fish and Wildlife Service, August 23, 1976). However, 92% of the time the level

TABLE 1

PROPOSED FISH RELEASE SCHEDULE
BELOW O'SCHAUGHNESSY DAM
(In Cubic Feet/Second)

Negotiated				
	<u>Existing</u>	<u>A^{1/}</u>	<u>B^{2/}</u>	<u>C^{3/}</u>
Jan 1	35	50 8.8"	40 6.1"*	35
Feb 1	35	60 14.0"	50 9.5"*	35
Mar 1	35	60 18.6"	50 14.2"*	35
Apr 1	35	75 23.0"	65 18.0"	35
May 1	75	100 26.6"	80 19.5"	50
Jun 1	75	125 28.5"	110 21.3"	75
Jul 1	75	125 575,000 af	110 390,000 af	75
Aug 1	75	125 640,000 af	110 400,000 af	75
Sep 1	75	100	80	75
Sep 15	35	80	65	50
Oct 1	35	60	50	35
Nov 1	35	60	50	35
Dec 1	<u>35</u>	<u>50</u>	<u>40</u>	<u>35</u>
Total	36,305 Acft	59,235 Acft	50,019 Acft	35,215 Acft
% of Time Applicable	100	60	32	8

*During the first three months, Schedule A will be applicable 60% of the time, Schedule B will be applicable 25% of the time and Schedule C will be applicable 15% of the time.

Average Annual Release Under Negotiated Schedule Equals 54,364 Acft

- 1/ Release Schedule A is in effect when cumulative precipitation or inflow since October 1 at Hetch Hetchy equals or exceeds values listed.
- 2/ Release Schedule C is in effect when cumulative precipitation or inflow since October 1 equals or exceeds values listed but is less than corresponding Schedule A values.
- 3/ Release Schedule C is in effect when cumulative precipitation or inflow is less than values listed in Schedule B.

of habitat would exceed the minimum levels afforded under the interim flow schedule over the past 15 years (Figures 1-4). During the remaining 8% of the time the fishery habitat would be similar to but slightly less than that which now exists (Figures 5 and 6).

Late summer flows are frequently critical for trout in west-slope Sierra streams. The proposed release schedule will sustain late summer and early fall river flows at levels equalling or exceeding those minimum levels which would occur naturally. The quality of fishery habitat provided by the proposed releases will also be enhanced over natural conditions because releases will be made from the bottom of Hetch Hetchy Reservoir. The resulting downstream water temperatures will be considerably cooler during the summer and fall months than those of the streams flowing into Hetchy Hetchy Reservoir.

It should be recognized that flows in addition to the minimum specified levels will prevail most years as Hetch Hetchy Reservoir fills and spills. These additional flows will continue to provide a degree of "wild river" character and will be of benefit to the fishery by maintaining a sediment-free channel.

Although the proposed flow schedule represents improvement for the twelve-mile reach over the habitat conditions which have existed under interim flows for the past 15 years, the degree of improvement will be less than would be obtained with the previously recommended flow schedule. Under that schedule flows would range from 75 cfs to 200 cfs in all years. Sustaining these levels of flows, particularly in drought years, would permit a larger and more stable fishery to become established.

Water temperatures at the downstream end of the study area will continue to be of some concern. During critically dry years water temperatures may climb to the 73-75 degree (Fahrenheit) range. However, these temperatures currently occur annually under the interim flow schedule and would also occur frequently under unimpaired (natural) flow conditions. In normal and dry water years the stream temperatures will likely reach 68-70 degrees. These levels are at the upper margin considered suitable for maintenance of good trout habitat.

It is expected that the Tuolumne's fish population will respond favorably to increased flows. Fish population data collected in 1977 near the end of a prolonged drought indicated that although there was an overall decline in trout numbers from seven years previously, there was a good population of both juvenile and adult trout residing in the upper portion of the study area (the first two to three miles below Hetch Hetchy Reservoir). During the drought fishery flows were sustained at or near the required interim flow levels, but there were no additional flows resulting from reservoir spills. Since such adverse flow conditions are expected on only an average of one year in twelve in the future under the proposed flow schedule, it is anticipated that sufficient trout will survive drought year flows to replenish downstream areas in following years.

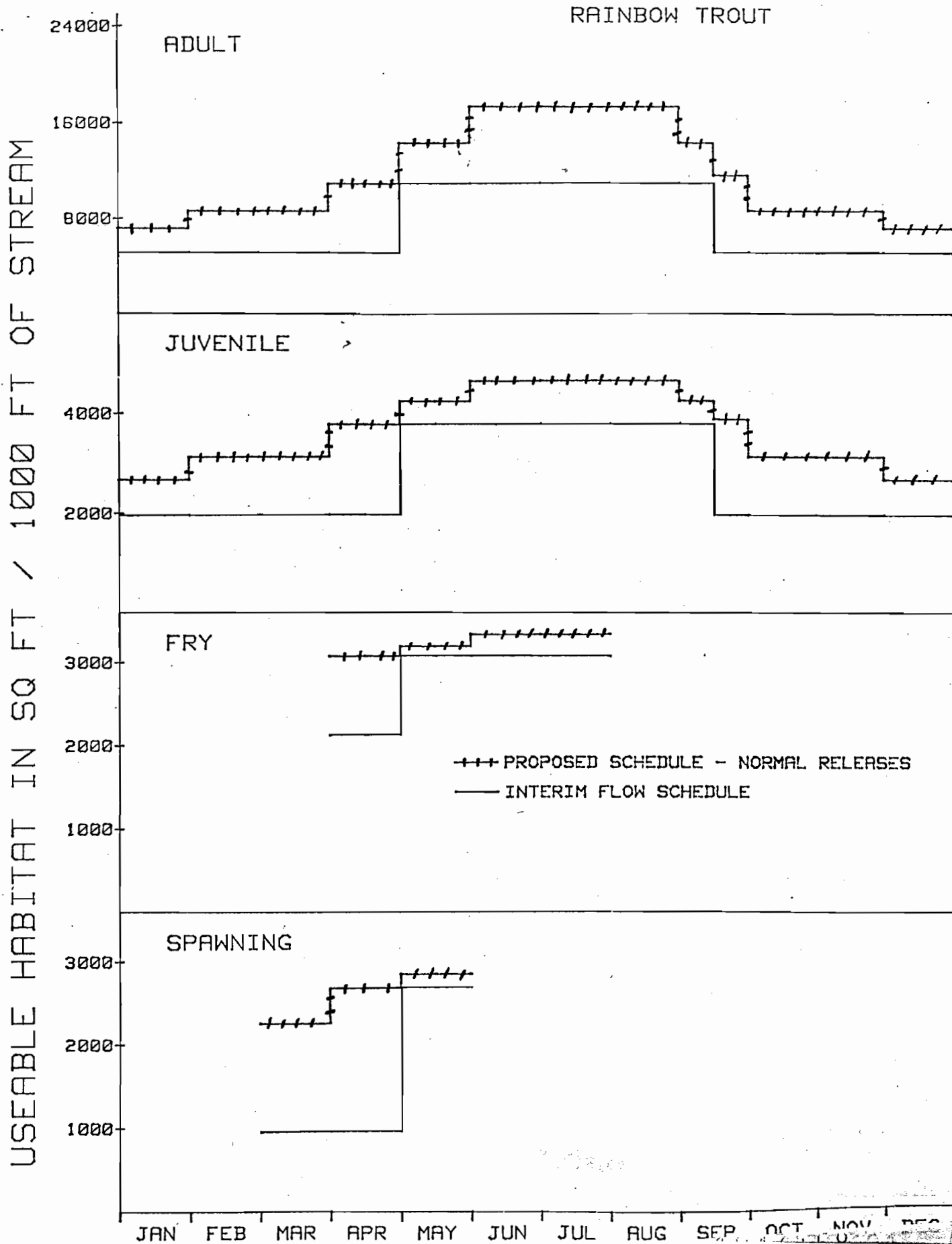


Figure 1.

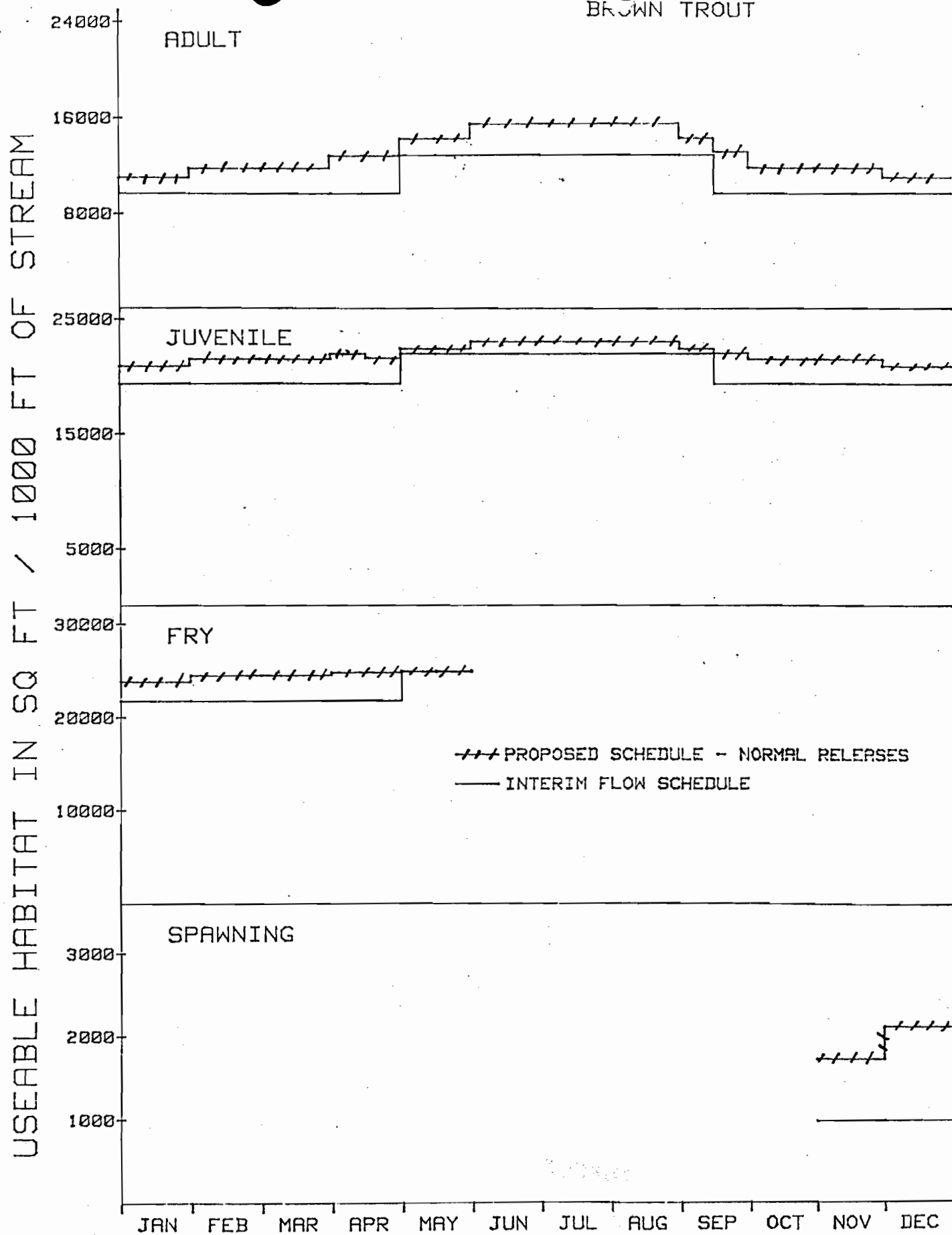


Figure 2.

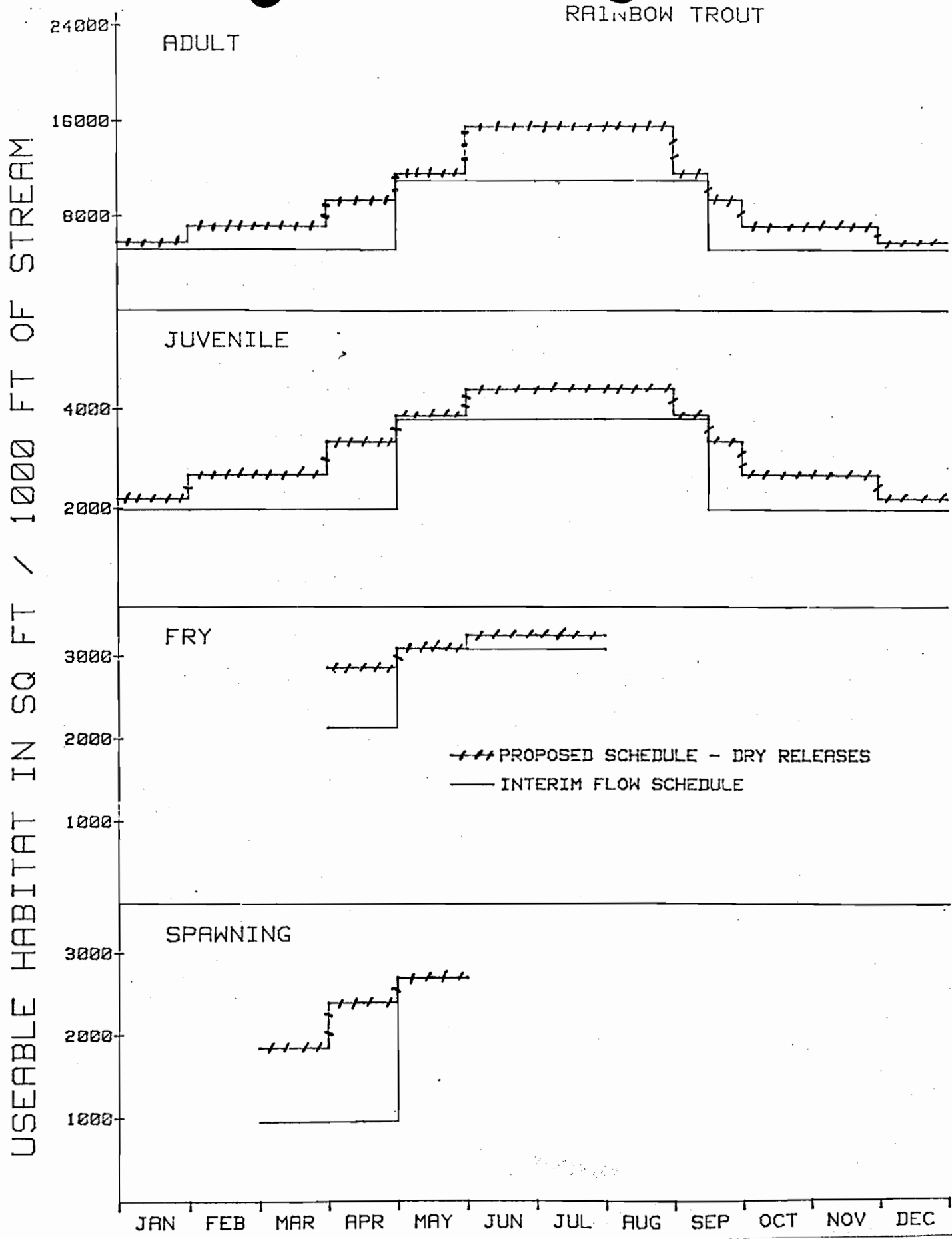


Figure 3.

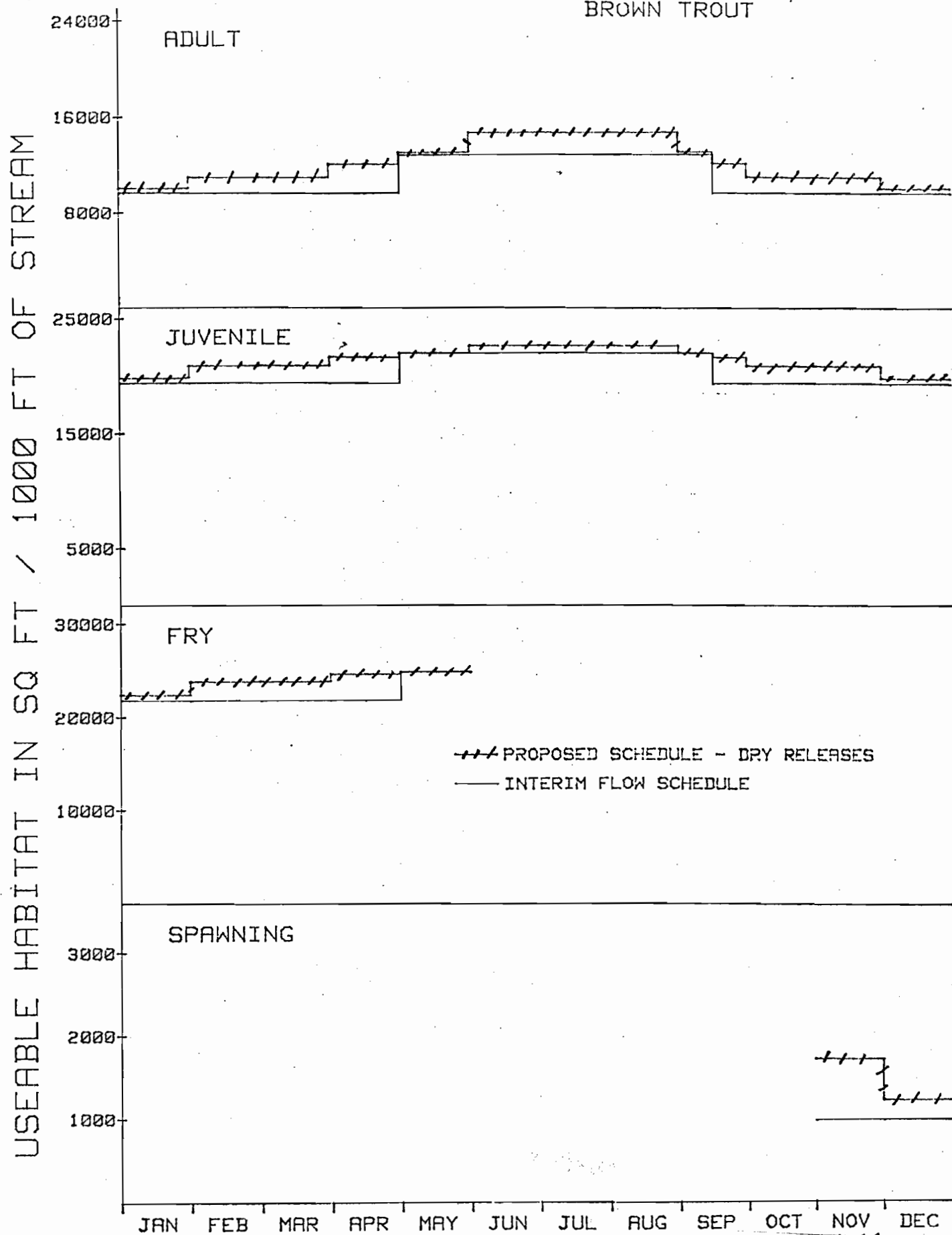


Figure 4.

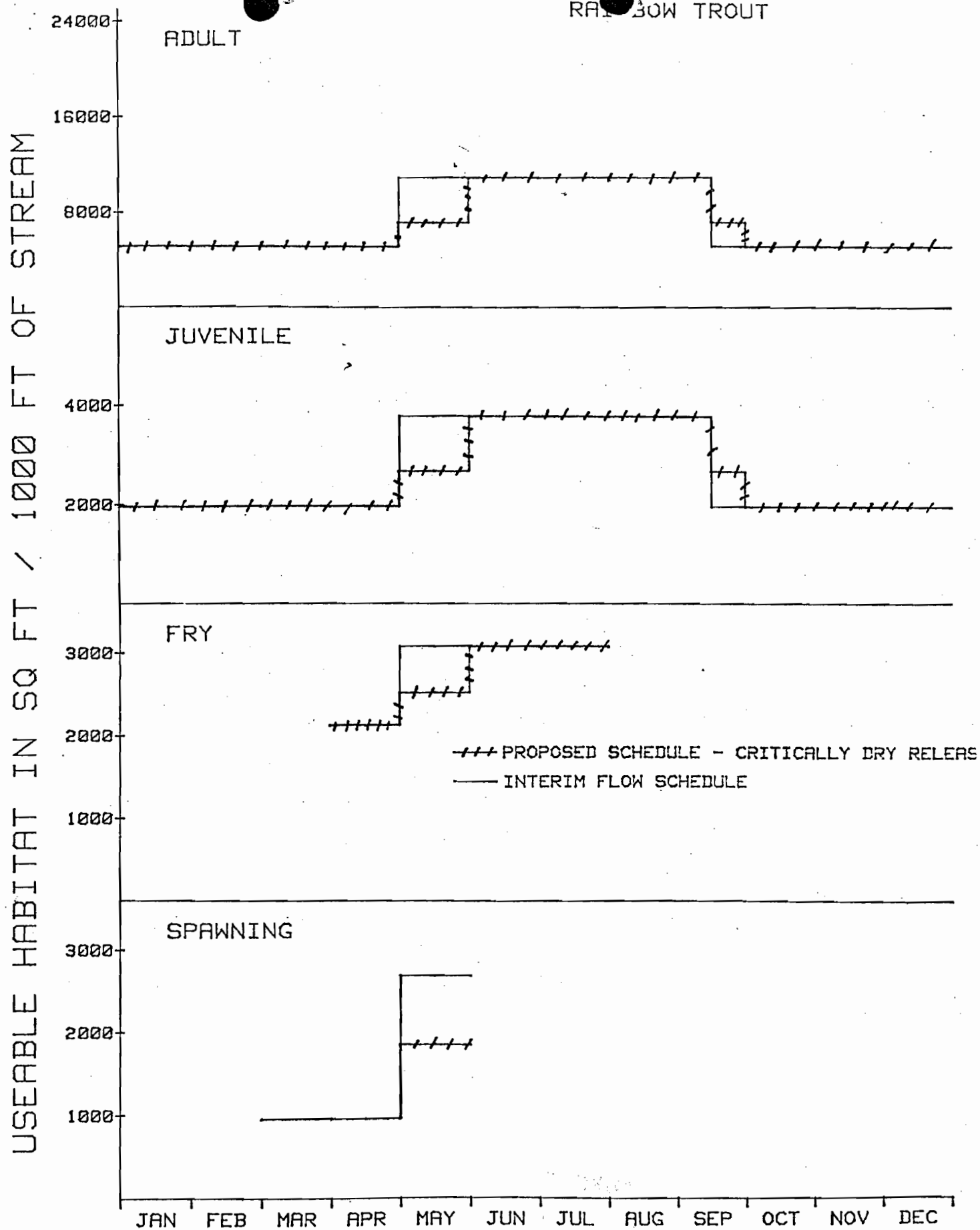


Figure 5.

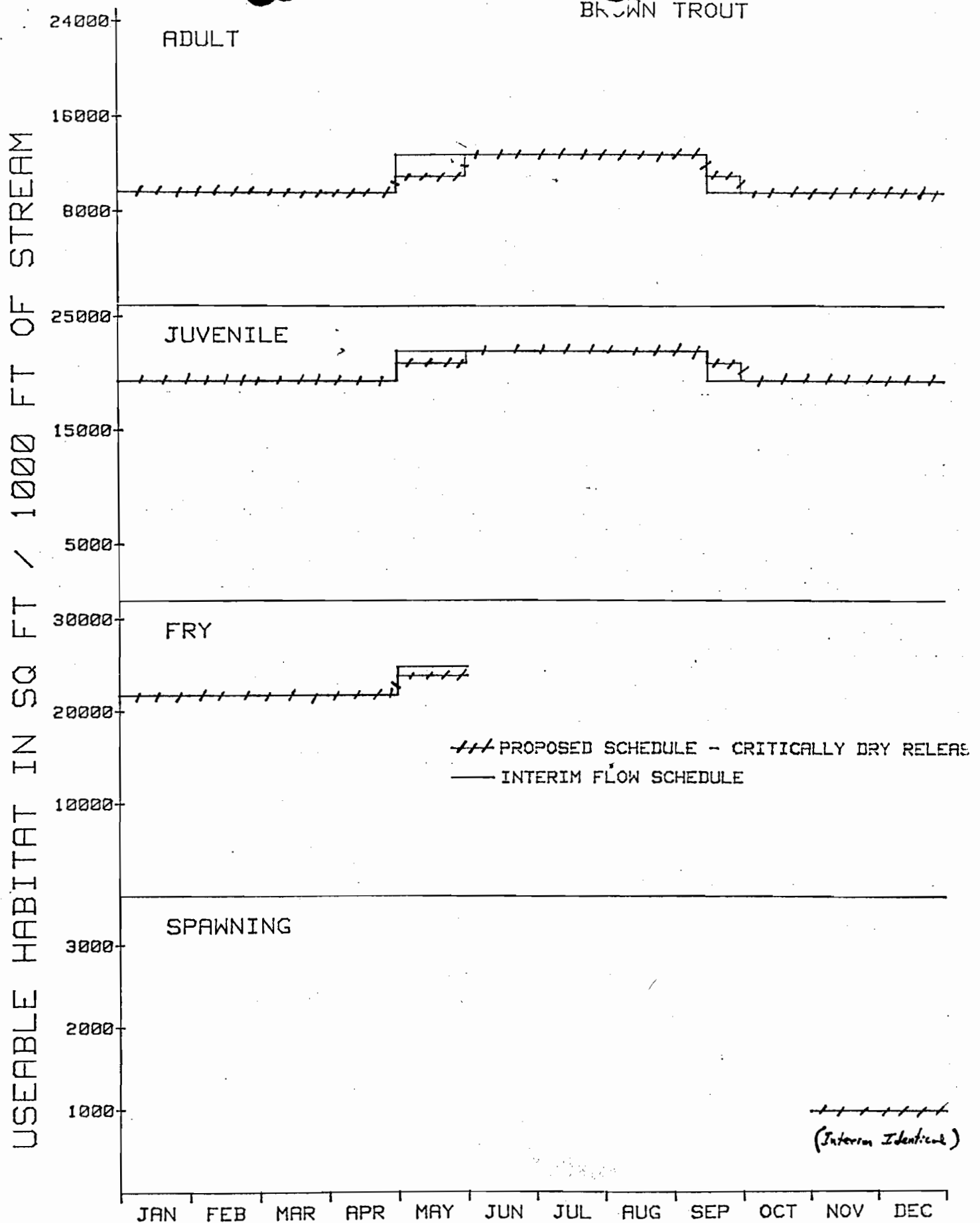


Figure 6.

Recreation-Esthetics

Recreation-esthetic values will be impacted by the proposed action. Those aspects most affected will be fishing, swimming, floating (in inner tubes and kayaks), and the scenic and sound qualities of the river. In terms of the existing (interim) flow schedule, some impacts of the proposed schedule will be beneficial and others adverse.

As fish populations improve in response to increased minimum flows fishing opportunities and success can be expected to increase. The proposed flow schedule will improve habitat for trout but should not result in flows turbulent enough to make fishing excessively difficult.

Although not a major activity, swimming may decrease or become less desirable as peak summer water temperatures fall 3 to 5 degrees (F) in the lower reaches in response to increased flows. The effects on swimming use should be slightly less than would have occurred under the previously proposed flow schedule.

Scenic and sound quality will be improved over existing minimum flow conditions. Summer flows will be sustained at higher levels, which will improve the attractiveness of the river to visitors. Springtime flows will continue to simulate wild (whitewater) river conditions as Hetch Hetchy Reservoir fills and spills in most years.

Water Supply

The dependable water supply of the City and County of San Francisco will not be significantly impacted by the proposed flow schedule because critically dry year river releases will be similar but slightly less than the existing interim schedule.

Hydroelectric Power Generation

Power generation (for the existing power plants and a small toe-generator to be installed at the base of O'Shaughnessy Dam) will be reduced with the proposed flow schedule. The City and County of San Francisco advises that these losses will be about 8 GWH annually under existing water supply demands. This amounts to a reduction of less than one-half of one percent of the current estimated average annual generation of 1,944.5 GWH. This reduction in generation is less than would have occurred under the previously proposed flow schedule.

ADDITIONAL DISCUSSION

This section summarizes the most recently stated positions of the other study agencies and organizations involved in this issue.

The U.S. Forest Service and National Park Service have reviewed the proposed flow schedule and associated stipulations at the field level and have recommended acceptance. Similarly, the California Department

of Fish and Game has approved the proposal by the City and County of San Francisco. These agencies have also reviewed a draft of this supplemental assessment.

Modesto and Turlock Irrigation Districts are primary downstream water users. They do not oppose the proposed settlement.

Tuolumne River Expeditions and the Tuolumne Group Intervenors are opposed to the proposal by the City and County of San Francisco. The principal reason for their opposition is that the proposed flows are viewed as insufficient to protect fishery, recreation and esthetic values. The grounds for opposition is based partly on previous findings that higher flows would be more adequate and desirable for sustaining resource values. We concur that higher flows would be more desirable, but for the reasons discussed in this addendum we believe the proposed flows are adequate.

The Park Service has also addressed the concern of the Tuolumne Group Intervenors and Tuolumne River Expeditions with respect to the adequacy of the proposed flows (Attachment 1). From a historical (pre-Hetch Hetchy Reservoir) perspective, the Park Service has concluded that the proposed flows are adequate to protect recreation and esthetic values.

APPENDIX 1

RECOMMENDATIONS

To protect the fishery, recreational, and esthetic values of the Tuolumne River downstream from O'Shaughnessy Dam (Hetch Hetchy Reservoir), the U.S. Fish and Wildlife Service (with the concurrence of the U.S. Forest Service, the National Park Service, and the California Department of Fish and Game) recommends that the rights-of-way under which the San Francisco Public Utilities Commission operates its Canyon Power Project be amended or supplemented, as appropriate, to provide for the following measures:

1. That the minimum amounts of water released from Hetch Hetchy Reservoir to the Tuolumne River at O'Shaughnessy Dam be in accordance with the schedule attached hereto as Exhibit A.
2. That the allowable rate of change in the magnitude of water releases from Hetch Hetchy Reservoir to the river at O'Shaughnessy Dam be changed from the present stipulation of ". . . not more than double nor less than one-half the previous release over a one-hour period" to "not more than double nor less than one-half the previous release over a four-hour period except when the previous release is 200 cfs or less, in which case the rate of change shall not exceed 50 cfs over a four-hour period."
3. That, insofar as the storage capacity at Hetch Hetchy Reservoir and emergency situations allow, releases to the Tuolumne River shall be managed to prevent sudden or short-term high magnitude releases or spills at O'Shaughnessy Dam.
4. That the San Francisco Public Utilities Commission provide the appropriate field offices of the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game with periodic reports of releases from Hetch Hetchy Reservoir to the Tuolumne River at O'Shaughnessy Dam. The reports should (1) be furnished on a monthly basis by the 10th work-day of the month following that reported on, (2) indicate the magnitude of the release at any given time during the report period, and (3) contain an explanation of any circumstances preventing compliance with the schedule of minimum reservoir releases specified in Recommendation No. 1.
5. That the San Francisco Public Utilities Commission notify the appropriate field office of the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game at least 7 days in advance of any anticipated noncompliance with the schedule of minimum reservoir releases specified in Recommendation No. 1.

6. That the foregoing conditions are imposed for the Tuolumne River from O'Shaughnessy Dam to Early Intake with respect to the existing Hetch Hetchy facilities and capacities along the Tuolumne River. San Francisco agrees that any proposed expansion, alteration, or other modification of the water and power supply facilities which could alter flows along that stretch of river will be subject to review by the Department of the Interior for the purpose of determining what change, if any, should be made in the flow release schedule stipulated in Condition 1. San Francisco further agrees that it will provide to the Department of the Interior advance information concerning any such proposed projects and will assist the Department of the Interior in making its review by undertaking as part of San Francisco's environmental review a study of any such project's impact on fish, wildlife, recreational, and aesthetic values due to changes in river flow. The plan of study will be formulated in coordination with the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service and California Department of Fish and Game, and approved by the Department of the Interior, to insure that all aspects of the proposed projects that could impact river flow are adequately investigated. At the conclusion of the study and based upon such study, the U.S. Fish and Wildlife Service will recommend to the Secretary of the Interior such changes in the flow releases schedule as may be necessary to protect fish, wildlife, recreational, and aesthetic values. Such recommendations shall become part of these conditions, unless San Francisco, within 30 days from receipt of notice of the recommendations, shall file with the Secretary of the Interior, its objections thereto. In such event, at its request, San Francisco shall be afforded a hearing regarding these objections before a special hearing officer who will render proposed findings of fact. The Secretary, after considering the proposed findings of fact and the record, shall determine what additional flows, if any, shall be required over those specified above.

Exhibit A

That the minimum amounts of water to be released from Hetch Hetchy Reservoir to the Tuolumne River at O'Shaughnessy Dam shall be in accordance with the following schedules:

	Minimum Release Schedules (cfs)			Cumulative Precip. (inches)/runoff (acre-feet)		
	A	B	C	A Equal to or greater than:	B Less than Col. A but equal to or greater than:	C Less than Col. B:
January	50	40	35	8.8	6.1	---
February	60	50	35	14.0	9.5	---
March	60	50	35	18.6	14.2	---
April	75	65	35	23.0	18.0	---
May	100	80	50	26.6	19.5	---
June	125	110	75	28.5	21.3	---
July	125	110	75	575,000	390,000	---
August	125	110	75	640,000	400,000	---
September 1-15	100	80	75	---	---	---
September 16-30	80	65	50	---	---	---
October	60	50	35	---	---	---
November	60	50	35	---	---	---
December	50	40	35	---	---	---
Minimum amount of Water (acre-feet)	59,235	50,019	35,215			
Frequency (percent) ^{1/}	60	32	8			

Determination of applicable schedule (A, B or C) is to be made on the first of each month during January through August. Determinations for January through June are to be based on cumulative precipitation at Hetch Hetchy since October 1 of the preceding year. Determinations for July and August are to be made based on calculated cumulative runoff into Hetch Hetchy since October 1 of the preceding year. The release schedule which is in effect on August 1 of each year shall remain in effect until the following January.

The frequency of each schedule is based on precipitation and runoff data which have been collected over the past 58 years at Hetch Hetchy. During the first three months Schedule B is adjusted to be in effect an average of 25% of the time and Schedule C 15% of the time.

FWS, Attention: AE

DEPARTMENT OF FISH AND GAME

1515 N NINTH STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-3531



Due Date: _____



March 30, 1983

ARD-HP	<input checked="" type="checkbox"/>
DARD-HP	_____
Admin.	_____
Budget	_____
Tech. Asst.	_____
Eco. Svs.	_____

James McKeivitt, Field Supervisor
Division of Ecological Services
U.S. Fish and Wildlife Service
2800 Cottage Way, Room F-2727
Sacramento, CA 95825

Dear Mr. McKeivitt:

The Department of Fish and Game has reviewed your draft addendum to the environmental assessment for the Tuolumne River Flow Study as requested in your letter of February 16, 1983.

We have been working with the U.S. Forest Service, Yosemite National Park, and your staff for sometime to develop a flow schedule for the Tuolumne River below Hetch Hetchy satisfactory to all, including the city and county of San Francisco. The flow schedule presented in the addendum is a product of that effort and is supported by this department. It was also affirmed in a previous document filed with the United States Department of the Interior, Office of Hearings and Appeals in November, 1982.

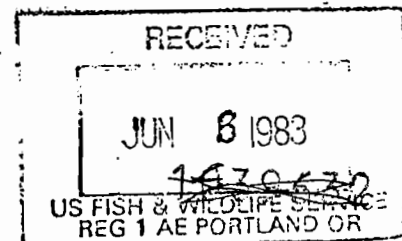
We believe the addendum is factual and complete, and concur with the recommendation that all five measures listed in the "recommendations" section be adopted for the Canyon Power Project Operation.

Sincerely,

E. J. Offici

Director

FOR



Page 1 of 3



UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Stanislaus National Forest
19777 Greenley Road
Sonora, California 95370

2540
2370
March 10, 1983

Mr. James J. McKevitt
Fish & Wildlife Service
Division of Ecological Service
2800 Cottage Way, Room E-2727
Sacramento, CA 95825
Attention: Jody Hoffman

[illegible]

Dear Ms. Hoffman:

We appreciated the opportunity to review the draft addendum to the Environmental Assessment for the Tuolumne River Flow Study (Canyon Power Project).

I regret our inability to provide a response as requested by 2/25/83.

We do not see any problems which would preclude Forest Service acceptance of the Supplement to the Tuolumne River E.A.

Sincerely,

Hany Horrell

BLAINE L. CORNELL
Forest Supervisor



Page 2 of 3

Page 2 of 3



United States Department of the Interior

NATIONAL PARK SERVICE

P.O. BOX 577

YOSEMITE NATIONAL PARK, CALIFORNIA 95389

IN REPLY REFER TO:

L7423 (WR-RNR)

JAN 27 1983

Mr. James J. McKivitt, Field Supervisor
 Division of Ecological Services
 U.S. Fish and Wildlife Service
 2800 Cottage Way, Room E-2727
 Sacramento, CA 95825

Dear Mr. McKivitt:

We have been asked by the Field Solicitor to respond to the comments of the Tuolumne Group Intervenors (TGI) and Tuolumne River Expeditions (TRE) regarding the proposed settlement of the Tuolumne River Flow Study Report. Our comments below constitute that response.

We agree with the protestants that the "existing" or Interim Flow Schedule has seriously degraded the Tuolumne River between O'Shaughnessy Dam and Early Intake in the past 18 years. However, comparison of the Interim Flow Schedule currently in force with flows that prevailed following completion of the Hetch Hetchy reservoir and prior to construction of the Canyon Tunnel conveys a false impression. Flows though excellent for the fishery, aesthetics and recreation were unnaturally stable; and during late summer and fall, were many times greater than the natural flows that occurred there prior to project development. This is illustrated by the fact that during that 44 year period flows seldom dropped below 200 cfs and the lowest monthly flow was approximately 640 cfs.

It is also true that Alternative 1, the recommended flow schedule described in the Environmental Assessment, Tuolumne River Flow Schedule Revision (Canyon Power Project) would be superior to the proposed compromise schedule in respect to fisheries, aesthetics and recreation although the 200 cfs minimum flow in May and June would discourage water contact recreation. Unfortunately prolonged discussions and negotiations with the City and County of San Francisco on this alternative were fruitless and led to this issue coming before an administrative law judge for settlement. The Interim Flow Schedule had resulted in prolonged and severe degradation of the fishery, aesthetic and recreational resources of the river and the Park was interested in rectifying that situation if a suitable compromise could be reached. We believe that the proposed stipulations including Flow Schedules A, B and C represent such a compromise.

Admittedly Schedule A would permit minimum flows to fall below 125 cfs each year during September. Instream flow studies conducted in 1968, 1970 and 1971 showed that flows below 125 cfs resulted in summer water temperatures in excess of 68° Fahrenheit and were beyond the upper limits considered suitable for trout. However, in this case the impact would probably be restricted to the lower portion of the affected reach near Early Intake and limited to only one month of the late summer season. For those reasons we do not believe impacts on the

fishery resource would be serious. Also, slight but acceptable impacts on aesthetic and recreational resources would occur.

To gain some insight on how such flows compare with the natural or unregulated flows that preceded the completion of O'Shaughnessy Dam the 13 year period of record preceding April 1923 should be consulted. These records show that average, monthly, natural flows failed to meet Schedule A requirements for August through October 18 times or 46 percent of the time.

Schedule B would require no flows greater than 110 cfs and as a result water temperatures would likely exceed 68° Fahrenheit for much of the period of June through September. The fact that the June through August minimum flows would be 110 cfs and that Schedule B would be in effect no more than 32 percent of the time suggests that impacts on the fishery would not be excessive. Impacts on aesthetic and recreational resources would not be severe and water contact recreation would be encouraged.

A comparison of Schedule B minima with natural flows reveals that average monthly flows for the latter failed to meet Schedule B 15 times or 38 percent of the time.

Schedule C represents only a slight improvement over the Interim Flow Schedule. Implementation of Schedule C should result in short-term but serious adverse impacts on fishery, aesthetic and recreational resources. However, due to the fact that this schedule would be in effect only eight out of every 100 years we do not believe that its long-term effects would be serious.

A comparison of these proposed minima with natural flows indicates that on eight occasions or 21 percent of the time Schedule C minimum flows would exceed natural flows from August through October.

The following is in reply to TGI's additional concerns:

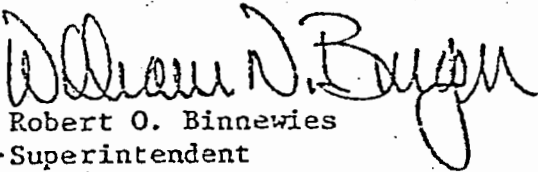
- 1) The protestants question why Exhibit A does not show the expected frequency for each sub-schedule. We believe these frequencies were accidentally omitted from the final submission and they are as follows; Schedule A: 60 percent; Schedule B: 32 percent; and Schedule C: 8 percent.
- 2) TGI recommends that "sudden or short-term high magnitude releases or spills" be defined. We see no problem with that recommendation and, if deemed important, believe that this could be done through consultation with all parties concerned.
- 3) The protestants note that there is no identifying mechanism for correcting routine noncompliance by the City and County of San Francisco. In actuality there are a number of administrative and legal remedies available for dealing with this issue.
- 4) TGI finds no stipulation in the proposed settlement that would require fish release flows to remain in the Tuolumne River below Early Intake as previously required in the Stipulations For Amendments Of Rights-Of-Way For The Canyon Power Project, Approved By Secretary Of The Interior On May 26, 1961.

Stipulation 3 of the above amendment states "The amendment applied for is also subject to provision that water diversions by applicant below Early Intake Dam do not decrease the magnitude of water releases from O'Shaughnessy Dam for fish, and provided these releases in addition to accretional runoff be permitted to enter and continue in the Tuolumne River below Early Intake."

It is our opinion that nothing in the proposed settlement would alter or replace Stipulation 3 or the other stipulations in the above described amendment. Therefore we believe there is no need to restate Stipulation 3 of the 1961 amendment in any new settlement.

We hope this has been helpful to you. If you have any questions or comments please do not hesitate to contact us.

Sincerely,


Robert O. Binnewies
FOIC Superintendent

Enclosures