January 5, 2000
TMT Members -

At our last meeting we continued discussions on decision-making criteria for upcoming in-season management. In preparation for continued discussions at the January meeting, TMT members agreed to submit their thoughts on goals, objectives, and "triggers" to Cindy at the Corps (Cynthia.A.Henriksen@nwd01.usace.army.mil) by WEDNESDAY, JANUARY 5TH. The Corps will then compile the information and distribute it prior to the January 12th meeting. It is important that we get input from each of you in order to keep moving forward on this effort. Thank you in advance for your thoughts, time and effort during this busy time.

ACTION REQUIRED: (1) Review "brainstorm list" from November 3rd facilitator's notes. (2) Complete the template, which appears at the end of this email, to identify goals, objectives, and "triggers" related to items from the "brainstorm" list. Those topics that were identified as of special priority for the January 12th meeting include: Dworshak/Brownlee; Hanford Stranding; Ives Island; Vernita Bar; and other mid-Columbia issues. Note that TMT members agreed to address these issues by breaking them into river regions to aid discussions. The template below is designed by region.

SOME DEFINITIONS OF GOALS, OBJECTIVES, TRIGGERS

The following definitions are intended to provide a starting place for the continued discussion of decision-making criteria at the upcoming TMT meeting and to help you fill in the template below. It is common practice for groups to select their own phrases for planning processes such as this (e.g., "triggers", as was suggested at TMT's December 15 meeting). What is most important is that you all have a common understanding of the words you are using to describe your actions.

GOALS:

Definition:

What people hope to achieve.

Other Defining Phrases: Aspirations; The end result of a lot of hard work; the ends.

Note: Goals tend to be vague and lofty, yet they should provide the general big picture of the desired results.

EX: Increasing survival of Snake River subyearling chinook salmon.

OBJECTIVES:

Definition:

How people know whether their goal is achieved.

Other Defining Phrases: Performance Standards; Benchmarks; Measuring Stick.

Note: Objectives tend to be quantifiable, concrete numbers, including dates and timelines for actions to occur. They should provide guidance on what is necessary to achieve the desired end results.

Example: Flow augmentation until ___% of the Snake River subyearling chinook salmon run passes Lower Granite to increase survival of subyearling chinook salmon.

"TRIGGERS":

Definition:

An event that precipitates others.

Other Phrases: Strategies.

Note: "Triggers" are more concrete then objectives, involving who must do what, when and how.

Example: Release Brownlee water earlier using temperature and flow at Hells Canyon Dam as a trigger (e.g., ___ degree Celsius and ___ kcfs).

TEMPLATE FOR DECISION MAKING CRITERIA

At the last TMT meeting, members agreed to work between meetings to come up with system and seasonal goals, objectives, and triggers for the following regions and issues. Members agreed that the following template would be a useful starting point. For more process information, see above.

SNAKE OR UPPER RIVER:

Elements to consider: flow, temperature, fish, timing (monthly, before/after refill, seasonal), refill, start and end of MOP.

SNAKE OR UPPER RIVER GOALS:

SNAKE OR UPPER RIVER OBJECTIVES:

SNAKE OR UPPER RIVER TRIGGERS:

MID-COLUMBIA:

Elements to consider: flow, temperature, fish, Hanford Reach operations, Vernita Bar, refill, Montana resorvoirs, timing (monthly, before/after refill, seasonal).

MID-COLUMBIA GOALS:

MID-COLUMBIA OBJECTIVES:

MID-COLUMBIA TRIGGERS:

LOWER RIVER:

Elements to consider: flow, temperature, fish, timing (monthly, before/after refill, seasonal), Ives Island.

LOWER RIVER GOALS:

LOWER RIVER OBJECTIVES:

LOWER RIVER TRIGGERS:

SPILL:

Elements to consider: timing (monthly, before/after refill, seasonal).

Thanks for your valuable work on this between meetings, so more progress can happen in the next meeting!

TECHNICAL MANAGEMENT TEAM			
BOR: *Romeo Wisco / Kim Fodrea*		**BPA:** *Scott Bettin / Robyn MacKay*	
NMFS: *Paul Wagner / Chris Ross*		**USFWS:** *Marv Yoshinaka / Bob Hallock / Susan Martin*	
OR: *Ron Boyce / Chuck Tracy*	**WA:** *Jim Nielsen*	**ID:** *Ed Bowles / Steve Pettit*	**MT:** *Jim Litchfield*
COE: *Cindy Henriksen / Rudd Turner*			

TMT MEETING

12 January 2000 1000 - 1500 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

Following discussion of the amount of work that needs to happen in TMT, members agreed to increase the frequency of upcoming meetings. Next meetings are scheduled for:

Wednesday, January 26th 10:00 - 3:00

(it was suggested that there be a short break followed by a working lunch)

Proposed Agenda Items:

- Air temperature and its effect on water temperature and fish. Scott Bettin (BPA)/Chris Ross (NMFS).
- TMT GUIDELINES (5/10/99 Draft HTML OR PDF): Any changes in TMT meeting schedule? Any changes re: SOR submission or decision-making criteria? Open/closed executive sessions: conclusions from attorneys and executive policy discussions. Update on IT feedback from January 6th meeting. Group.
- Decision-making criteria for TMT. Review goals/objectives/triggers information. Begin developing specific criteria. Group.
- Recommended river operations.

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935.

TECHNICAL MANAGEMENT TEAM					
BOR: *Kim Fodrea / Pat McGrane*			**BPA:** *Scott Bettin / Robyn MacKay*		
NMFS: *Paul Wagner / Chris Ross*			**USFWS:** *Marv Yoshinaka / Bob Hallock / Susan Martin*		
OR: *Chuck Tracy*	**WA:** *Jim Nielsen*		**ID:** *Ed Bowles / Steve Pettit*	**MT:** *Jim Litchfield*	
COE: *Cindy Henriksen / Rudd Turner*					

TMT MEETING

26 January 2000 1000 - 1500 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

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TMT In-Season Management Criteria – Objectives & Triggers

26 January 2000

Lower Columbia River

Overall

Goal

Increase survival of listed fish populations by providing suitable migration conditions for all life phases of anadromous fish. [A]

Objectives

1	2
Provide a non-turbine passage route for juvenile migrants by providing spill at the lower Columbia River dams during the spring period. Maintain spill at a level to achieve tailwater TDG levels of 120% at defined schedules during the juvenile migration period which is approximately mid-April through June 20. Maintain the same spill conditions during the summer period with the exception of McNary Dam, where transportation is maximized during the summer migration period (July 1 - August 31) and spill is not managed for. [A]	Spill to the maximum allowable state standard at all dams on the lower Snake and Columbia rivers when spring migrants are present (approximately early-April through mid-June) and minimize turbine and multiple bypass passage. [C] Based on dissolved gas monitoring data, Idaho will not object to a gas level up to 120/125% in the lower Snake and Columbia rivers. [C] Operate turbines within 1% of peak efficiency when smolts are present. [C] Maintain Minimum Operating Pools at all reservoirs on the lower Snake and Columbia rivers (except John Day Reservoir at MIP) during the spring migration period. [C] Utilize a "spread-the-risk" transportation strategy based on annual pre-season projections of in-river migration conditions. In 1999 Idaho recommended transportation of smolts collected at Lower Granite and Little Goose dams, and returning all bypassed fish to the river at Lower Monumental and McNary

Source:

[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**

[C] From Ed Bowles-Idaho From Corps of Engineers

From Bureau of Reclamation

	dams. (Spill to the maximum allowable by state water quality agencies at all collector projects throughout the spring migration period.) Trucking should be limited in the transport of smolts. [C]

Triggers

Initiation of spill
The date is near the historic migration time and juvenile fish numbers are in _ digits and show an increasing trend for _ consecutive days or are _ digits for _ days and do not decrease by more than _% on the _ day. . [A]

Bonneville

Objectives

Spill for Juvenile Fish April 20 – August 31
Provide adult and juvenile fish passage according to Fish Passage Plan (FPP)
Maintain Navigation
Operate Units within 1% guidelines
Provide flows to protect Chum and Fall Chinook Spawning below Project, late October to April

Triggers

Middle 90% of juvenile fish runs
Fall-winter flows: dates of initiation of spawning and incubation of listed chum and fall chinook; dependent on flow conditions

The Dalles

Objectives

Spill for Juvenile fish April 20 – August 31
Provide adult and juvenile fish passage according to FPP
Maintain Navigation
Operate Units within 1% guidelines

Triggers

Middle 90% of juvenile fish runs

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
From Corps of Engineers
From Bureau of Reclamation
[C] From Ed Bowles-Idaho

John Day

Objectives

Spill for Juvenile Fish April 20 – August 31
Provide adult and juvenile fish passage according to FPP
Maintain Navigation
Operate within a one and half foot range of 262.5 from April 20 to September 30
Maintain Irrigation
Operate Units within 1% guidelines

Triggers

Middle 90% of juvenile fish runs

McNary

Objectives

Transport Juvenile Fish in the summer
Initiate transportation of fish at McNary Dam when spring migrants are passing in low numbers and in-river conditions are no longer "spring like" . [A]
Spill for Juvenile Fish April 20 – June 30
Provide adult and juvenile fish passage according to FPP
220 – 260 kcfs Flow Objective from April 20 to June 30
200 kcfs Flow Objective from July 1 to August 31
Manage flows to achieve a level of at least 220 kcfs at McNary Dam during the spring period (April - June 20) and 200 kcfs during the summer period (June 21 - August 31) as frequently as possible. [A]
Maintain Navigation
Operate Units within 1% guidelines

Triggers

Flow forecast
Middle 90% of juvenile fish runs
Begin transport when subyearling chinook predominate total chinook daily collections for 3 consecutive days.

Middle Columbia River

Overall

Goals

Source:

[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**
[C] From Ed Bowles-Idaho From Corps of Engineers
From Bureau of Reclamation

Improve survival of listed fish populations by providing suitable migration conditions for all life stages of anadromous fish. [A]
Assure reservoirs are as full as possible at the start of the migration periods so natural runoff is used to increase river flows instead of filling empty reservoir space. Draft reservoirs as needed during the spring migration period to achieve flow objectives but place a higher priority on achieving reservoir refill by July 1 than meeting spring flow levels. [A]
Provide suitable discharge from Grand Coulee and Chief Joseph projects to enable Priest Rapids Dam operations to minimize river fluctuations and stranding of juvenile chinook salmon. [B]
Meet ESA obligations. Meet BiOP objectives and commitments per Record of Decision.
Meet tribal treaty and trust responsibilities.
Fulfill project operating requirements, authorizations and contractual commitments.
Meet multi-purpose objectives.
Achieve resident fish objectives to the fullest extent practicable.
Dam safety, public safety, operating efficiency and flexibility.

Objectives

Vernita Bar

Triggers

Establish and maintain fall chinook incubation flows according to 1988 VB Settlement Agreement.

Priest Rapids

Objectives

135 kcfs Flow Objective from April 10th - June 30
Manage flows to achieve a level of at least 135 kcfs at Priest Rapids beginning approximately April 10 and extending through June 30 as frequently as possible. [A]
Implement Hanford Reach Stranding agreement
Maintain a steady or increasing hydrograph through the spring to the extent possible to protect emergent fry in the Hanford reach. [A]
Coordinate federal and PUD project operations so that flow fluctuations are minimized during the subyearling chinook emergence and early rearing period. [B]

Triggers

Index seining in the Hanford Reach captures 50 or more sub-yearling chinook from the 6 index seine sets. [A]

Triggers for the Hanford Reach have been developed by the Hanford Reach Fish Protection Policy Group. [B]

Source:
[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**
[C] From Ed Bowles-Idaho From Corps of Engineers
From Bureau of Reclamation

Chief Joseph

Objectives

Operate at elevation 930 – 956 feet from October 21 to February 14
Operate at a lower limit of 950 feet from February 15 to May 15 for Goose nesting.
Operate at elevation 950 – 956 feet from May 16 to October 20

Triggers

Grand Coulee

Objectives

Assist in Meeting Flow Objectives
Meet Flood Control
Operate to meet 85% confidence level of meeting April 10 flood control elevation.
Meet BiOP in-season flow objectives (April 10 to August 31).
Meet chum flows October-April(?).
Protect during December-March the 85% confidence of refilling on April 10.
Serve irrigation diversion requirements.
Meet flood control.
Prevent spill through SNL, or by banking the water; Spill with minimum TDG impact.
Provide flows for Vernita Bar; alleviate Hanford stranding.
Draft/fill for power or non-power emergencies; Maintain power system integrity.
Meet multi-purpose needs: tribal needs (e.g., 1283 feet), power, NWPPC-resident fish.
minimum lake level for ferry operation, etc.
Refill on June 30. Provide for safe recreation through July 4 and Labor Day.
Secure optimum period-by-period storage levels to be responsive to needs and emergencies.

Triggers

BiOP flow targets, dates, elevation limits (1280 feet), fish curves.
Timing of flood control draft to minimize spill.
Volume forecast may trigger need for refill prior to April 10 for Hanford stranding.
Impending, perceived, or sudden emergencies – power or non-power.
Project operating requirements – daily draft or refill rate limits to prevent bank sloughing.
Maintenance and other actions for dam safety, public safety.
Sufficient water releases to protect such needs as navigation (e.g., reactor vessels, etc).
1225 feet FDR Lake level to maintain ferry operation.
1240 feet or other elevations for efficient pumping to keep up with irrigation demands.
Upstream (e.g., Canadian) operations.
August 31: transition from BiOP in-season operations to multi-purpose operations.

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
From Corps of Engineers
From Bureau of Reclamation
[C] From Ed Bowles-Idaho

Upper Columbia

Hungry Horse

Objectives

Assist in meeting flow objectives
Meet Flood Control
Operate to meet 75% confidence level of meeting April 20 flood control elevation
Attempt to meet IRC elevations if feasible after BiOp conditions have been met
Meet in-season (April 10 to August 31) BiOP flow objectives.
Protect during December-March the 75% confidence of refilling on April 10.
Meet local and system-wide flood control.
Meet IRC elevations to the fullest extent practicable.
Meet minimum flow requirement of 3,500 cfs at Columbia Falls.
Serve local and system-wide power or non-power emergency needs.
Avoid spill through such actions as deferring April 10 refill.
Assist in meeting Flathead Basin Management operating objectives.
Meet other multi-purpose needs.
Secure optimum period-by-period storage levels to be responsive to needs and emergencies.

Triggers

BiOP flow targets, dates, elevation limits (3540 feet), fish curves.
Kerr operating conditions that may prompt Horse assistance to meet FERC requirements.
Prognosis for spill; need for pre-emptive releases to avoid such spill.
Available turbine/generation capacity.
Impending, perceived, or sudden emergencies – power or non-power.
Expectations of flow arrival for BiOP objectives triggers timing of storage draft.
Discharge limits for downstream public safety.
River fluctuations must be minimized to protect resident fish.
Project operating requirements – ramp rates, minimum discharge, etc.
Maintenance and other actions for dam safety, public safety.
August 31: transition from BiOP in-season operations to multi-purpose operations.

Libby

Goals

Overall sturgeon goal for the Kootenai River is to restore natural recruitment to the Kootenai River white sturgeon population. [B]
Provide suitable stream flows in the Kootenai River to recover Kootenai River white sturgeon. [B]
Provide a suitable stream flow regime for bull trout in the Kootenai and Flathead rivers. [B]

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
From Corps of Engineers
From Bureau of Reclamation
[C] From Ed Bowles-Idaho

Objectives

Operate to meet 75% confidence level of meeting April 20 flood control elevation.
On upper rule curves by April 10th (from ROD)
Balance the needs of providing a volume water for sturgeon spawning, riverine habitat for bull trout, and achieving refill of Libby reservoir by mid-July. [A]
Meet flood control
Meet International Joint Commission (IJC) requirements at Kootenay Lake
Assist in Meeting Flow Objectives
Provide suitable river flow and water temperature for sturgeon spawning, incubation, hatching, and juvenile survival. [B]
15 kcfs flow at Bonners Ferry from May 1 to Start of Sturgeon Spawning, then release full powerhouse capacity for up to 42 days. Goal = 35 kcfs at Bonners Ferry, then 11 kcfs at Bonners ferry for 21 days.
Maintain stable discharge from Libby Dam between the sturgeon spawning and salmon flow augmentation operations. This discharge may be between 4 kcfs and 10 kcfs. [B]
Attempt to meet IRC elevations if feasible after BiOp conditions have been met
Ramp stream flows in the Kootenai River at a rate that does not strand or otherwise adversely impact bull trout. This ramp rate should not exceed a 10% change within a day or between days. [B]

Triggers

Initiation of sturgeon spawning
Will be provided when 2000 Sturgeon Guidelines for Libby Dam operations are developed by the FWS. [B]
The 1999 sturgeon guidelines can be used as a reference example. The 1999 guidelines specified maintaining 4kcfs outflow from Libby Dam starting April 1. Once local runoff downstream from Libby Dam increases flow at Bonners Ferry to 15kcfs, then maintain 15kcfs. If local inflow does not provide sufficient water to reach 15kcfs, regulate outflow from Libby Dam to reach 15kcfs at Bonners Ferry in June. [B]
Triggers to start the flow pulsing operation for sturgeon include: 1) the combined water temperature at Bonners Ferry is expected to be maintainable at 10 degrees C.; 2) radio tagged sturgeon spawners have moved into the Kootenai River; and 3) local inflow to the Kootenai River between Libby Dam and Bonners Ferry is increasing or believed to be near the annual peak. When these trigger conditions are met, increase the Libby Dam discharge to the maximum extent possible. [B]
Bull Trout Triggers will be developed by the FWS for 2000. Flow requirements for 1999 can be used as an example for 2000. In 1999, the FWS requested that all flow changes be limited to a maximum of 10% within and between days when the river flow was less than 14 kcfs. The FWS also requested that Libby Dam discharge be maintained at about 8 kcfs during the summer between the sturgeon spawning flow pulse and the start of salmon flow augmentation. . [B]

Albeni Falls

Objectives

90% confidence level of being at the (April 15th (ROD or April 20 Water Management plan) flood control elevation
Meet Flood Control
Meet Minimum Flow Requirements

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
From Corps of Engineers
From Bureau of Reclamation
[C] From Ed Bowles-Idaho

Triggers

Lower Snake River

Overall

Goals

1	2
Improve survival of listed fish populations by providing suitable migration conditions for all life stages of anadromous fish. [A] **The overall goal is to recover listed stocks of anadromous salmonids in the Snake River Basin.** [B] **To provide safe downstream passage for juvenile salmonids in a timely manner.** [B] **To provide timely upstream passage for adult salmonids.** [B] **To meet water quality standards in the Snake River.** [B] **To optimize passage conditions for juvenile salmonids.** [B]	Provide the best utilization of Idaho resources to benefit ESA stocks, resident species, and improve conditions associated with the Clean Water Act. [C] Provide the best possible in-river migration conditions, given existing dam configurations and water availability limitations, and ensure a sensible balance, based on river conditions, between the number of fish transported and those allowed to migrate in the river. [C]

Objectives

1	2
Assure reservoirs are as full as possible at the start of the migration periods so natural runoff is used to increase river flows instead of filling empty reservoir space. Draft reservoirs as needed during the spring migration period to shape flows on fish movement and achieve flow objectives but place a higher priority on achieving reservoir refill by July 1 than meeting spring flow levels. [A] *Shape flood control water to the extent*	Determine the amount of water available to aid fish migration based on state water law and projected runoff volumes. Prioritize available water supplies for springtime migrants. [C] Prioritize available storage at Brownlee and Dworshak reservoirs to fill in the holes from spring snowmelt and flood control operations to help keep average flows at Lower Granite Dam from dropping below the 85-100 kcfs sliding

Source:

[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**
[C] From Ed Bowles-Idaho From Corps of Engineers
From Bureau of Reclamation

possible from winter and early spring to the late April period. [A] Manage flood control to ensure the highest possible reservoir levels by early April and shift as much of the flood control drafting as possible to coincide with smolt migration (beginning early to mid April). [C] *Assure contracts are in place to provide 427 kaf of water from upper Snake River reservoir storage to maintain flows in the lower Snake River during the juvenile migration season.* [A] *Provide a non-turbine passage route for juvenile migrants by providing spill at all the lower Snake River dams. Maintain spill at a level to achieve tailwater TDG levels of 120% at defined schedules during the juvenile migration period which is approximately April through June 20.* [A] *Control temperatures for juvenile summer migrants to the extent possible while using Dworshak and Brownlee reservoirs as sources of flow augmentation water.* [A] **To maintain suitable water temperatures in the Snake River for subyearling chinook salmon survival.** [B] *Determine whether use of Dworshak reservoir storage to date during the juvenile migration period provides adequate adult salmon benefits and whether alternative operations are justified or feasible.* [A]	scale seasonal flow target from mid-April through May when spring migrants are present. Idaho supported 100 kcfs for the 1999 spring migration. [C] Spill to the maximum allowable state standard at all dams on the lower Snake and Columbia rivers when spring migrants are present (approximately early-April through mid-June) and minimize turbine and multiple bypass passage. [C] Based on dissolved gas monitoring data, Idaho will not object to a gas level up to 120/125% in the lower Snake and Columbia rivers. [C] Operate turbines within 1% of peak efficiency when smolts are present. [C] Maintain Minimum Operating Pools at all reservoirs on the lower Snake and Columbia rivers (except John Day Reservoir at MIP) during the spring migration period. [C] Utilize a "spread-the-risk" transportation strategy based on annual pre-season projections of in-river migration conditions. In 1999 Idaho recommended transportation of smolts collected at Lower Granite and Little Goose dams, and returning all bypassed fish to the river at Lower Monumental and McNary dams. (Spill to the maximum allowable by state water quality agencies at all collector projects throughout the spring migration period.) Trucking should be limited in the transport of smolts. [C]

Triggers

Initiation of spill:
The date is near the historic migration time frame and juvenile fish index numbers show a steady and or increasing trend. Examples: (1) Index numbers are in the _ digits and show an increasing trend for _ consecutive days or _ digits for _ days and do not decrease by more than _% on the _ day. (2) _% of the projected run has passed lower Granite Dam to date. These would serve as initiation points to further evaluate the run. [A]

Termination of spill:

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS** From Corps of Engineers From Bureau of Reclamation
[C] From Ed Bowles-Idaho

June 20 or spring migrants are consistently in double digits. [A]

Use of Brownlee and Dworshak for flow augmentation:
This needs some analysis given Billy Conner's presentation and an understanding of the Nez Perce's position. [A]

Ice Harbor

Objectives

Spill for Juvenile Fish April 3 – August 31
Provide adult and juvenile fish passage according to FPP
Maintain Navigation
Operate within 1 foot of MOP from April 3 until adult fall chinook enter lower Snake.
Operate Units within 1% guidelines

Triggers

End MOP when daily adult fall chinook passage at IHR exceeds __ fish for __ consecutive days.
Middle 90% of juvenile fish runs

Lower Monumental

Objectives

Juvenile Fish Transport
Spill for Juvenile Fish April 3 – June 20
Provide adult and juvenile fish passage according to FPP
Maintain Navigation
Operate within 1 foot of MOP from April 3 until adult fall chinook enter lower Snake.
Operate Units with 1% guidelines

Triggers

85 kcfs seasonal average flow forecast
End MOP when adult fall chinook enter lower Snake (see IHR trigger)
Middle 90% of juvenile fish runs

Little Goose

Objectives

Juvenile Fish Transport
Spill for Juvenile Fish April 3 – June 20
Provide adult and juvenile fish passage according to FPP
Maintain Navigation
Operate within 1 foot of MOP from April 3 until adult fall chinook enter lower Snake.
Operate Units within 1% guidelines

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[A] *From Paul Wagner-NMFS*
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From Corps of Engineers
From Bureau of Reclamation
[C] From Ed Bowles-Idaho

Triggers

85 kcfs seasonal average flow forecast
Middle 90% of juvenile fish runs
End MOP when adult fall chinook enter lower Snake (see IHR trigger)

Lower Granite

Objectives

Juvenile Fish Transport
Spill for Juvenile Fish April 3 – June 20
Provide adult and juvenile fish passage according to FPP
85 – 100 kcfs Flow Objective April 3 to June 20
Manage flows at a level of at least 85 kcfs during the spring period (April - June 20) and at least 50 kcfs during the summer period (June 21 - August 31) as frequently as possible. [A]

To provide flow augmentation in the Snake River until 90% of the subyearling chinook salmon has passed Lower Granite Dam to increase their survival. [B]

50 – 55 kcfs Flow Objective June 21 to August 31
Maintain Navigation
Operate within 1 foot of MOP from April 3 to November 15
Operate Units within 1% guidelines

Triggers

85 kcfs seasonal average flow forecast
Middle 90% of juvenile fish runs
End MOP when adult fall chinook enter lower Snake
augment flow when significant fish are present and forecasted runoff is less than that year's flow objective

Dworshak

Objectives

1	2
Assist in Meeting Snake and Columbia Salmon Flow Objectives Meet Flood Control Be no higher than 1558 elevation on December 15 Be on the flood control curve by April	Pass inflow and release storage (in complement with Brownlee) as necessary to fill in the holes from natural spring runoff to help keep average flows at Lower Granite Dam from dropping below 100 kcfs from mid-April through May. [C] Strive for a full pool by June 1, and maintain as full a pool as possible through Labor Day by delaying large-

Source:

[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**
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	scale drafts until mid-August. [C] Limit late summer drafting to elevation 1535 ft msl. This will reserve approximately 200 kaf storage to be shaped in the fall to aid adult steelhead and fall chinook migration. [C] Strive for as full pool as possible, within flood control constraints, by early April. Shift timing to release as much of the flood control volume as possible after smolt migration begins early to mid-April. [C] Provide Temperature Control for Lower Snake Projects Water used from Dworshak should not jeopardize the ability of federal and state hatcheries at Ahsahka, Idaho, from fulfilling their federal mitigation debt. [C]

Triggers

1	2
Conditions at Hatchery Condition of juvenile and adult migrating fish on lower Snake	**Begin flow augmentation from Dworshak Dam when water temperature in the Lower Granite Dam tailrace reaches 17 to 19 degrees C.** [B]

Brownlee/Upper Snake

Objectives

1	2
Secure annual volume on a willing buyer/seller basis, in compliance with Idaho State law. Deliver available volumes into	Strive for as full pool as possible, within flood control constraints, by early April. Shift timing to release as much of the flood control volume as

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[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
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From Bureau of Reclamation
[C] From Ed Bowles-Idaho

Brownlee in coordination with Idaho Power Company. Achieve water quality objectives from volume deliveries.	possible after smolt migration begins early to mid-April. [C] Contribute up to 110 kaf storage (approximately eight feet) as needed prior to mid-May to help ensure flows at Lower Granite Dam do not drop below 100 kcfs. If Lower Granite flow are adequate, inflow can be used to help refill Brownlee Reservoir by June 7. [C] Maintain stable or rising reservoir levels (at no lower than 2,069 ft msl) from mid-May through June. [C] Pass through or shape up to 427 kaf BOR contribution from uncontracted storage and will seller/lessor agreements for anadromous fish. Provide this water as best possible to meet the real-time needs of migrating fish, taking into consideration management factors such as resident fish and water quality. [C] Any late summer drafts should be timed and shaped as best possible for the benefit of adult fall chinook and steelhead migration, taking into consideration resident fish needs and provided that reservoir elevation is 2,059 ft msl by September 30. [C] Any flow augmentation operations by Idaho Power Company to assist survival of anadromous fish at downstream federal facilities must meet Idaho's requirement that BPA reimburse energy, capacity and head losses incurred by IPC at its facilities. [C]

Triggers

1	2
BiOP flow targets, dates River flow limit (eg., 1500 cfs at Milner). Delivery is after flood control releases, typically late spring or in summer. Consistent with Water Master scheduling.	**Begin flow augmentation from Brownlee Dam (Hells Canyon Complex) before water temperature reaches 17 to 19 degrees C. [B]** **Maximize the release of outflow from Brownlee Dam (Hells Canyon Complex) within total dissolved gas standards and ramp**

Source:

[A] *From Paul Wagner-NMFS* [B] **From Marv Yoshinaka-FWS**
[C] From Ed Bowles-Idaho From Corps of Engineers
From Bureau of Reclamation

Volumes delivered into Brownlee are summer/winter split per arrangements. Shaping services from Brownlee delivers the full 427 KAF into Lower Granite in-season. Operating plans expressed by letter to the State of Idaho	**down outflows in the shape of the natural hydrograph when water temperature in the Lower Granite Dam tailrace reaches 17 to 19 degrees C.** [B]

Source:

[A] *From Paul Wagner-NMFS*
[B] **From Marv Yoshinaka-FWS**
[C] From Ed Bowles-Idaho
From Corps of Engineers
From Bureau of Reclamation

DRAFT

GUIDELINES FOR TECHNICAL MANAGEMENT TEAM

January 26, 2000

I. Introduction

The National Marine Fisheries Service's (NMFS) Biological Opinion on the "Reinitiation of Consultation on 1994-1998 Operation of the Federal Columbia River Power System (FCRPS) and Juvenile Transportation Program in 1995 and Future Years" calls for the establishment of a Technical Management Team (TMT) to advise the operating agencies on dam and reservoir operations, thus optimizing passage conditions for juvenile and adult anadromous salmonids. These guidelines are adopted in accordance with that Opinion. They are also consistent with the Supplemental Biological Opinion issued on May 14, 1998.

The TMT is one of several technical teams within the Regional Implementation Forum established by the NMFS, the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (COE), the Bureau of Reclamation (BOR), and the Bonneville Power Administration (BPA). The Regional Forum provides for regional discussion and decision on the operation and configuration of the FCRPS. Its goal is to develop consensus among the various members on these decisions. The TMT's mission is specifically to ensure broad technical participation and use of the best available technical information, and to encourage consensus in decisions on operating the FCRPS. When consensus is not achieved, the TMT ensures that the basis for participants' recommendations and Federal decisions is fully explained and documented. In such situations, questions can be elevated to the Implementation Team (IT) for resolution.

The TMT operates under the Interim Procedures adopted for the Regional Forum. The following, more specific guidelines supplement the Forum's procedures for TMT operations in 2000 1999. As the Forum procedures are refined, these guidelines may be revised.

II. Scope

The focus of the TMT is to implement the NMFS Biological Opinion on operation of the FCRPS while considering the provisions of (and effects on) the Northwest Power Planning Council's (NPPC) Fish and Wildlife Program, other biological opinions, State and Tribal plans and programs, and other relevant operational requirements. Specifically, the TMT should explore operational scenarios under the NMFS Biological Opinion that would serve to protect other fish and wildlife in the Columbia River Basin and promote coordination and consistency with these other objectives to the extent possible.

III. Membership

See Forum Rules and Procedures.

The members and alternates of the TMT are listed in Attachment 1. Initial confirmation of membership, designation of representatives, and any changes in representation should be provided in writing to the NMFS Implementation Team Chair.

IV. Roles and Responsibilities

The TMT is responsible for discussion and decision on hydro system flows at designated control points and expected project operations to implement the FCRPS Biological Opinion for listed Snake River salmon and Snake River, Upper Columbia River, and Lower Columbia River steelhead, while taking into account the needs of (and effects on) other listed and non-listed species.

The TMT is to engage in joint decision-making that works toward consensus within the recognized authorities and management jurisdictions of its participating members. Specifically, the State, Tribal and Federal salmon managers (Salmon Managers) recommend the flows at the control points that best meet the needs of salmon and steelhead. These may include specific project operations, but this does not foreclose TMT consideration of alternative means of providing the same operating condition. Other participants (e.g., Resident Fish Managers) may also make recommendations consistent with the scope of these guidelines. The vehicle for communicating a river or project condition, which will benefit salmon/steelhead migration, is a system operational request (SOR). See Section V(d). All parties submitting SORs are encouraged to coordinate with other participants to the extent possible.

The Salmon Managers are responsible for the management of anadromous salmonids in the basin. The COE and BOR are responsible for decisions on operation of the FCRPS projects; and the COE and BPA are responsible for agreements with Canada regarding storage in Canada and other Treaty-related matters. The participation of other affected sovereign and non-sovereign entities is intended to ensure that decision-makers have the broadest possible source of information upon which to base their decisions. All parties are encouraged to succinctly present their views regarding biological or operational recommendations. Input can provide alternative options for the appropriate authority to consider when making their decisions, but authority for implementing the request remains with the appropriate agencies.

The TMT is a year-round technical body. Pre-season planning will consist of development of a Water Management Plan. In-season management is to implement the Biological Opinion, its 1998 Supplement and the Water Management Plan. Post-season review will consist of a review of the previous year's activities and performances, and updating operating procedures as needed. Throughout the year the COE, BOR, and BPA will coordinate planning and operational decisions that may affect salmon and other species, through the TMT (e.g., yearly agreement on Non-Treaty Storage Agreement spring/summer operation, the 5-year Idaho Power Company Agreement, and the Libby/Arrow swap). The COE, BOR and BPA will specifically use the TMT as a forum for the coordination and consideration of potential effects on salmon, steelhead and other species prior to a final decision. Idaho Power Company, the Mid-Columbia Public Utility Districts, and other non-sovereign participants are also encouraged to use TMT as a forum for coordination of planning and operational decisions throughout the year.

V. Operating Procedures

a) Annual Water Management Plan

By April 15 each year, the TMT will finalize an annual Water Management Plan based on the run-off forecast and other factors specific to that year. A complete draft, subject to refinement based on the April 1 forecast, should be available for review no later than March 10 each year. All interested parties may participate in the plan development and will be given an opportunity to review and comment on the draft plan. In general, the Salmon Managers will provide information on salmon and salmon operational requirements to be included in the plan. Resident Fish Managers will provide information on resident fish needs. The Action Agencies will provide information on reservoir status; planned project operations (and operating constraints); flow forecasts; anticipated special operations for research and other purposes; turbine outage and maintenance plans; and operating agreements and contracts that may affect annual operations. Priorities among competing needs should be resolved within the context of the scope of these guidelines.

b) Summary of In-season Management Key Weekly Events

Monday Begin implementing operations based on last week's decision.

Tuesday (9 a.m.) The COE posts or otherwise distributes weekly (Monday through Sunday) flow projections for Priest Rapids, McNary and Lower Granite, along with resulting reservoir operations and elevations, and current dissolved gas and temperature data. Salmon Managers will post or otherwise distribute biological information.

Tuesday (3 p.m.) TMT Members (or others) submit SORs to the Reservoir Control Center (RCC) and send (fax) hard *copies to TMT members and participants.* The salmon managers will fax SORs to all project owners for which an operation is requested. An electronic

version of any SOR will be simultaneously sent to the Corps so that it is available for the TMT web page at the start of the meeting.*The Corps posts all the SORs received on the TMT homepage as soon as they are delivered. This will allow all the information to be kept central and facilitate efficient review by all parties. The Corps will scan in any SORs that are not provided electronically. As always, electronic copies are preferred.*

Wednesday (1 Thursday 9 a*p.m.) The TMT meets to discuss in-season management data and SORs, documents operations and recommends the following week's operations.* At the start of the meeting all SORs will be posted to the TMT web page for use by members who can not attend the meeting. *If necessary, the TMT frames the issue(s) to be raised to the IT before 5*12 a *p.m.*

Thursday (13 p.m.) In case of impasse, disputes are resolved through the IT. [NOTE: All TMT members were asked to consult with their IT member to assure that a 3 p.m. Thursday afternoon dispute resolution call would be appropriate for their agency.

Friday (noon) In the event an issue has been raised to the IT and the IT has resolved the issue, the Action Agencies document the operation to begin on the following Monday. This decision, and rationale, are posted on the TMT homepage or otherwise distributed.

Friday (p.m.) The TMT draft meeting notes are posted or otherwise distributed

c) In-season Management Data

The TMT will use the National Weather Service's River Forecast Center's (RFC) streamflow forecast for the Columbia River Basin. This forecast (and the basic reservoir operations that are assumed when producing it) is the official forecast to be used for the decision-making process. The BPA forecast may be used as supplemental information. The COE will use the RFC forecast to prepare weekly (Monday through Sunday) flow projections for Priest Rapids, McNary and Lower Granite. By 9 a.m. (or as early as possible after that) on Tuesday, the flow projections and resulting reservoir operations will be posted on the TMT home page or otherwise distributed. The Action Agencies will also provide dissolved gas, temperature, and other physical monitoring data available for decision-making.

During the anadromous fish migration period, the Salmon Managers will provide biological information on salmon and steelhead numbers, migration timing and condition, for both the current year and historically. The USFWS, and others as appropriate, will provide relevant information on other fish and wildlife resources. These data will be posted by NMFS and USFWS each Tuesday by 3 p.m.

d) System Operational Requests

TMT members will provide recommendations to the TMT on hydro system flows and/or expected project operations consistent with the scope of these guidelines. Non-TMT members may also submit recommendations for consideration. These recommendations will be in the form of system operational requests (SORs) stating the flow objective(s) sought (e.g., keep flows at a location X in a W-Z range). Expected project operations may also be added. Each SOR will include the biological basis for the recommendation. Each SOR will also indicate whether the request is to implement a NMFS Biological Opinion, Fish and Wildlife, or other Federal, State or Tribal program. Non-TMT members may also submit SORs for special operating purposes for TMT consideration.

All SORs will be submitted by 3:00 p.m. on Tuesday via fax to the action agencies, or any other project owner that may be required to delivery a specified operation the day prior to the TMT meeting, provided that the flow projections were available by 9 a.m. that day. Electronic submittal through the Proposal Submission/Review form on the TMT homepage is preferredmay also be used, but proposals may also be sent via FAX to all TMT members. TMT and public comments on the proposal can also be appended via the Internet form. If proposals are incomplete, or are not received in time for sufficient review, the TMT may choose to delay action, but lack of an SOR should not preclude discussion of relevant matters at the meeting.

SORs should list members of the agencies who have reviewed and support the request.

The SOR will be outlined for description on the TMT SOR disposition web page. The SOR will be posted to the disposition page at the start of the TMT meeting so that telephone participants can follow the meeting.

When an SOR has been properly submitted, the Action Agencies (COE, BOR, BPA) should be prepared at TMT to describe the operational options and implications of meeting the request.

e) Meetings

Between the last week of March and up to at least August 31 the TMT will meet every Wednesday or more often if necessary, to conduct in-season management. All meetings will be open to interested parties. A conference line will be available for those who cannot attend in person.

An agenda for each meeting will be distributed at least three business days prior to the meeting (the preceding Friday in the case of the regularly scheduled in-season meetings). The principal purpose of the meetings and standing agenda items during the migration season is to review the status of the preceding week's SOR and operations, biological data, new SORs and project operating data, and to reach informed decisions on FCRPS operations for the following week(s). As other items are brought forward for TMT consideration they will be added to the agenda for future discussion, but lack of an agenda item will not preclude discussion of relevant matters at the meeting.

The discussion of SORs at TMT meetings will include distinct segments dealing with both biological and operational issues. Biological questions associated with an SOR will be addressed to ensure that the biological basis of the SOR is clear, and to allow the TMT to consider any additional biological information that may be made available at the meeting. The meeting will then move on to a discussion of operational alternatives to meet the SOR by the Action Agencies and members of the TMT. The chair should ensure that adequate time is allotted to each segment of the meeting.

The Chair should also ensure that the support or opposition of each TMT member for an SOR and a final decision by the Action Agencies are noted in the minutes.

f) Meeting Facilitation

Meetings of the TMT will be facilitated by an impartial facilitator, with skills as a meeting manager and conflict resolver, to allow all TMT members the opportunity to fully participate in discussions, and to help members resolve conflicts as they arise. The meeting facilitator shall serve at the will of all members of TMT. His/her role will include helping the chair to:

- Develop meeting agendas
- Manage the meeting agenda in a balanced and even-handed fashion so that all members have an opportunity to speak and be heard,
- Highlight decisions reached by the group, and
- Enforce the ground rules established by the TMT (see Attachment 2)

The meeting facilitator will also help the TMT membership to:

- Stay focused on the agenda and prioritize items that need action and further discussion
- Reach consensus on decisions
- Resolve conflicts that may arise in the course of discussion
- Clarify issues, seek potential solutions to impasses, and develop opportunities that may resolve conflicts and increase the overall satisfaction with the TMT process in the long term.

TMT members may give feedback directly to the facilitator or to the chair if they have concerns with the manner by which meetings are managed.

g) In-season Decision making

On Thursday morning Wednesday afternoon the TMT will decide on operations for the following week based on the available information and any pending SORs. These weekly operating decisions will be made by consensus whenever possible. Consensus is defined as lack of an objection that would prompt one or more of the TMT members to elevate the issue to the IT. In the absence of consensus, the decision will be referred to the IT in accordance with the dispute resolution process described below.

If the decision is to implement the SOR or a modification of the SOR as agreed to by the TMT, then this should be documented for the minutes, and the SOR (and the Biological Opinion, Council's program or other plan on which it is based) may form the basis for the decision. If the Action Agencies do not agree to implement an SOR, they will describe for the minutes both the intended operation and the basis for that decision. The basis for the decision could include that the proposed operation is inconsistent with a Biological Opinion, that operational constraints prevent its implementation, that cost is prohibitive beyond that already included in the so-called "Fish Cap", or that the Action Agency has an alternative view of the best available biological information. If the Action Agencies believe the best available biological information supports a position that differs from that of the SOR sponsor(s), then the explanation should acknowledge this difference and should provide a clear, succinct written explanation of the data, analysis or judgement that supports the alternative view. In each case, a full explanation will be provided by the Action Agencies to the TMT and IT.

The final decision made by the COE and BOR on the following week's operation will be made at the meeting whenever possible. The TMT will try to avoid making decisions outside the established process. In-season FCRPS operating decisions made through a separate process, such as those under the Action Agencies' authority for emergency situations, will be explained and documented as soon as possible, but in any case no later than Friday following the TMT meeting.

a. Documentation

Minutes of all TMT meetings will be prepared in accordance with Regional Forum procedures and approved by the TMT. Every effort will be made to post the draft meeting notes to the TMT home page by the Friday afternoon following the meeting. Comments will be due by the following meeting.

The TMT meeting minutes will be used to keep track of the decision-making process. The minutes will include the substance of any SOR, the decision, the decision-maker, and the basis for the decision. The minutes will also include: (1) documentation of consensus or a listing of members objecting to an SOR or a final decision; and (2) when an SOR is not implemented, clear documentation of the reasons provided by the decision-maker.

If a decision is elevated to the IT and therefore not made at the weekly TMT meeting, documentation on the final decision reached will be provided separately in writing by the IT and will include the same information noted above. This documentation of the decision should be distributed via home page and other appropriate means by noon on Friday.

Each member is responsible for reviewing the decision documentation and the meeting minutes, especially if the agency he/she represents is one of the decision-makers.

Interested parties may request copies of the minutes if they have no access to the TMT homepage.

b. Distribution of Information

Meeting notes and material will be made available to TMT participants throughout the year. These materials will be made available through the TMT home page and may be reproduced on other Internet home pages where available. They will also be faxed to members and participants that request such services. Regular mail may be used for materials when time permits.

c. Public Participation

Members of the public may comment on an issue or agenda item at the end of the meeting. They may also comment outside the TMT process.

VI. TMT Dispute Resolution Process

In the event that the TMT is unable to reach consensus on an issue, any member may request that the item be elevated to the IT. Every effort should be made to ensure that the issue is raised at least one week in advance of the monthly IT meeting (first Thursday Wednesday? of the month).

If, despite all efforts to the contrary, the TMT finds at its Thursday morning Wednesday meeting that it is unable to resolve a weekly in-season management dispute, and the decision cannot await consideration at the next regularly scheduled meeting, the IT will meet by conference call at 13:00 on the following Thursday afternoon. In the event that such a meeting is necessary, the TMT will prepare, and agree to, a brief summary of the issue(s) and a short description of the opposing viewpoints. This document will be given to the IT members by 91:00 ap.m. on Thursday afternoonmorning.

The IT will attempt to reach consensus. If the IT is unable to reach a consensus, then a final recommendation will made by the appropriate agency (e.g., NMFS or USFWS if the issue relates to implementation of a Biological Opinion, or NPPC if the issue relates to implementation of the Fish and Wildlife Program). The member with the authority for the action will then make the decision and will post it on the TMT homepage or otherwise distribute it, along with a written description and rationale, by noon on Friday.

ATTACHMENT 1

DESIGNATED TECHNICAL MANAGEMENT TEAM (TMT) MEMBERS

ORGANIZATION	REPRESENTATIVE	ALTERNATES
National Marine Fisheries Service	Paul Wagner	Chris Ross
Corps of Engineers	Cindy Henriksen	Rudd Turner
Bonneville Power Administration	Scott Bettin	Robyn MacKay
Bureau of Reclamation	Kim Fodrea	Romeo Wisco/Lori Postlethwait/
U.S. Fish & Wildlife Service	Marv Yoshinaka	Bob Hallock/Susan Martin
State of Washington	Jim Nielsen	

State of Oregon	Chuck Tracy	
State of Alaska		
State of Idaho	Ed Bowles	Steve Pettit
State of Montana	Jim Litchfield	
Kootenai Tribe of Idaho		
Confederated Tribes of the Umatilla Indian Reservation		
Confederated Salish & Kootenai Tribes of the Flathead Reservation		
Shoshone-Bannock Tribes of Fort Hall	Keith Kutchins *	
Confederated Tribes of the Warm Springs Reservation		
Yakama Indian Nation		
Shoshone-Paiute Tribes of Duck Valley Reservation		
Burns Paiute Tribe		
Kalispel Tribe		
Spokane Tribe of Indians	Tim Peone	Keith Underwood
Nez Perce Tribe of Idaho	Dave Statler *	
Coeur d'Alene Tribe of Idaho		
Confederated Tribes of the Colville Indian	Jerry Marco	Kirk Truscott

Reservations		

(*) Lacks written response to request for designation of representatives

Attachment 2.

MEETING GROUND-RULES & EXPECTATIONS

The following meeting ground-rules and expectations were discussed and agreed to by all members present at the June 17, 1998 meeting of the TMT. They may be changed at the request of the Team.

I. Ground-Rules

Meetings will start and end on time unless an emergency requires otherwise.

Members will treat each other with respect, which includes:

- Listening to what others have to say
- No interruptions
- Monitoring your own air time
- No side conversations
- Letting the facilitator or chair know when you would like to speak
- Being mindful of tone when speaking directly to other members of the team

During in-season management, each member agency/group will have one primary TMT representative who will sit at the table during meetings. Alternates or technical resource staff are welcome to attend and provide input through their primary representative, or when called on by TMT members. In the off-season, all are welcome to sit at the table --with preference for the primary representatives if there is a space limitation.

Any issues elevated from the TMT to the Implementation Team (IT) will be thoroughly discussed at TMT. TMT members will agree on the "issue statement" for the IT. The TMT Chair will then present the issue at the IT meeting. All TMT members will brief their agency IT representative on the issue prior to the IT meeting.

The meeting facilitator may make process comments in order to keep the group on track, focused and productive.

II. Expectations

Members are expected to come prepared to participate in the meetings. This means, they will provide necessary input to discussions and work towards making decisions based on information they have gathered from their respective agencies between meetings.

Members are expected to keep their agencies and staff apprised of decisions or important meeting discussions.

Members are expected to attend all meetings or send an alternate. If an alternate attends the meeting, a briefing, both before and after the meeting, is expected of the primary representative. The group will not revisit information for members who were absent from or late to a meeting.

Members are expected to follow through on assignments to which they agree, or are given by other team members, on a timely basis. This includes requests for comments on information or reports from other team agencies.

The meeting facilitator is expected to keep the group on track and focused on agenda items. Additionally, the group expects the facilitator to assure equal participation, highlight any decisions that the group reaches, and maintain a sense of humor.

People who listen in on the telephone are expected to "sign-in" as they call in on the conference telephone line.

Group members may contact the facilitator to discuss process issues at any time.

DRAFT
GUIDELINES FOR TECHNICAL MANAGEMENT TEAM

January 26, 2000

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During the anadromous fish migration period, the Salmon Managers will provide biological information on salmon and steelhead numbers, migration timing and condition, for both the current year and historically. The USFWS, and others as appropriate, will provide relevant information on other fish and wildlife resources. These data will be posted by NMFS and USFWS each Tuesday by 3 p.m.

d) System Operational Requests

TMT members will provide recommendations to the TMT on hydro system flows and/or expected project operations consistent with the scope of these guidelines. Non-TMT members may also submit recommendations for consideration. These recommendations will be in the form of system operational requests (SORs) stating the flow objective(s) sought (e.g., keep flows at a location X in a W-Z range). Expected project operations may also be added. Each SOR will include the biological basis for the recommendation. Each SOR will also indicate whether the request is to implement a NMFS Biological Opinion, Fish and Wildlife, or other Federal, State or Tribal program. Non-TMT members may also submit SORs for special operating purposes for TMT consideration.

All SORs will be submitted by 3:00 p.m. on Tuesday via fax to the action agencies, or any other project owner that may be required to delivery a specified operation ~~the day prior to the TMT meeting~~, provided that the flow projections were available by 9 a.m. that day. Electronic submittal through the Proposal Submission/Review form on the TMT homepage ~~is preferred~~may also be used~~, but proposals may also be sent via FAX to all TMT members~~. TMT and public comments on the proposal can also be appended via the Internet form. If proposals are incomplete, or are not received in time for sufficient review, the TMT may choose to delay action, but lack of an SOR should not preclude discussion of relevant matters at the meeting.

SORs should list members of the agencies who have reviewed and support the request.

The SOR will be outlined for description on the TMT SOR disposition web page. The SOR will be posted to the disposition page at the start of the TMT meeting so that telephone participants can follow the meeting.

When an SOR has been properly submitted, the Action Agencies (COE, BOR, BPA) should be prepared at TMT to describe the operational options and implications of meeting the request.

e) Meetings

Between the last week of March and up to at least August 31 the TMT will meet every Wednesday or more often if necessary, to conduct in-season management. All meetings will be open to interested parties. A conference line will be available for those who cannot attend in person.

An agenda for each meeting will be distributed at least three business days prior to the meeting (the preceding Friday in the case of the regularly scheduled in-season meetings). The principal purpose of the meetings and standing agenda items during the migration season is to review the status of the preceding week's SOR and operations, biological data, new SORs and project operating data, and to reach informed decisions on FCRPS operations for the following week(s). As other items are brought forward for TMT consideration they will be added to the agenda for future discussion, but lack of an agenda item will not preclude discussion of relevant matters at the meeting.

The discussion of SORs at TMT meetings will include distinct segments dealing with both biological and operational issues. Biological questions associated with an SOR will be addressed to ensure that the biological basis of the SOR is clear, and to allow the TMT to consider any additional biological information that may be made available at the meeting. The meeting will then move on to a discussion of operational alternatives to meet the SOR by the Action Agencies and members of the TMT. The chair should ensure that adequate time is allotted to each segment of the meeting.

The Chair should also ensure that the support or opposition of each TMT member for an SOR and a final decision by the Action Agencies are noted in the minutes.

f) Meeting Facilitation

Meetings of the TMT will be facilitated by an impartial facilitator, with skills as a meeting manager and conflict resolver, to allow all TMT members the opportunity to fully participate in discussions, and to help members resolve conflicts as they arise. The meeting facilitator shall serve at the will of all members of TMT. His/her role will include helping the chair to:

- Develop meeting agendas
- Manage the meeting agenda in a balanced and even-handed fashion so that all members have an opportunity to speak and be heard,
- Highlight decisions reached by the group, and
- Enforce the ground rules established by the TMT (see Attachment 2)

The meeting facilitator will also help the TMT membership to:

- Stay focused on the agenda and prioritize items that need action and further discussion
- Reach consensus on decisions
- Resolve conflicts that may arise in the course of discussion
- Clarify issues, seek potential solutions to impasses, and develop opportunities that may resolve conflicts and increase the overall satisfaction with the TMT process in the long term.

TMT members may give feedback directly to the facilitator or to the chair if they have concerns with the manner by which meetings are managed.

g) In-season Decision making

On Thursday morning ~~Wednesday afternoon~~ the TMT will decide on operations for the following week based on the available information and any pending SORs. These weekly operating decisions will be made by consensus whenever possible. Consensus is defined as lack of an objection that would prompt one or more of the TMT members to elevate the issue to the IT. In the absence of consensus, the decision will be referred to the IT in accordance with the dispute resolution process described below.

If the decision is to implement the SOR or a modification of the SOR as agreed to by the TMT, then this should be documented for the minutes, and the SOR (and the Biological Opinion, Council's program or other plan on which it is based) may form the basis for the decision. If the Action Agencies do not agree to implement an SOR, they will describe for the minutes both the intended operation and the basis for that decision. The basis for the decision could include that the proposed operation is inconsistent with a Biological Opinion, that operational constraints prevent its implementation, that cost is prohibitive beyond that already included in the so-called "Fish Cap", or that the Action Agency has an alternative view of the best available biological information. If the Action Agencies believe the best available biological information supports a position that differs from that of the SOR sponsor(s), then the explanation should acknowledge this difference and should provide a clear, succinct written explanation of the data, analysis or judgement that supports the alternative view. In each case, a full explanation will be provided by the Action Agencies to the TMT and IT.

The final decision made by the COE and BOR on the following week's operation will be made at the meeting whenever possible. The TMT will try to avoid making decisions outside the established process. In-season FCRPS operating decisions made through a separate process, such as those under the Action Agencies' authority for emergency situations, will be explained and documented as soon as possible, but in any case no later than Friday following the TMT meeting.

h) Documentation

Minutes of all TMT meetings will be prepared in accordance with Regional Forum procedures and approved by the TMT. Every effort will be made to post the draft meeting notes to the TMT

home page by the Friday afternoon following the meeting. Comments will be due by the following meeting.

The TMT meeting minutes will be used to keep track of the decision-making process. The minutes will include the substance of any SOR, the decision, the decision-maker, and the basis for the decision. The minutes will also include: (1) documentation of consensus or a listing of members objecting to an SOR or a final decision; and (2) when an SOR is not implemented, clear documentation of the reasons provided by the decision-maker.

If a decision is elevated to the IT and therefore not made at the weekly TMT meeting, documentation on the final decision reached will be provided separately in writing by the IT and will include the same information noted above. This documentation of the decision should be distributed via home page and other appropriate means by noon on Friday.

Each member is responsible for reviewing the decision documentation and the meeting minutes, especially if the agency he/she represents is one of the decision-makers.

Interested parties may request copies of the minutes if they have no access to the TMT homepage.

i) Distribution of Information

Meeting notes and material will be made available to TMT participants throughout the year. These materials will be made available through the TMT home page and may be reproduced on other Internet home pages where available. They will also be faxed to members and participants that request such services. Regular mail may be used for materials when time permits.

j) Public Participation

Members of the public may comment on an issue or agenda item at the end of the meeting. They may also comment outside the TMT process.

VI. TMT Dispute Resolution Process

In the event that the TMT is unable to reach consensus on an issue, any member may request that the item be elevated to the IT. Every effort should be made to ensure that the issue is raised at least one week in advance of the monthly IT meeting (first ~~Thursday~~ Wednesday? of the month).

If, despite all efforts to the contrary, the TMT finds at its Thursday morning ~~Wednesday~~ meeting that it is unable to resolve a weekly in-season management dispute, and the decision cannot await consideration at the next regularly scheduled meeting, the IT will meet by conference call at ~~1~~3:00 on ~~the following~~ Thursday afternoon. In the event that such a meeting is necessary, the TMT will prepare, and agree to, a brief summary of the issue(s) and a short description of the opposing viewpoints. This document will be given to the IT members by ~~9~~1:00 ~~a~~p.m. on Thursday afternoon~~morning~~.

The IT will attempt to reach consensus. If the IT is unable to reach a consensus, then a final

recommendation will made by the appropriate agency (e.g., NMFS or USFWS if the issue relates to implementation of a Biological Opinion, or NPPC if the issue relates to implementation of the Fish and Wildlife Program). The member with the authority for the action will then make the decision and will post it on the TMT homepage or otherwise distribute it, along with a written description and rationale, by noon on Friday.

ATTACHMENT 1

DESIGNATED TECHNICAL MANAGEMENT TEAM (TMT) MEMBERS

ORGANIZATION	REPRESENTATIVE	ALTERNATES
National Marine Fisheries Service	Paul Wagner	Chris Ross
Corps of Engineers	Cindy Henriksen	Rudd Turner
Bonneville Power Administration	Scott Bettin	Robyn MacKay
Bureau of Reclamation	Kim Fodrea	Romeo Wisco/Lori Postlethwait/
U.S. Fish & Wildlife Service	Marv Yoshinaka	Bob Hallock/Susan Martin
State of Washington	Jim Nielsen	
State of Oregon	Chuck Tracy	
State of Alaska		
State of Idaho	Ed Bowles	Steve Pettit
State of Montana	Jim Litchfield	
Kootenai Tribe of Idaho		
Confederated Tribes of the Umatilla Indian Reservation		
Confederated Salish & Kootenai Tribes of the Flathead Reservation		
Shoshone-Bannock Tribes of Fort Hall	Keith Kutchins *	
Confederated Tribes of the Warm Springs Reservation		
Yakama Indian Nation		
Shoshone-Paiute Tribes of Duck Valley Reservation		
Burns Paiute Tribe		
Kalispel Tribe		
Spokane Tribe of Indians	Tim Peone	Keith Underwood
Nez Perce Tribe of Idaho	Dave Statler *	
Coeur d'Alene Tribe of Idaho		
Confederated Tribes of the Colville Indian Reservations	Jerry Marco	Kirk Truscott

(*) Lacks written response to request for designation of representatives

Attachment 2.

MEETING GROUND-RULES & EXPECTATIONS

The following meeting ground-rules and expectations were discussed and agreed to by all members present at the June 17, 1998 meeting of the TMT. They may be changed at the request of the Team.

I. Ground-Rules

Meetings will start and end on time unless an emergency requires otherwise.

Members will treat each other with respect, which includes:

- Listening to what others have to say
- No interruptions
- Monitoring your own air time
- No side conversations
- Letting the facilitator or chair know when you would like to speak
- Being mindful of tone when speaking directly to other members of the team

During in-season management, each member agency/group will have one primary TMT representative who will sit at the table during meetings. Alternates or technical resource staff are welcome to attend and provide input through their primary representative, or when called on by TMT members. In the off-season, all are welcome to sit at the table --with preference for the primary representatives if there is a space limitation.

Any issues elevated from the TMT to the Implementation Team (IT) will be thoroughly discussed at TMT. TMT members will agree on the "issue statement" for the IT. The TMT Chair will then present the issue at the IT meeting. All TMT members will brief their agency IT representative on the issue prior to the IT meeting.

The meeting facilitator may make process comments in order to keep the group on track, focused and productive.

II. Expectations

Members are expected to come prepared to participate in the meetings. This means, they will provide necessary input to discussions and work towards making decisions based on information they have gathered from their respective agencies between meetings.

Members are expected to keep their agencies and staff apprised of decisions or important meeting discussions.

Members are expected to attend all meetings or send an alternate. If an alternate attends the

meeting, a briefing, both before and after the meeting, is expected of the primary representative. The group will not revisit information for members who were absent from or late to a meeting.

Members are expected to follow through on assignments to which they agree, or are given by other team members, on a timely basis. This includes requests for comments on information or reports from other team agencies.

The meeting facilitator is expected to keep the group on track and focused on agenda items. Additionally, the group expects the facilitator to assure equal participation, highlight any decisions that the group reaches, and maintain a sense of humor.

People who listen in on the telephone are expected to "sign-in" as they call in on the conference telephone line.

Group members may contact the facilitator to discuss process issues at any time.

TECHNICAL MANAGEMENT TEAM					
BOR: *Kim Fodrea / Pat McGrane*			**BPA:** *Scott Bettin / Robyn MacKay*		
NMFS: *Paul Wagner / Chris Ross*			**USFWS:** *Marv Yoshinaka / Bob Hallock / Susan Martin*		
OR: *Chuck Tracy*	**WA:** *Jim Nielsen*		**ID:** *Ed Bowles / Steve Pettit*	**MT:** *Jim Litchfield*	
COE: *Cindy Henriksen / Rudd Turner*					

TMT MEETING

8 February 2000 1300 - 1600 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

- 1300 - 1310 Welcome, Introductions.
- 1310 - 1320 Review last TMT meeting minutes.
- 1320 - 1340 Air temperature and its effect on water temperature and fish (BPA, NMFS).
- 1340 - 1400 Preliminary results and discussion: water temperature modeling of DWR and BRN summer releases (COE).
- 1400 - 1500 Decision-making Criteria for TMT (current draft and NMFS revisions of lower Snake objectives). Continue review of goals, objectives, and triggers.
- 1500 - 1530 Water Management Plan - review outline and 2000 Plan for substantive issues.
  - Grey Areas
  - Water Management Plan (2/7/00 Draft PDF)
- 1530 - 1540 Recommended river operation.
- 1540 - 1550 Utilities' response to proposed weekly coordination schedule.
- 1550 - 1600 Other.
  - Set agenda for next meeting; adjourn.

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935.

Draft

TMT IN-Season Management Criteria – Objectives & Triggers

COE 2 Feb 2000

Columbia and Snake River (System)

Goals

Increase survival of listed fish populations by providing suitable migration conditions for all life phases of anadromous fish, while operating projects for multiple purposes.

Objectives

Meet BiOp objectives and commitments per action agency's Records of Decision
Meet tribal treaty and trust responsibilities
Fulfill project operating requirements, authorizations and contractual commitments
Meet multi-purpose objectives.
Achieve resident fish objectives
Meet system and local flood control objectives. Montana wants to accomplish this by implementing VARQ strategy.
Where applicable operate turbines within Fish Passage Plan (FPP)1% guidelines when smolts are present.
Where applicable maintain navigation

Lower Columbia River

Overall

Goals

Objectives

Provide a non-turbine passage route for juvenile migrants by providing spill at the lower Columbia River dams during the spring period.
Maintain spill at a level to achieve tailwater TDG levels of 120% (maximum allowable waiver of the state standard)(Idaho would be willing to go to 125%) at defined schedules during the juvenile migration period which is approximately mid-April (20th) through June 30.
Maintain the same spill conditions during the summer period (July 1 - August 31) with the exception of McNary Dam.
Collect and transport juvenile fish at McNary in the summer.
Provide adult and juvenile fish passage according to FPP
Idaho proposes to utilize a "spread-the-risk" transportation strategy based on annual pre-season projections of in-river migration conditions. In 1999 Idaho recommended no transportation of smolts at McNary dams. Spill to the maximum allowable by state water quality agencies at all collector projects throughout the spring migration period. Trucking should be limited in the transport of smolts.
Maintain Minimum Operating Pools at all reservoirs on the Columbia rivers during the spring migration period.

Triggers

Initiation of spill: The date is near the historic migration time and juvenile fish numbers are in _ digits and show an increasing trend for _ consecutive days or are _ digits for _ days and do not decrease by more than _% on the _ day.

Bonneville

Objectives

Provide flows according to BiOp to protect Chum and Fall Chinook Spawning below Project, late October to April

Triggers

Fall-winter flows: dates of initiation of spawning and incubation of listed chum and fall chinook; dependent on flow conditions

The Dalles

Objectives

Triggers

John Day

Objectives

Operate within a 1.5 feet of 262.5 feet from April 20 to September 30, or as coordinated with reservoir users and TMT.

Maintain Irrigation

Triggers

McNary

Objectives

Transport Juvenile Fish in the summer

220 – 260 kcfs Flow Objective from April 20 to June 30

200 kcfs Flow Objective from July 1 to August 31

Montana feels that this should be based on water availability in upstream subbasins

Triggers

Flow forecast

Begin transport when: (1) subyearling chinook predominate total chinook daily collections for 3 consecutive days and (2) in-river conditions are no longer "spring like".

Middle Columbia River

Over all

Goals

Assure reservoirs are as full as possible (Montana says use VARQ Flood Control) at the start of the migration periods so natural runoff is used to increase river flows instead of filling empty reservoir space. Draft reservoirs as needed during the spring migration period to achieve flow objectives but place a higher priority on achieving reservoir refill by July 1 than meeting spring flow levels.

Montana says use a parabolic reservoir refill trajectory at storage reservoirs (i.e. as the pool approaches full, gradually reduce the refill rate) and attempt to fill on the date that inflows decline to turbine capacity (this reduces the chance of a forced spill/gas supersaturation). Use available pass-through flow during the spring migration period to achieve flow objectives

Coordinate federal and PUD project operations to provide suitable discharge from Grand Coulee and Chief Joseph projects to enable Priest Rapids Dam operations to minimize river fluctuations and stranding of juvenile chinook salmon in the Hanford reach.

Objectives

Vernita Bar spawning and incubation.

Triggers

Establish and maintain fall chinook incubation flows according to 1988 VB Settlement Agreement.

Montana says monthly reservoir inflow forecasts define VARQ flood vacancy requirements and refill trajectory.

Priest Rapids

Objectives

135 kcfs Flow Objective from April 10th - June 30

Implement Hanford Reach Stranding agreement
Maintain a steady or increasing hydrograph through the spring to the extent possible to protect emergent fry in the Hanford reach.

Triggers
Index seining in the Hanford Reach captures 50 or more sub-yearling chinook from the 6 index seine sets.

Chief Joseph

Objectives
Operate at elevation 930 – 956 feet from October 21 to February 14
Operate at a lower limit of 950 feet from February 15 to May 15 for Goose nesting.
Operate at elevation 950 – 956 feet from May 16 to October 20

Triggers

Grand Coulee

Objectives
Assist in Meeting BiOp in-season flow objectives (April 10 to August 31).
Montana adds by re-regulating upstream runoff to create a protracted runoff event.
Operate to meet 85% confidence level of meeting April 10.
Assist in meeting chum flows October-April
Serve irrigation diversion requirements
Prevent spill through SNL, or by banking the water; Spill with minimum TDG impact
Provide flows for Vernita Bar; and to help alleviate Hanford stranding
Draft/fill for power or non-power emergencies; Maintain power system integrity
Meet multi-purpose needs: tribal needs (e.g., 1283 feet), power, NWPPC-resident fish, minimum lake level for ferry operation, etc.
Refill by June 30. Provide for safe recreation from July 4 through Labor Day.
Secure optimum period-by-period storage levels to be responsive to needs and emergencies
Minimum 1225 feet FDR Lake level to maintain ferry operation
Sufficient water releases to protect such needs as navigation (e.g., reactor vessels, etc)

Triggers
BiOp flow targets, dates, elevation limits (1280 feet), fish curves
Timing of flood control draft to minimize spill.
Volume forecast
Impending, perceived, or sudden emergencies – power or non-power
Project operating requirements – daily draft or refill rate limits to prevent bank sloughing
Maintenance and other actions for dam safety, public safety
1240 feet or other elevations for efficient pumping to keep up with irrigation demands
Upstream (e.g., Canadian) operations
Montana says inflows from upstream subbasins should define refill date and trajectory based on acceptable flood risk. After the threat of flooding is past and flows from headwaters subside, gradually release storage to extend the runoff event into summer.

Upper Columbia

Hungry Horse

Goals

Provide a suitable stream flow regime for bull trout and other sensitive native species in the Flathead Watershed.

Objectives

Assist in meeting flow objectives. Montana adds by operating the reservoir above the IRCs, up to VARQ elevations (if safe in terms of flood control and economically feasible) to store water for spring release while maintaining 95% reservoir refill probability.

Montana says meet Flood Control using VARQ strategy, then use improved reservoir refill potential to increase the number of years in which storage above elevation 3550 is available for summer flow augmentation.

Operate to meet 75% confidence level of meeting April 20 (Bureau of Reclamation says April 10) Montana objects to this paragraph.

Attempt to meet IRC elevations if possible after BiOp conditions have been met Montana adds by implementing VARQ/ IRCs. Use storage above elevation 3550 for summer flow augmentation, gradually released to produce a smoothed discharge shape to benefit juvenile bull trout in the Flathead River downstream.

Normalize reservoir discharge hydrograph. Smooth discharge especially during the biologically productive summer months to avoid flow fluctuations and attendant negative varial zone effects.

Meet minimum flow requirement of 3,500 cfs at Columbia Falls.

Serve local and system-wide power or non-power emergency needs

Avoid spill through such actions as deferring April 10 refill.

Assist in meeting Flathead Basin Management operating objectives.

Secure optimum period-by-period storage levels to be responsive to needs and emergencies

Triggers

BiOp flow targets, dates, elevation limits (3540 feet), fish curves

Kerr operating conditions that may prompt Hungry Horse assistance to meet FERC requirements

Prognosis for spill; need for pre-emptive releases to avoid such spill

Available turbine/generation capacity

Impending, perceived, or sudden emergencies – power or non-power

Expectations of flow arrival downstream for BiOp objectives triggers timing of release of storage draft.

Discharge limits for downstream public safety.

River fluctuations must be minimized to protect resident fish.

Maintenance and other actions for dam safety, public safety

Montana says reservoir inflow forecasts determine VARQ and reservoir drawdown and refill trajectories based on IRC matrix.

Refill date should be on or within a few days of the date on which inflows decline to within maximum turbine capacity.

Libby

Goals

Overall sturgeon goal for the Kootenai River is to restore natural recruitment to the Kootenai River white sturgeon population by providing suitable stream flows for spawning and recruitment.

Provide a suitable stream flow regime for bull trout in the Kootenai and Flathead (Montana says only Kootenai) rivers.

Objectives

Operate to meet 75% confidence level of meeting April 20. Montana objects to this paragraph.

On upper rule curves by April 10th (from ROD) Montana objects to this paragraph

Montana says Use improved reservoir refill potential to increase the number of years in which storage above elevation 2449 is available for summer flow augmentation.
Balance the needs of providing a volume water for sturgeon spawning, riverine habitat for bull trout, and achieving refill of Libby reservoir by mid-July. Montana adds (refill date should be a sliding scale based on inflow volume, filling later in high water years).
Montana says meet flood control using VARQ strategy.
Meet International Joint Commission (IJC) requirements at Kootenay Lake
Assist in Meeting Flow Objectives Montana adds by operating the reservoir above the IRCs, up to VARQ elevations (if safe in terms of flood control and economically feasible) to store water for spring release while maintaining 95% reservoir refill probability.
Normalize reservoir discharge hydrograph. Smooth discharge especially during the biologically productive summer months to avoid flow fluctuations and attendant negative varial zone effects.
Use storage above elevation 2449 for summer flow augmentation, gradually released to produce a smoothed discharge shape to benefit juvenile white sturgeon and bull trout in the Kootenai River downstream.
Provide suitable river flow and water temperature for sturgeon spawning, incubation, hatching, and juvenile survival.
15 kcfs flow at Bonners Ferry from May 1 to Start of Sturgeon Spawning
Then release full powerhouse capacity for up to 42 days. Goal 35 kcfs at Bonners Ferry.
Then 11 kcfs at Bonners ferry for 21 days.
Maintain stable discharge from Libby Dam between the sturgeon spawning and salmon flow augmentation operations. This discharge may be between 4 kcfs and 10 kcfs.
Attempt to meet IRC elevations if possible after BiOp conditions have been met
Meet BiOp conditions in the lower Columbia by implementing VARQ/IRCs.
Ramp stream flows in the Kootenai River at a rate that does not strand or otherwise adversely impact bull trout. This ramp rate should not exceed a 10% change within a day or between days.
Montana submits the following guidelines for the Sturgeon Operation
When low elevation runoff increases flows to 15 kcfs at Bonners Ferry, use Libby discharge as needed to maintain or increase flows (simulating a natural ascending limb of the runoff hydrograph) during the start of Sturgeon Spawning.
Then release full powerhouse capacity for up to 42 days. Goal 35 kcfs at Bonners Ferry release Libby discharge as needed to meet the “tiered flow objective” at Bonners Ferry as described in the WS Recovery Plan and cited literature [Note: there seems to be some confusion about the operation specified by the WS Recovery Plan].
Maintain stable discharge from Libby Dam between (Montana says after) the sturgeon spawning and salmon flow augmentation operations. This discharge may be between 4 kcfs and 10 kcfs.

Triggers

Montana says reservoir refill date should occur on or within a few days of the date on which inflows decline to within turbine capacity.
Montana says reservoir inflow forecasts determine VARQ and reservoir drawdown and refill trajectories based on IRC matrix.
Volume of sturgeon tiered flows are estimated based on the May 1 forecast and refined using subsequent monthly forecasts and flow

enveloping [Note: tiered flows were designed assuming that reservoir elevations were at or above the KIRC (or IRC)].
Initiation of sturgeon spawning.
Will be provided when 2000 Sturgeon Guidelines for Libby Dam operations are developed by the FWS.
The 1999 sturgeon guidelines can be used as a reference example. The 1999 guidelines specified maintaining 4kcfs outflow from Libby Dam starting April 1. Once local runoff downstream from Libby Dam increases flow at Bonners Ferry to 15kcfs, then maintain 15kcfs. If local inflow does not provide sufficient water to reach 15kcfs, regulate outflow from Libby Dam to reach 15kcfs at Bonners Ferry in June.
Triggers to start the flow pulsing operation for sturgeon include: 1) the combined water temperature at Bonners Ferry is expected to be maintainable at 10 degrees C.; 2) radio tagged sturgeon spawners have moved into the Kootenai River; and 3) local inflow to the Kootenai River between Libby Dam and Bonners Ferry is increasing or believed to be near the annual peak. When these trigger conditions are met, increase the Libby Dam discharge to the maximum extent possible.
Bull Trout Triggers will be developed by the FWS for 2000. Flow requirements for 1999 can be used as an example for 2000. In 1999, the FWS requested that all flow changes be limited to a maximum of 10% within and between days when the river flow was less than 14 kcfs. The FWS also requested that Libby Dam discharge be maintained at about 8 kcfs during the summer between the sturgeon spawning flow pulse and the start of salmon flow augmentation.
Montana says Bull Trout Triggers will be developed by the FWS for 2000. Flow requirements for 1999 can be used as an example for 2000. In 1999, the FWS requested that all flow changes be limited to a maximum of 10% within and between days when the river flow was less than 14 kcfs. The FWS also requested that Libby Dam discharge be maintained at about 8 kcfs during the summer between the sturgeon spawning flow pulse and the start of salmon flow augmentation. . [I recommend that the “flat flow” discharge volume be based on water availability to reduce fluctuations and associated varial zone impacts and to assure maximum benefit to all sensitive Columbia River stocks. Correct me if I’m wrong, but an ACOE model analysis showed that the benefits to anadromous recovery of a) the double peak operation and b) Flat flow operation, were nearly identical as measured at Corra Linn Dam. If this were true, why would anyone want to harm white sturgeon and juvenile bull trout by wildly fluctuating flows, if there is no benefit to salmon?].
Montana has the following triggers for Sturgeon operation:
Initiation of sturgeon spawning migration begins in-season-management to use the controllable portion of the tiered flow (that portion from Libby Dam) to the greatest benefit for white sturgeon.
Will be provided when 2000 Sturgeon Guidelines for Libby Dam operations are developed by the FWS. Montana adds [Does this differ from the signed Recovery Plan? If so, Montana requests a detailed description and rationale].
Triggers to start the flow pulsing operation for sturgeon include: 1) the combined water temperature at Bonners Ferry is expected to be maintainable at 10 degrees C.; 2) radio tagged sturgeon spawners have moved into the Kootenai River; and 3) local inflow to the Kootenai River between Libby Dam and Bonners Ferry is increasing or believed to be near the annual peak. When these trigger conditions are met, increase

the Libby Dam discharge to the maximum extent possible. Montana says increase the Libby Dam discharge to the specified tiered flow target

Albeni Falls

Objectives

90% confidence level of being at the April 15th (ROD) or April 20 flood control elevation

Meet Minimum Flow Requirements

Triggers

Lower Snake River

Overall

Goals

"The overarching goal is to recover listed stocks of anadromous salmonids in the Snake River basin by optimizing passage conditions for juvenile and adult salmonids, and by meeting water quality standards in the Snake River. This will be achieved by providing the best utilization of Snake River basin resources to benefit anadromous and resident species, and improve conditions associated with the Clean Water Act, while recognizing trust responsibilities to Native American tribes."

Objectives

Note awaiting draft from Paul Wagner & Ed Bowles for objectives below.

Assure reservoirs are as full as possible at the start of the migration periods so natural runoff is used to increase river flows instead of filling empty reservoir space. Draft reservoirs as needed during the spring migration period to shape flows on fish movement and achieve flow objectives but place a higher priority on achieving reservoir refill by July 1 than meeting spring flow levels.

Shape flood control water to the extent possible from winter and early spring to the late April period.

Determine the amount of water available to aid fish migration based on state water law and projected runoff volumes. Prioritize available water supplies for springtime migrants.

Prioritize available storage at Brownlee and Dworshak reservoirs to fill in the holes from spring snowmelt and flood control operations to help keep average flows at Lower Granite Dam from dropping below the 85-100 kcfs sliding scale seasonal flow target from mid-April through May when spring migrants are present. Idaho supported 100 kcfs for the 1999 spring migration.

Manage flood control to ensure the highest possible reservoir levels by early April and shift as much of the flood control drafting as possible to coincide with smolt migration (beginning early to mid April).

Assure contracts are in place to provide 427 kaf of water from upper Snake River reservoir storage to maintain flows in the lower Snake River during the juvenile migration season.

Provide a non-turbine passage route for juvenile migrants by providing spill at all the lower Snake River dams. Maintain spill at a level to achieve tailwater TDG levels of 120% (maximum allowable state standard) (Idaho willing to spill to 125% based on monitoring) at defined schedules during the juvenile migration period which is approximately April through June 20.

Control temperatures for juvenile summer migrants to the extent possible while using Dworshak and Brownlee reservoirs as sources of flow augmentation water.

Determine whether use of Dworshak reservoir storage to date during the juvenile migration period provides adequate adult salmon benefits and whether alternative operations are justified or feasible.
Maintain Minimum Operating Pools (MOP) at all reservoirs on the lower Snake and Columbia rivers during the spring migration period.
Utilize a "spread-the-risk" transportation strategy based on annual pre-season projections of in-river migration conditions. In 1999 Idaho recommended transportation of smolts collected at Lower Granite and Little Goose dams, and returning all bypassed fish to the river at Lower Monumental. (Spill to the maximum allowable by state water quality agencies at all collector projects throughout the spring migration period.)
Trucking should be limited in the transport of smolts.
Provide adult and juvenile fish passage according to FPP

Triggers

Initiation of spill: The date is near the historic migration time frame and juvenile fish index numbers show a steady and or increasing trend. Examples: (1) Index numbers are in the _ digits and show an increasing trend for _ consecutive days or _ digits for _ days and do not decrease by more than _% on the _ day. (2) _% of the projected run has passed lower Granite Dam to date. These would serve as initiation points to further evaluate the run.
Termination of spill: June 20 or spring migrants are consistently in double digits.
Use of Brownlee and Dworshak for flow augmentation. This needs some analysis given Billy Conner's presentation and an understanding of the Nez Perce's position.
End MOP when adult fall chinook enter lower Snake except at LWG.
Spill trigger: At least 85 kcfs seasonal average flow forecast.

Ice Harbor

Objectives

Triggers

Lower Monumental

Objectives

Spring and Summer Juvenile Fish Transport

Triggers

Little Goose

Objectives

Spring and Summer Juvenile Fish Transport

Triggers

Lower Granite

Objectives

Spring and Summer Juvenile Fish Transport
85 – 100 kcfs Flow Objective April 3 to June 20
Provide flow augmentation in the Snake River until 90% of the subyearling chinook salmon have passed Lower Granite Dam, to increase their survival.
50 – 55 kcfs Flow Objective June 21 to August 31
Operate within 1 foot of MOP from April 3 to November 15

Triggers

augment flow when significant fish are present and forecasted runoff is less than that year's flow objective

Dworshak

Objectives

Assist in Meeting Snake and Columbia Salmon Flow Objectives
Be no higher than 1558 elevation on December 15
Be on the flood control curve by April
Provide Temperature Control for Lower Snake Projects
Idaho has the following objectives:
Pass inflow and release storage (in complement with Brownlee) as necessary to fill in the holes from natural spring runoff to help keep average flows at Lower Granite Dam from dropping below 100 kcfs from mid-April through May.
Strive for a full pool by June 1, and maintain as full a pool as possible through Labor Day by delaying large-scale drafts until mid-August.
Limit late summer drafting to elevation 1535 ft msl. This will reserve approximately 200 kaf storage to be shaped in the fall to aid adult steelhead and fall chinook migration.
Strive for as full pool as possible, within flood control constraints, by early April. Shift timing to release as much of the flood control volume as possible after smolt migration begins early to mid-April.
Water used from Dworshak should not jeopardize the ability of federal and state hatcheries at Ahsahka, Idaho, from fulfilling their federal mitigation debt. [C]

Triggers

Water and fish conditions at Hatcheries
Condition of juvenile and adult migrating fish on lower Snake
Consider flow augmentation from Dworshak Dam when water temperature in the Lower Granite Dam tailrace reaches 17 to 19 degrees C.

Brownlee

Objectives

The following objectives are from Idaho:
Strive for as full pool as possible, within flood control constraints, by early April. Shift timing to release as much of the flood control volume as possible after smolt migration begins early to mid-April.
Contribute up to 110 kaf storage (approximately eight feet) as needed prior to mid-May to help ensure flows at Lower Granite Dam do not drop below 100 kcfs. If Lower Granite flow are adequate, inflow can be used to help refill Brownlee Reservoir by June 7.
Maintain stable or rising reservoir levels (at no lower than 2,069 ft msl.) from mid-May through June.
Pass through or shape up to 427 kaf BOR contribution from uncontracted storage and will seller/lessor agreements for anadromous fish. Provide this water as best possible to meet the real-time needs of migrating fish, taking into consideration management factors such as resident fish and water quality.
Any late summer drafts should be timed and shaped as best possible for the benefit of adult fall chinook and steelhead migration, taking into consideration resident fish needs and provided that reservoir elevation is 2,059 ft msl. by September 30.
Any flow augmentation operations by Idaho Power Company to assist survival of anadromous fish at downstream federal facilities must meet Idaho's requirement that BPA reimburse energy, capacity and head losses incurred by IPC at its facilities.

Triggers

Begin flow augmentation from Brownlee Dam (Hells Canyon Complex) before Lower Snake water temperature reaches 17 to 19 degrees C.

Consider maximizing the release of outflow from Brownlee Dam (Hells Canyon Complex) within total dissolved gas standards and ramp down outflows in the shape of the natural hydrograph when water temperature in the Lower Granite Dam tailrace reaches 17 to 19 degrees C.

Upper Snake(427 KAF)

Objectives

Secure annual volume on a willing buyer/seller basis, in compliance with Idaho State law

Deliver available volumes into Brownlee in coordination with Idaho Power Company

Achieve water quality objectives from volume deliveries

Triggers

BiOp flow targets, dates

River flow limit (e.g., 1500 cfs at Milner, ____ cfs at Lime Point)

Delivery is after flood control releases, typically late spring or in summer

Consistent with Water Master scheduling

Volumes delivered into Brownlee are summer/winter split per arrangements

Shaping services from Brownlee delivers the full 427 KAF into Lower Granite in-season.

Operating plans expressed by letter to the State of Idaho

Lower Snake River Objectives

Paul Wagner NMFS February 7, 2000

Manage reservoirs to be as full as possible by the start of the migration season.

Determine available water supply for the migration year.

Assure contracts are in place to provide 427 kaf from upper Snake River storage.

Shift flood control releases to the maximum extent possible to benefit Snake River flows and shape flood control and spring runoff to the maximum extent possible into the juvenile migration season which begins early to mid April.

Maintain flows of at least 85 kcfs at Lower Granite throughout the spring passage season emphasizing the period mid April through mid June.

Manage reservoir refill in the spring to achieve a 95% probability of refilling Brownlee and Dworshak reservoirs by July 4. Utilize reservoir storage as required to maintain spring flows in the 85 to 100 kcfs range.

Provide juvenile spillway passage at lower Snake River dams by spilling to allowable State standards during schedules defined by the BiOp.

Operate turbines within 1% of peak efficiency March 15 through November 30.

Maintain minimum operating pool elevations at all reservoirs on the lower Snake River from April 1 until juvenile numbers decrease to low numbers in the fall.

Utilize a “spread the risk” transportation strategy based on annual pre-season projections of in-river migration conditions. Transport all fish collected from Snake River projects with the exception of PIT tagged fish.

Control temperature and augment flow to the extent practicable during the fall chinook migration season.

Utilize Brownlee reservoir to augment summer flow and shape BOR’s upper Snake River water to the maximum extent possible early in the summer season when Brownlee water temperatures are still cool.

Utilize Dworshak as a source of augmentation water during the summer migration season to provide both temperature and flow benefits.

Apply modeling techniques to determine the temperature benefits achieved by using Dworshak

and Brownlee reservoirs at defined outflows on defined dates and use these results to plan release schedules.

Use results of temperature modeling and adult behavioral information to decide whether releases from Dworshak should occur during September to improve adult migration conditions.

Technical Management Team
DRAFT 2000 WATER MANAGEMENT PLAN
For The Federal Columbia River Power System

March 8, 2000~~January~~ 2000?

I. Introduction

This Water Management Plan (Plan) describes the measures needed in 2000~~1999~~ to provide the fish passage conditions called for in the National Marine Fisheries Service's (NMFS) *Biological Opinion (BiOp) on the operation of the Federal Columbia River Power System (FCRPS) and Juvenile Transportation Program in 1995 and Future Years*, and the *1998 Supplemental BiOp*. It covers relevant factors affecting the operation of FCRPS, including federal reservoir and dam operations to augment flows for fish, power generation, turbine outage and spill scheduling; water temperature control; total dissolved gas management and special operation for research and other purposes. The Plan is updated annually by April 15 of each year by the Technical Management Team (TMT). It is consistent with the TMT Guidelines and gives full consideration to the provisions of and effects on the Northwest Power Planning Council's Fish and Wildlife Program, other biological opinions, state and tribal plans and programs, the Endangered Species Act (ESA), the Clean Water Act (CWA), and other relevant operational requirements.

Seven appendices are attached to the Plan:

- Appendix 1. Dissolved Gas Management Plan
- Appendix 2: Emergency Protocols
- Appendix 3: Load Shaping Guidelines for Turbine Operation Outside 1% Peak Efficiency
- Appendix 4: TMT Guidelines
- Appendix 5: Maintenance Schedule Outages of Generating Units
- Appendix 6. TMT Goals, Objectives and Triggers~~Recurring Issues Faced by the TMT and Possible Options for Resolution~~
- Appendix 7. Operation-related BiOp Provisions

II. Water Supply Forecasts

The (February ~~April~~ Final) January - July forecast for the Columbia River at The Dalles is 106~~128~~ million acre-feet (maf), 100~~121~~% of normal. Runoff forecasts for Reclamation reservoirs above Brownlee are in the 60 - 81~~116-127~~ percent of normal range. Pertinent water supply forecasts issued by the River Forecast Center are summarized in Table 1 for key locations on the Columbia and Snake Rivers. The final observed water supply for 199~~9~~8 is also given for comparison purposes.

Table 1. February~~April~~ Final 2000~~1999~~ (and May Final 199~~98~~) Runoff Volume Forecasts

Location	February~~April~~ Final '00~~99~~	% of Normal February~~April~~ Fin. '00~~99~~	May Final 199~~98~~ (actual)	% of Normal 199~~98~~ (actual)
	Maf	%	Maf	%
Libby (Jan-Jul) *	6.92	108	6.80 (6.95)	106 (109)
Libby (Apr-Aug) *	**6.80**	**108**	6.76 (7.13)	106 (112)
Libby (Apr-Sep) *	7.25	107		
Hungry Horse (Jan-Jul)	2.11	93	2.37 (2.24)	104 (99)
Hungry Horse (Apr-Sep)	2.04	93		
Grand Coulee (Jan-Jul)	66.1	104	72.4 (71.3)	114 (113)
Dworshak (Apr-Jul) *	2.72	101	3.24 (3.19)	120 (118)
Lower Granite (Jan-Jul)	26.9	90	35.8 (36.1)	120 (121)
Lower Granite (Apr-Jul)	19.7	91	25.5(25.8)	118(119)
Lower Granite (Apr-Aug)			27.2 (27.3)	118 (119)
Lower Granite (Apr-Sep)				
The Dalles (Jan-Jul)	106	100	124.0 (124.1)	117 (117)
The Dalles (Apr-Sep)	99.4	100		
The Dalles (Apr-Aug)			108.0 (110.3)	116 (118)
Brownlee (Jan-Jul)			12.90 (13.60)	132 (139)
Brownlee (Apr-Jul)	3.67	63	7.32(8.05)	126(139)
Brownlee (Apr-Aug)			8.18 (8.84	126(137)
Brownlee (Apr-Sep)				

(*) Should use COE Forecast

III. Winter Operations (September 199~~98~~ - March 2000~~1999~~)

Reservoir Refill

During the winter season leading up to the 2000~~1999~~ fish passage season, the Federal projects were operated with best efforts to meet the BiOp's recommendations on reservoir refill. The objective was to achieve the levels of confidence of refill summarized in Table 2 to April 10 flood control at Grand Coulee, and April 20 flood control at Libby, Hungry Horse and Albeni Falls. A 59-year modeling run is routinely used to predict the expected refill probability of each of the reservoirs involved. The results of the model runs are described in more detail in Section VI, Outlook for Meeting Flow Objectives.

Table 2. Required Confidence Levels for Reservoir Refill (Source: 1995 BiOp)

Libby and Hungry Horse	Grand Coulee	Albeni Falls
75%	85%	90%

The maximum flood control draft varied at each project. The timing of the maximum draft also varied for each project. Table 3 provides the 2000~~1999~~ maximum flood control requirements at each project and the date of maximum draft at each project.

Table 3. Flood Control (FC) Requirements (*based on February ~~April~~ final forecast)*

Projects	Date of Max. FC Draft	Max. FC Draft Elev.	Min. Pool Elevation	Max. Pool Elevation
Mica	31 March	2080.0*	2320.0	2475.0
Arrow	31 March	1399.9	1377.9	1444.0
Duncan	28 February	1807.7	1794.2	1892.0
Libby	15 March	2325.6	2287.0	2459.0
Hungry Horse	30 April	3498.1	3336.0	3560.0
Albeni Falls	30 April	2055.0	2051.0	2062.5
Grand Coulee	30 April	1237.0	1208.0	1290.0
Brownlee	28 February	2056.7	1976.0	2077.0
Dworshak	15 April	1495.1	1445.0	1600.0

(*) in kaf. Mica flood control evacuation requirements are defined in kaf space required rather than a corresponding elevation in feet.

Reservoir and Reservoir-Related Operations

Libby. Libby was operated for power in the September through December period, and for flood control in the January-March period. The end of December flood control target was elevation 2411 feet. Toward the end of December Libby was drafted below 2411 feet in an attempt to try to provide low flows for burbot study. Unfortunately due to high inflows it was not possible to provide for the low flows requested. Libby's end of December elevation was 2408.1 The end of January, February, and March flood control elevation targets were 2370.9, 2338.3, 2325.6 feet respectively based on each respective water supply forecast. Libby's end of January, February elevations were 2370.13, 2341.13 feet, respectively. The end of February flood control elevation was not met because it was felt that the March final forecast would be lower than the February forecast and to help in making the April 15th refill goal. The BiOp's objective is to achieve the April 15 flood control evacuation point with 75% confidence.

Hungry Horse. Hungry Horse started September off at elevation.3554.05 feet. It continued to draft until the early part of November. It then filled to elevation 3544.63 near the end of November 29th. The end of January, February, March and April flood control elevations were 3545.9, 3529.5, 3514.2, and 3498.1 feet respectively based on each respective water supply forecast. End of January and February elevation was 3526.18 and 3513.06 .

Albeni Falls. Going into September the Lake Pend Oreille elevation operation range was 2062 – 2062.5 feet.. The lake was drafted to elevation 2062 feet by September 30th. It was intended to draft the lake elevation 2056 feet by October 31st. The elevation target was later changed to 2055 by October 20 – 25 and 2051 feet by mid November. The planned 2051 feet elevation was the second part of a five year test where the first three years (completed last year) the lake was to operated at elevation 2055 feet during the winter and then for the next two years the lake was to be operated at elevation 2051 feet. The Corps was sued to keep the lake at elevation 2055 instead of drafting to 2051 has originally planned. A compromise was reached which allowed the lake to be drafted to elevation 2053 – 2053.5 by November 20th. The operating range was changed to 2053 – 2054 at the end of September.

Grand Coulee. Grand Coulee started September at elevation 1286.56 feet. It ended September at elevation 1284.99 feet. It stayed around these elevations until around November 20th. Its end of

January, February. March and April flood control elevation were 1290, 1290, 1270.1 and 1237 feet. respectively based on each respective water supply forecast. At the end of January and February Grand Coulee's elevation was 1263.30 and 1262.70 feet.

Brownlee. Brownlee started September at elevation 2045.1 feet. It ended September at elevation 2038.5 feet and continued to draft until the middle of October at which point it began to fill. Brownlee reached a maximum elevation of 2075.20 feet January 3rd. Brownlee's end of January, February, March and April flood control elevations were 2077.0, 2056.7, 2058.1 and 2061.3 feet respectively based on each respective water supply forecast. Brownlee's end of January and February elevation was 2063.36 and 2059.95 feet. A variance was given to Brownlee for their end of February flood control elevations because of high inflows to the project.

Upper Snake River.

Dworshak. At the beginning of September Dworshak was still releasing water for flow augmentation and temperature control. It's end of September elevation was 1256.7 feet. Dworshak went to minimum project release 14 September when elevation reached 1520 feet and stayed there until around January 6th. The end of January, February, March and April flood control elevations were 1530.6, 1523.6, 1509.8, and 1515.3 3 feet respectively based on each respective water supply forecast. Dworshak's end of January and February elevations were 1529.73 and 1524.27 feet. Dworshak's February flood control elevation was not meet because of high inflows similar to what happened at Brownlee.

Lower Snake River Projects. Lower Granite went off MOP November 15th. Lower Granite, Little Goose, and Lower Monumental projects operated within the normal operating range.

Bonneville. Bonneville's outflow was controlled to provide protection for spawning Chum and Fall Chinook.. The minimum flow level was set at 125 kcfs 15 October. The protection level was set at 140 kcfs (+-10 kcfs) November 10th. TMT set the protection level at 150 kcfs at the December 15th meeting. This level was held until the current time.

John Day. A spill test was held at John Day dam in early February to test the effect of tailwater elevation on the flow defectors.

IV. Spring Operations (April-June)

Spring Flow Objectives at Lower Granite and McNary

The spring flow objectives at Lower Granite and McNary are to be calculated based on the May final volume runoff forecast, using a sliding scale defined in the BiOp. Values shown in Table 4 resulted from an early determination based on the February ~~April~~ final runoff forecasts (April-July runoff forecast of 19.7~~26.2~~ maf at Lower Granite and January-July runoff forecast of 106~~128~~ maf at The Dalles).

Table 4. BiOp Spring Flow Objectives (based on May final runoff forecast)

Lower Granite		McNary	
Period	**Flows (kcfs)**	**Period**	**Flows (kcfs)**
4/3-6/20	98.9	4/20-6/30	260

As called for in the BiOp (Page 96), FCRPS will be operated to meet the spring flow objectives, with reservoirs at flood control elevations on April 10 (or April 20, as the case may be) and full on June 30. Given the ~~above~~ average runoff forecast at The Dalles, it is anticipated there will be no need to limit the spring flow augmentation in order to refill the reservoirs by June 30.

Idaho recommends examining the requirement to be at April 10 flood control. Having reservoirs at flood control on April 10 does not allow for any provision to "fill in the holes" from delayed spring snowmelt to benefit migrating smolts. Shifting the timing of meeting final flood control elevations would provide this flexibility.

Spring Flow Objective for the Mid-Columbia River

The recommended average flow objective at Priest Rapids is 135 kcfs during the April 10 - June 30 period. The shaping of the flows will be guided by the desire to refill by June 30, timing and magnitude of the juvenile migration, water temperature, spill and total dissolved gas levels, adult fish and other requirements for improved survival of listed fish. Flows greater than the objective may be provided on a weekly basis during key points in the migration if this does not jeopardize reservoir refill and summer flow augmentation.

Snake Reservoirs at MOP

The lower Snake River reservoirs will be operated within one foot of the minimum operating pool (MOP) from April 10 until adult fall chinook salmon begin entering the lower Snake River (late August). The operating ranges are shown in Table 5.

Table 5. Lower Snake River Reservoirs Operating Ranges

Reservoirs	MOP Range(ft)	Normal Operating Range (ft)
Lower Granite	733 - 734	733 - 738
Little Goose	633 - 634	633 - 638
Lower Monumental	537 - 538	537 - 540
Ice Harbor	437 - 438	437 - 440

MOP draft and refill operations will be determined by TMT and done in a manner that provides fish benefits, while avoiding exceedence of state TDG standards, if possible. This will be accomplished through proper timing of the draft at each individual reservoir, proper sequencing of the operation, and controlling the draft rate. Detailed draft operation will be discussed in-season.

Other Reservoir Spring Operation

Libby will be operated for Kootenai River sturgeon, using operational guidelines for Kootenai River white sturgeon prepared by USFWS in coordination with NMFS. The Service will also make recommendations for operation of the Libby Project for bull trout, which has been listed under the Endangered Species Act. These recommendations may be in the form of operational guidelines. Specific requests for project and reservoir operations at the Libby Project will be made by System Operational Requests.

~~Albeni Falls will start April near its winter elevation of 2055 feet. The end of April maximum elevation is 2056 feet. Lake Pend Oreille will be operated to be full by the end of June.~~

Canadian Treaty projects will operate consistent with the 19998-200099 Detailed Operating Plan (DOP) and related operating agreements such as the Non-Power Uses Agreement and the Non Treaty Storage Agreement. The Operating Rule Curve for the whole of Canadian Storage shall be the sum of the Operating Rule Curves for each of Duncan, Arrow, and Mica. Mica will operate consistent with the Mica Project Operating Criteria table as shown in the DOP. More detailed information on the DOP will be available via the TMT homepage.

Spring Spill for-fish-passage

Planning dates for spring spill are April 3 to June 20 in the Snake River; April 20 to June 30 in the lower Columbia River. A summary of the general guidance on spill requirements and other considerations provided in the 1998 Supplemental BiOp is listed in Table 6. Spill will be up to the level by the 120% TDG limit. Spill will also be implemented at all three Snake River collector projects "*when seasonal average flows are projected to meet or exceed 85 kcfs*". In-season adjustments of the spill caps will be made based on actual TDG levels measured below the projects.

NMFS has requested the necessary state waivers to allow spill for-fish-passage to occur up to the recommended 120% TDG level. A letter response was received from Washington Department of Ecology dated ~~April 1, 1999~~?. The Oregon Department of Environmental Quality issued a waiver dated ~~March 19, 1999~~?.

If needed to provide the best condition for an evaluation of the effects and efficacy of spill to improve in-river survival, the TMT may recommend that a single spill regime prevail throughout the spring migration season. This action will depend on when the numbers of fish arriving at the projects are significant and when the flows are expected to reach trigger levels during the spring season.

Table 6. Summary of Spill Requirements and Other Considerations (1998 Supplemental BiOp)

Project	**Flow trigger**	**Spill Duration**	**Recommended Min/Max Powerhouse Capacity (1)**	**Spill Cap for 120% TDG (2) at the start of the spring season**	**Other Considerations (per 1998 Supplemental BiOp Appendix C) to prevent eddy formation, improve fish passage, etc.**
	Kcfs	**hours**	**kcfs**	**kcfs**	**% of flow or kcfs**
LWG	85	12 (4)	11.5/123	45	
LGS	85	12 (4)	11.5/123	60	35% max(3), page C-11
LMN	85	12 (4)	11.5/123	40	50% max (3) page C-11
IHR		24	7.5/94	75	
MCN		12 (4)	50/175	120-160	
JDA		12(5)	50/	180	60% max (for flows up to 250-300) or TDG cap (whichever is less); 25% min (due to eddy) See page C-13
TDA (6)		24	50/	230 (5)	(6)64% max 30% min (test). See page C-14
BON		24	30 min. (BPA); see page C-14. 60 min. (FPP)	120	50 kcfs min. spill (tailrace hydraulics); 75 kcfs max. daylight hours (adult fallback) See page C-14

1. Max. value is for powerhouse with units operating within 1% peak efficiency
2. Starting value subject to in-season adjustments based on real-time information
3. Levels provided in the 1998 BiOp to prevent eddy formation and maintain good adult passage conditions. May be adjusted in-season by TMT
4. Normally between 1800-0600 hours
5. From 1900 to 0600 from May 15 to July 31 and from 1900-0600 in August at John Day.
6. Spill at TDA is limited to the 1995 BiOp level of 64% (rather than spilling to the TDG cap). ~~Note that this requirement may be modified for 1999 (see below).~~

Note – There are several spill related research activities planed for this spring / summer. The final details have not been worker out yet. Below is our current ideas on what might happen.

Bonneville – It has been proposed this year to test the effect of spilling to the gas cap 24 hours a day. Most likely there will a randomized block test consisting of a block of 2 days of spilling during the daylight hours to the gas cap followed by a block of limiting daytime spill to the 75 kcfs adult fallback cap.

The Dalles – Recent research has shown that juvenile fish survival at TDA is better at 30% spill as opposed to 64% spill. Most likely the spill level will be between 30 - 50 % this year.

John Day - There will most likely be a test of spilling several different levels during the daytime period. A randomized block design consisting of periods of 0% spill and 20% spill during daytime has been suggested. The daytime spill amount may be linked to the spill at Bonneville. John Day would spill during the day when Bonneville was spilling to the daytime 75 kcfs cap and not spill when Bonneville was spilling to the gas cap during the day.

Ice Harbor – There is a proposed spillway survival and adult test that mentions spilling at two different levels of 45 and 110 kcfs. My guess is that this test is similar in concept to the test at Bonneville. In that they would alternate daytime spill between the gas cap (last year around 100 kcfs) and 45 kcfs the adult fallback cap.

Lower Granite – In support of the Surface Bypass Collector testing Lower Granite will be spilling 20% 24 hours a day.

V. Summer Operations (July-August)

Summer Flow Objective at Lower Granite and McNary

The seasonal average flow objective for Lower Granite is to be based on the May final water supply forecasts, but the seasonal average flow objective for McNary is a fixed 200 kcfs regardless of the runoff forecasts. Summer flow objectives based on the April final April-July runoff forecast are shown in Table 7.

Table 7. Biological Opinion's Summer Flow Objectives

Lower Granite Period	Lower Granite Flows (kcfs)	McNary Period	McNary Flows (kcfs)
6/21-8/31	51.5	7/1-8/31	200

At Libby, draft to provide flows for white sturgeon spawning (RPA 1(a)) does not, in itself, preclude drafting below the interim draft limit to meet flow objectives for salmon in accordance with the conditions and process described in RPA 1(f) of the BiOp. The USFWS and NMFS, in coordination with

the states and tribes, will make the best efforts to balance the flow requirements of both species and make recommendations to the TMT. The Corps will evaluate those recommendations consistent with its 1995 and 1997 Records of Decisions, and its 1998 Record of Consultation and Summary of Decision, which state that *"the Corps will operate Libby Dam in an attempt to meet the sturgeon flow requirements consistent with existing treaties and laws, and will reduce releases if monitoring identifies potential adverse effects of flooding and/or bank erosion, or if requested to reduce releases by USFWS. If, at the conclusion of the operation for sturgeon, Lake Koocanusa is above elevation 2439 on or before August 31, the Corps may, if necessary lower Libby Reservoir to elevation 2439 by August 31 to meet salmon flow objectives without spilling at Libby*."

In 1995, 1996, 1997 and 1998, the Libby-Arrow swap has been executed, which made it possible for Libby to stay full many more weeks into the summer. The potential for repeating this beneficial, volume neutral operation will be reexamined in 2000~~1999~~, subject to concurrence from Canada. The exchange, if it occurs, will be fully documented. Provisions are in place in the DOP to provide for the optimal balancing of the storage of water in Libby and Arrow reservoirs, considering mutually beneficial power and non-power objectives. Storage and/or release rates may be modified at the appropriate reservoir should such modifications be necessary to protect fish or accommodate other operating constraints. Water stored in the Libby Account will be released later, according to a schedule agreed to by the U.S. and Canadian parties, and taking into account the project considerations on Canadian Treaty and Libby reservoirs as well as operation of Kootenay Lake under the International Joint Commission order. BPA and the Corps will coordinate Treaty operations with TMT.

Summer Reservoir Interim Draft Limits

The interim draft limits specified in the 1995 BiOp on reservoir elevations through August 31 are shown in Table 8 and are independent of the June 30 reservoir elevations. Reservoirs are not always required to be drafted to those draft limits because of potential adverse impacts on other portions of the Columbia Basin ecosystem and the resident fish and wildlife that rely on the reservoirs (1995 BiOp, page 96). On the other hand, the 1995 BiOp (Page 102) also stated that, under certain circumstances, lower summer reservoir elevations may be recommended to meet flow objectives. Examples of special circumstances include:

- a low water year that is one in a series of low water years and an outmigrating population of fish that represents a strong year class
- upper rule curve goals were not met on April 20 (later changed to April 10) at Grand Coulee and Albeni Falls, or
- The Dalles April-August unregulated runoff is expected to be less than 65 maf, determined as of June 30."

Table 8. BiOp Interim Summer Reservoir Draft Limits (in feet) Through August 31

Grand Coulee	Libby	Hungry Horse	Dworshak
1280	2439	3540	1520

Upper Snake River Reservoir Operation

Operations of the Upper Snake Reservoirs is in question at this point in time because the Idaho legislation authorizing the use of 427 MAF of Snake River Water has not been renewed.

Summer Reservoir Operations

During the July - August period Dworshak will draft to as low as elevation 1520 feet. Note that this depends on the maximum allowable outflow. The maximum outflow without exceeding 110% and 120% TDG is about 14 and 22 kcfs respectively. In 19998, the state of Idaho and CRITFC recommended that ~~a~~ Dworshak not draft to 1520 feet ~~only to a maximum of 1535 feet~~ by the end of August to allow use of additional ~~approximately 15 feet of~~ storage ~~(200 kaf)~~ for release in the fall ~~and early winter~~ to aid adult steelhead and fall chinook conversions.

Again in 2000~~1999~~, Idaho recommends that as best possible, Brownlee may be used to delay Dworshak drafting below 1580 feet until early to mid-August. Idaho Power anticipates that Brownlee may operate to guarantee refill to 2059 feet by the end of September.

Albeni Falls will be full by the end of June and will pass inflow through July and August.

Reclamation will operate Grand Coulee and Hungry Horse consistent with the Biological Opinion and its stated limits of 1280 feet and 3540 feet, respectively, at these reservoirs. Outflows from Hungry Horse will include meeting the 3,500 cfs minimum flow requirement at Columbia Falls without drafting below the 3540 foot limit anytime in July-August. Reclamation will also attempt to reach IRC elevations at Hungry Horse depending on circumstances of runoff, with a higher priority for meeting the Biological Opinion flow objectives.

Summer Spill for-fish-passage

Planning dates for summer spill, where applicable, are the same as in the 1995 BiOp. Summer spill requirements/limitations would be as shown previously for spring spill. Summer spill is only required at Ice Harbor, John Day, The Dalles and Bonneville. Daily spill periods are 24 hours at Ice Harbor, The Dalles and Bonneville, and 1900-0600 (May-July) and 1900-0600 (August) at John Day. Spill for-fish-passage will be subjected to the state standards for TDG as determined by the spill caps, which will be adjusted in-season based on actual TDG readings.

VI. Outlook for Meeting Flow Objectives in 2000

Unregulated and Regulated Summary Hydrographs at Lower Granite and McNary

The monthly flow values of the average summary unregulated and regulated hydrographs for Lower Granite and McNary are provided in Table 10, and the hydrographs themselves are shown in Figures 1 and 2. This material was based on 1929-1987 data that were adjusted to match the February final January - July 2000 runoff volume forecasts.

Table 10. 2000 Average Summary Hydrographs at Lower Granite and McNary

	LWG Unregulated Flow (kcfs)	MCN Unregulated Flow (kcfs)	LWG Regulated Flow (kcfs)	MCN Regulated Flow (kcfs)	LWG Flow Objective (kcfs)	MCN Flow Objective (kcfs)
Apr 1 - 15	70	191	76	253	- (Apr 1-9) 98.9 (Apr 10-15)	-
Apr 16 - 30	86	272	84	281	98.9	- (Apr 16-19) 260 (Apr 20-30)
May	115	455	100	274	98.9	260
Jun	102	502	91	314	98.9 (Jun 1-20) 51.5 (Jun 21-30)	260

Jul	38	275	49	209	51.5	200
Aug 1 - 15					51.5	200
Aug 16-31					51.5	200

(*) average flows during the month indicated

FIGURE 1. AVERAGE FLOW HYDROGRAPH FOR MCNARY 2000

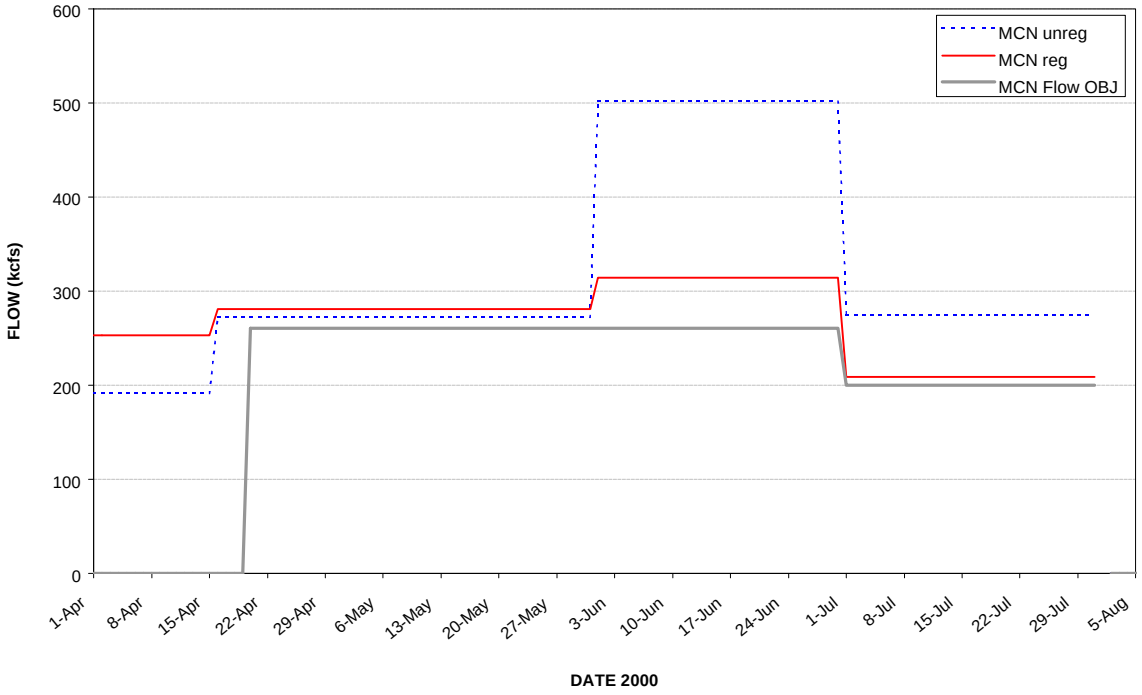
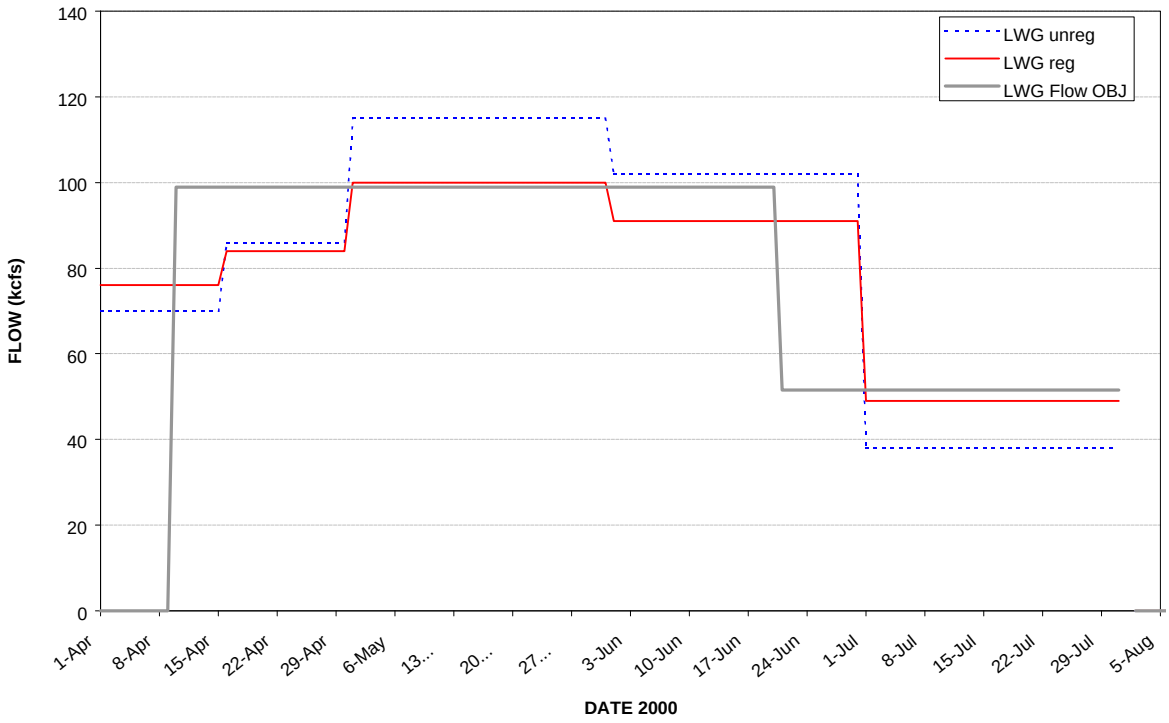


FIGURE 2. AVERAGE FLOW HYDROGRAPH FOR LOWER GRANITE 2000



The COE Power Branch made a 59-year (1929-1987) monthly flow computer simulation based on the February final runoff forecasts at Lower Granite and The Dalles. The model simulation provides an estimate of the expected flows at Lower Granite and McNary for any of the 59 years having the same January - July runoff volume as the water supply volume forecasted for 2000. When more reliable information becomes available, the results of the 59-year monthly study were superceded by weekly flow projections made more specifically for 2000 (see below).

Study assumptions for the computer simulation run were as follows:

- Streamflows were adjusted based on the February final water supply forecast using The Dalles January-July volume.
- Starting elevation: Treaty projects use 11 Feb 00 TSR (Mica, Arrow, and Duncan). Other projects use actual 31 Jan 00 elevation at 2400 hours from CROHMS.
- Flow Objectives (kcfs):

Projects	**Apr1**	**Apr2**	**May**	**Jun**	**July**	**Aug1**	**Aug2**
Lower Granite	98.9	98.9	98.9	83.1	51.5	51.5	51.5
McNary		260	260	260	200	200	200
Vernita Bar	60	60	60				
Priest Rapids		135	135	135			

Flood Control levels based on the February final water supply forecast:

	MAR	APR1	APR2
BRN	2058.1	2059.9	2061.3
DWR	1509.8	1495.1	1515.2
HGH	3514.2	3506.3	3498.1
GCL	1270.1	1252.5	1237.0
LIB	2325.6	2335.7	2345.3

- Dworshak: will operate on Qmin or flood control in MAR – APR1. APR - JUL operate to support the Lower Granite flow objectives. Operate to a target elevation of 1600' in June. Qmax is 14,000 cfs for augmenting LWG flow objectives, but can release 25,000 cfs for flood control. Qmin is 1,300 cfs all periods.

- Canadian operation using 11 Feb 00 TSR values.

- Hungry Horse will operate on flood control or Qmin for Columbia Falls requirement MAR - JUL. Target elevation of 3560.0' in JUN.

- Grand Coulee will augment for Vernita Bar requirements (65 kcfs) in MAR. Target elevation 1270.1' in MAR and 1290' in JUL. Meet flood control in APR1 – APR.. In MAY help support Priest Rapids flow objective. In MAY - JUL help support McNary flow objectives.

- Brownlee operates on flood control MAR - APR2. In MAY - AUG2 operate on target elevations:

May	June	July	Aug1	Aug2
2069	2077	2059	2067	2057

- Libby will operate on flood control MAR - APR1. In MAY, JUN and JUL operate to support the Bonners Ferry flow objectives of 14,200 cfs in MAY, 25,000 cfs in JUN, and 14,200 cfs in JUL. At Libby discharge is limited by the maximum allowable lake level at Kootenay Lake (Corra Linn) of 1739.32' MAR - MAY and 1743.32' JUN - AUG2 when releasing more than inflow. Maximum release 25,000 in JUN.

- Albeni Falls May elevation = 2062.5.

The analysis produced a wide range of flow conditions as a result of meeting the necessary system requirements for flood control, power, Libby sturgeon operation, and the BiOp seasonal flow objectives summarized above (see Table 11).

Table 11. Expectations for Meeting 2000 Seasonal Flow Objectives
(based on 1929-1987 monthly simulation - 59 years, and February final water supply forecast)

Lower Granite		
Periods:	Apr 10 – Jun 20	Jun 21 – 31 Aug
Seasonal Flow Objective, kcfs	98.9	51.5
Projected Seasonal Average, kcfs	92.2	
No. Years Seasonal Objective is Met	*6 (10%)	

No. Years Ave. Flows > Seas. Objective:		
Apr1/Apr2/May/June	8/12/25/20	
June/July/Aug1/Aug2		57/11/ /
McNary		
Periods:	Apr 20 – Jun 30	Jul 1 – 31 Aug
Seasonal Flow Objective, kcfs	260.0	200.0
Projected Seasonal Average, kcfs	294.8	
No. Years Seasonal Objective is Met	*54 (92%)	
No. Years Ave. Flows > Seas. Objective:		
Apr2/May/June	39/32/52	
July/Aug1/Aug2		43/ /
Priest Rapids		
Periods:	Apr 10 – Jun 30	
Seasonal Flow Objective, kcfs	135	
Projected Seasonal Average, kcfs	173.5	
No. Years Seasonal Objective is Met	*59 (100%)	
No. Years Ave. Flows > Seas. Objective:		
Apr1/Apr2/May/June	45/50/58/59	

More reliable flow projections will be made starting in late March, using the results of the SSARR run adjusted as needed to meet the seasonal flow objectives at Lower Granite, Priest Rapids and McNary. The projected seasonal average flows derived from the weekly flow projection spreadsheet will be shown in the following format:

Lower Granite: 4/10 - 6/20: X1 kcfs; 6/21 - 7/31: X2 kcfs
Priest Rapids: 4/10 - 6/30: Y1 kcfs
McNary: 4/20 - 6/30: Z1 kcfs 7/01 - 7/31: Z2 kcfs

VII. Water temperature

Water quality standards have been developed by the states and tribes under the authority of the federal Clean Water Act to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. High water temperature is a basin-wide issue involving tributaries and mainstem watercourses and impoundments. The TMT recognizes that water temperature is important to the survival of fish and other aquatic life forms, and will recommend that every effort be made to meet the state and tribal water quality standards in the mainstem.

2000~~1999~~ Actions

Timely summer drafts of cold water from Dworshak, as done in the previous years, will be considered in 2000~~1999~~ to lower water temperatures in the lower Snake River. This will be

accomplished in close coordination with the NMFS, USFWS, Idaho Department of Fish and Game, and the Nez Perce Tribe to ensure that the water temperature requirements of the Clearwater River fish hatcheries and rearing conditions in the Clearwater River are taken into account. This operation will need to be closely coordinated with flow augmentation from Brownlee Reservoir, in consultation with the USFWS and other salmon management agencies, to ensure that optimum use is made of both of these reservoirs. In the past, a release temperature of 50 degrees F. range (+or - 5 degrees F.) has been found acceptable by all parties. Unless otherwise agreed to by U.S. Fish and Wildlife, Idaho Department Of Fish and Game, and the Nez Perce Tribe, use of a similar water temperature level is anticipated for 20001999.

The need for decreasing water temperature in fishways will be considered based on the results on-going mainstem adult passage studies. Real-time temperature monitoring in the lower Columbia and lower Snake Rivers will be continued as a part of the on-going, system-wide TDG monitoring program. Temperature monitoring in adult fishways will also continue. The emergency plan to address high water temperature incidences at McNary will be reviewed in the light of past experience in consultation with the salmon managers and other interested parties.

Additional activities for 20001999 may also emerge as a result of on-going consultations and discussions between EPA, the states of Oregon, Idaho and Washington, and the Corps in an effort to develop a long-term strategy regarding water quality standards for TDG and water temperature.

VIII. Total Dissolved Gas Management

Given the above average runoff forecast, normal amounts of widespread spill is expected to prevail during a good portion of the 20001999 fish passage season. Assuming that the necessary State waivers for TDG will have been obtained by NMFS before the start dates, voluntary spill for fish passage will occur as called for in the 1998 Supplemental BiOp subject to the 115%/120% TDG limits. In 20001999 (note the following spill levels at BON, TDA, and JDA are based of our current best estimate of what will happen. Final spill amounts have not be finalized yet . At BON a in season test will be made comparing spilling during daytime hours to the gas cap as opposed to spilling at the 75 kcfs adult fallback cap. TDA will spill at a level between 30 and 50% based on research that showed better juvenile survival at 30% than at the BiOp specified level. the NMFS made a decision to proceed with a within season test of alternative spill levels at The Dalles Dam beginning April 19. Spill will vary between 64% (the BiOp level) and 30% in three day blocks at the Dalles this spring. A study at John Day will evaluate daytime spill at a 2030% (?) level on the days when the BONDalles is spilling during the daytime at the gas cap (?).30%. At Bonneville, a test will be made to determine the effects of spilling during the daytime at the gas cap as opposed to spilling during the day to the 75 kcfs adult fallback cap.nighttime spill will be up to the 115/120% TDG level, and daytime spill will be 75 kcfs. At Ice Harbor a similar test to the one at Bonneville is proposed alternating daytime spill between the gas cap and the 45 kcfs adult fallback cap. Because of the continuing testing of the surface bypass collector at Lower Granite spill will be set at a level of 20% for 24 hours a day.

The spill limitation to the 115/120% TDG will be met by specifying an appropriate spill cap depending on the project's propensity to create TDG. This spill cap will be adjusted in-season upon TMT recommendation based on actual TDG readings. A spill priority list will be developed and implemented, based on relevant information, including real-time and predicted TDG, flow, biological monitoring, and fish movement. The concept of the spill priority is illustrated in Figures 3 and 4.

TDG management options are limited. More water can be stored in the reservoirs behind the dams; the quantity of spill can be shifted to various periods within the day; more water can be put through the turbines; spill can be shifted within the system to avoid excessive local concentrations; spill can be transferred outside the system; and spill bays can be used more effectively. The TMT will work with the Water Quality Team (WQT) to explore other tools available to the TMT for TDG reduction across the season.

Beside the spill priority list, changing the spill from a crown to an uniform pattern, avoiding the use of spillway bays without deflectors, and allowing turbine units to operate outside their 1% peak efficiency flow range are additional management options. Proper scheduling of service and maintenance time tables, identifying additional energy loads to serve, and displacing available thermal projects that are serving the same loads also help relieve the need for spill.

Normal operations and others that are required by research, construction, unit maintenance and services, etc. at COE and Reclamation projects will be managed to avoid causing TDG saturation levels above state standards to the extent feasible.

The COE and Reclamation will continue to monitor dissolved gas in the forebay and tailwater areas of all their mainstem Columbia and Snake Rivers projects and make them available to all interested parties through the TMT homepage. Other dams where spill is frequently scheduled will also be monitored. Winter monitoring may also be implemented below selected projects to establish baseline data. The COE will continue to develop and test regional dissolved gas abatement strategies and monitor their effects on the ecosystem in the framework of overall water resources management.

Appendix 1 provides more detailed information and discussions on total dissolved gas management in 1999.

IX. Transportation

In the 1998 Supplemental BiOp NMFS has determined that the moratorium on spring collection and transportation from McNary, adopted in 1995, should be continued. The Service wrote on Page III-8 that "all fish collected under the Action Agencies' proposed operation [at each Snake River Collector Projects] will be transported." Also, no change in operations is proposed for juvenile fish transportation during the 2000~~1999~~ summer migration; all fish collected will be transported.

The decision is also consistent with the 1995 BiOp Page 110), which gave the TMT the flexibility to recommend "that fish be returned to the river... if credible evidence is presented that in-river migration will be beneficial". To date, however, no such evidence has been presented.

Comments offered by the Independent Scientific Advisory Board (ISAB) and IDFG are noted below.

The ISAB stated that spill is provided in the spring at Snake River collector projects to "spread the risk" between transportation and in-river migration. The objective of transport is “not recommending any specific proposition to limit transported fish. Rather, we [ISAB] were recommending that transportation not be maximized…”

IDFG recommends that the TMT should retain the flexibility to manage smolt transportation operations based on the real-time needs and performance of the fish, and the real-time conditions

of the river. Spill is not used just to "spread-the-risk", it is primarily used to help optimize dam passage conditions for in-river migrants.

Summer Transportation

The Action Agencies do not propose any change from the operation for transporting juvenile summer migrants that was described in 1995 RPA Measure 3, but they propose to continue evaluating fall chinook transport. Oregon recommends a spread-the-risk transport policy for Snake River fall chinook with transport of no more than 50% of fish. As before, the transportation collector projects should be operated to maximize collection and transportation (i.e., no voluntary spill except as needed for approved research) during the summer migration.

In general, the switch from spring to summer spill operation will occur on or about June 20. In practice, the TMT has the discretion to make the switch earlier or later based on monitoring of in-river conditions. When more favorable spring-like flow and temperatures either end before or extend after June 20, the actual date to end spill at collector projects should be modified, continuing to spread the risk of transport versus in-river passage for spring migrants so long as favorable flow and temperature conditions persist.

X. Operations for Research & Other Activities

Project operations planned in conjunction with the activities listed below will be discussed and coordinated at the weekly TMT meetings as needed. In general, conduct of research at mainstem projects will be subordinate to the higher priority of ensuring the best possible downstream passage conditions for listed species. Details of project operations for fishery purposes at Corps projects are provided in the COE Fish Passage Plan. Special operations with potential impact to project performance are listed in Table 12. Implementation details may need to be worked on a case-by-case basis, based on specific river operation requirements for the specific activity, real-time river conditions and applicable test requirements, if any.

Table 12

Project	Activity	Operational Requirements	Start/End Date
Bonneville	Spring Creek NFH Release	24 hour spill	3/9 – 3/16
	ESBS Testing PH1	1 Unit shut down for removal and placement of Fyke nets, Outages for equipment Installation, removal,	4/15 – 7/15

		inspection and repair.	
	Unit Rehab Biological Testing	Unit shutdown for equipment Installation Removal and Repair. Unit becomes priority unit.	9/1 – 12/1 ?
	Fallback Spill testing	Change in daytime spill level.	4/15 – 6/15 ?
	Lamprey passage study	Change in operation of fish ladders	4/4 – 9/30
	FPE studies	Outages for equipment installation and removal	3/1 – 8/14
	PH2 Vertical Distribution	Change in unit operating priority	4/1 – 8/31
	PH1 Prototype Surface Collector	Forebay limitations, Unit outages for equipment installation and removal, Change in unit operating priority and flow range	3/1 – 7/31
The Dalles	Spillway and Sluiceway Survival Studies	Possible flow restrictions because of boating in tailrace	4/20 – 7/31
	FPE Evaluation	Unit and spillway outages	4/20 – 7/31

		for equipment installation, repair and removal	
	Behavioral studies	Possible outages for equipment installation, repair and removal	4/20 – 7/31
	Adult Salmon and Steelhead Passage Evaluations	Possible outages for equipment installation, repair and removal	4/1 – 10/31
John Day	FPE Studies	Alternating spill levels during daytime , Outages for equipment installation, repair and removal	5/1 – 8/31
	Adult Salmon and Steelhead Passage Evaluations	Alternating spill levels during daytime , Outages for equipment installation, repair and removal	4/1 – 10/31
McNary	Turbine Passage/Survival Studies	Unit outage for equipment installation and removal. Possible Unit outage while equipment in	5/1 – 10/22

		place but no testing going on.	
	Effects of ESBS on Lamprey	Unit outage to install video camera	4/1 – 10/31
	Biological Performance of Plates of ESBS	Unit outages for equipment installation, repair and removal and while screens are switched	6/1 – 8/31
Ice Harbor	Spillway Survival Study	Alternating Spill levels, stable flow conditions during fish release	4/1 – 7/31
	Evaluation of Adult salmon and Steelhead Migration	Alternating Spill levels	3/1 – 11/30
Little Goose	FGE Testing	Unit outages for screen swaps along with outages for equipment installation, repair and removal	4/1 – 12/15
Lower Granite Dam	Surface Bypass Collector Testing	20% spill during test	4/10 – 5/27

APPENDICES

- **APPENDIX 1: 1999 Total Dissolved Gas Management Plan**
- **APPENDIX 2: Emergency Protocols**
- **APPENDIX 3: BPA's System Load Shaping Guidelines for Operating Turbines Outside 1% Peak Efficiency**
- **APPENDIX 4: TMT Guidelines**
- **APPENDIX 5: Northwest Power Pool 1999 Maintenance Schedule Outages of Generating Units (G:\rcc\tmt99\documents\wmp99_app5.doc)**
  USFW recommends that the scheduled outages of the Hells Canyon Complex projects be included because of their effect on delivery of Snake River flows in the summer. While IDPC is unable to share its maintenance schedule with the TMT, it will share information relevant to TMT on an as needed basis.

- **Appendix 6. Recurring Issues Faced by the TMT and Possible Options for Resolution**
- **Appendix 7. Operation-related BiOp Provisions**

TECHNICAL MANAGEMENT TEAM					
BOR: *Kim Fodrea / Pat McGrane*			**BPA:** *Scott Bettin / Robyn MacKay*		
NMFS: *Paul Wagner / Chris Ross*			**USFWS:** *Marv Yoshinaka / Bob Hallock / Susan Martin*		
OR: *Chuck Tracy*	**WA:** *Jim Nielsen*		**ID:** *Ed Bowles / Steve Pettit*	**MT:** *Jim Litchfield*	
COE: *Cindy Henriksen / Rudd Turner*					

TMT MEETING

24 February 2000 1000 - 1500 hours

Custom House Room 118
Portland, Oregon
Conference call line: 503-808-5190

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, Introductions
2. Review last TMT meeting minutes
3. Air temperature and its effect on water temperature and fish (BPA, NMFS).
4. Results and discussion: water temperature modeling of DWR and BRN summer releases (COE).
5. Update on flood control and VARQ evaluations (COE, BOR)
6. Decision-making Criteria for TMT (draft and NMFS revisions / Idaho revisions of lower Snake and draft Upper Columbia objectives). Continue review of goals, objectives, and triggers.
7. Water Management Plan, review outline and 2000 Plan for substantive issues.
   - TMT Guidelines (1/26/00 Draft PDF)
8. Recommended River Operations
   - Chum salmon operation
   - Spring Creek Hatchery Release
   - Nez Perce Request (Clearwater River Flow)
9. Next Meetings Dates
10. Other
    - John Day Dam spill test video

Questions about the meeting may be referred to Cindy Henriksen at (503) 808-3945, or Rudd Turner at (503) 808-3935.

Lower Snake River Objectives

Ed Bowles (ID) edits to Paul Wagner (NMFS) draft of February 7, 2000

Manage reservoirs to be as full as possible by the start of the migration season.

Determine available water supply ~~for the~~ **each** migration year.

Assure contracts are in place to provide 427 kaf from upper Snake River storage.

Shift flood control releases to the maximum extent possible to benefit ~~Snake River flows~~ **fish migration** and shape flood control and spring runoff to the maximum extent possible into the juvenile migration season which begins early to mid April.

~~Maintain flows of a least 85 kcfs~~ **Strive to ensure flows do not drop below 100 kcfs** at Lower Granite ~~throughout~~ **during** the spring ~~passage~~ **migration** season**.** ~~emphasizing the period mid-April through mid June.~~

~~Manage reservoir refill in the spring to achieve a 95% probability of refilling Brownlee and Dworshak reservoirs by July 4. Utilize reservoir storage as required to maintain spring flows in the 85 to 100 kcfs range.~~ **Manage reservoirs to maximize refill, subordinate to helping ensure Lower Granite flows do not drop below 100 kcfs. *Or*, Utilize inseason management, based on needs of the fish, to balance reservoir refill in June with helping ensure springtime flows at Lower Granite do not drop below 100 kcfs.**

~~Provide~~ **Maximize** juvenile spillway passage at lower Snake River dams by spilling to **the full extent** allow~~able~~**ed by** State standards during ~~schedules defined by the BiOp~~ **the spring migration period. Begin spill test for summer migrants.**

Operate turbines within 1% of peak efficiency March 15 through November 30.

Maintain minimum operating pool elevations at all reservoirs on the lower Snake River from April 1 until juvenile numbers decrease to low numbers in the fall.

Utilize a “spread the risk” transportation strategy based on annual pre-season projections of in-river migration conditions. Transport all fish collected from Snake River projects ~~with the exception of PIT tagged fish~~ **except those required for research**.

Control temperature and augment flow to the extent practicable during the fall chinook migration season.

Utilize Brownlee ~~r~~**R**eservoir to augment summer flow and shape BOR’s upper Snake River water to the maximum extent possible early in the summer season when Brownlee water temperatures are still cool **and before lower Snake River water temperatures become critical**.

Utilize Dworshak as a source of augmentation water during the summer **and fall** migration season to provide both temperature and flow benefits **to listed juvenile and adult salmon and steelhead.**

Apply modeling techniques to determine the temperature benefits achieved by using Dworshak and Brownlee reservoirs at defined outflows on defined dates and use these results to plan release schedules.

Use results of temperature modeling and adult behavioral information to decide whether releases from Dworshak should occur during September to improve adult migration conditions.

TMT Goals and Objectives for Upper Columbia River

COE Draft February 14, 2000

Upper Columbia

Overall

Goals

The goal is to recover listed stocks of resident fish and assist in the recovery of listed anadromous salmonids in the Columbia River by providing the best possible flow conditions for resident fish while providing flow augmentation downstream for salmon. This will be achieved by providing the best utilization of Upper Columbia River basin resources to benefit resident and anadromous species, and improve conditions associated with the Clean Water Act, while recognizing trust responsibilities to Native American tribes."

Objectives

Assist in meeting downstream BiOp flow objectives at Priest Rapids and McNary.
Provide local and system flood control. (Montana wishes to provide flood control by using VARQ strategy at Hungry Horse and Libby)
Meet other multi-purpose needs.

Hungry Horse

Goals

Provide a suitable stream flow regime for bull trout and other sensitive native species in the Flathead Watershed.

Objectives

Assist in meeting BiOp flow objectives.
Operate to meet 75% confidence of refill by April 20th flood control.
Provide local and system flood control.
Meet minimum flow requirement of 3,500 cfs at Columbia Falls.
Serve local and system-wide power or non-power emergency needs
Avoid spill through such actions as deferring refill.
Assist in meeting Flathead Basin Management operating objectives.
Secure optimum period-by-period storage levels to be responsive to needs and emergencies
Minimized river fluctuations to protect resident fish.

Montana's objectives

Montana provides the following modified objectives. They want to meet the above objects by using the VARQ strategy instead of the way we operate today.
Assist in meeting BiOp flow objectives by operating the reservoir above the IRCs, up to VARQ elevations (if safe in terms of flood control and economically feasible) to store water for spring release while maintaining 95% reservoir refill probability.
Provide local and system flood control using VARQ strategy, then use improved reservoir refill potential to increase the number of years in which storage above elevation 3550 is available for summer flow augmentation. When available use storage above elevation 3550 for summer flow augmentation, gradually released to produce a smoothed discharge shape to benefit juvenile bull trout in the Flathead River downstream.
Montana objects to the goal of operate to meet 75% confidence of refilling project by April 20th.

Normalize reservoir discharge hydrograph. Smooth discharge especially during the biologically productive summer months to avoid flow fluctuations and attendant negative varial zone effects.

Triggers

Reservoir inflow forecasts
Prognosis for spill; need for pre-emptive releases to avoid such spill
Available turbine/generation capacity
Expectations of flow arrival downstream for BiOp objectives triggers timing of release of storage draft.
Refill date should be on or within a few days of the date on which inflows decline to within maximum turbine capacity.

Libby

Goals

Restore natural recruitment to the Kootenai River white sturgeon population by providing suitable stream flows for spawning and recruitment.
Provide a suitable stream flow regime for bull trout in the Kootenai and Flathead (Montana says only Kootenai) rivers.

Objectives

Assist in meeting BiOp flow objectives.
Operate to meet 75% confidence of refill by April 20th flood control. Montana objects to this paragraph.
On upper rule curves by April 10th (from ROD) Montana objects to this paragraph
Provide local and system flood control.
Meet International Joint Commission (IJC) requirements at Kootenay Lake
Balance the needs of providing a volume water for sturgeon spawning, riverine habitat for bull trout, and achieving refill of Libby reservoir by mid-July.
Provide suitable river flow and water temperature for sturgeon spawning, incubation, hatching, and juvenile survival.
15 kcfs flow at Bonners Ferry from May 1 to Start of Sturgeon Spawning
Then release full powerhouse capacity for up to 42 days. Goal 35 kcfs at Bonners Ferry.
Then 11 kcfs at Bonners ferry for 21 days.

Montana's Objectives

Montana provides the following modified objectives. They want to meet the above objects by using the VARQ strategy instead of the way we operate today.
Assist in meeting BiOp flow objectives by operating the reservoir above the IRCs, up to VARQ elevations (if safe in terms of flood control and economically feasible) to store water for spring release while maintaining 95% reservoir refill probability.
Use improved reservoir refill potential to increase the number of years in which storage above elevation 2449 is available for summer flow augmentation.
Balance the needs of providing a volume water for sturgeon spawning, riverine habitat for bull trout, and achieving refill of Libby reservoir by mid-July. Refill date should be a sliding scale based on inflow volume, filling later in high water years.
Provide local and system flood control using VARQ strategy.
Normalize reservoir discharge hydrograph. Smooth discharge especially during the biologically productive summer months to avoid flow fluctuations and attendant negative varial zone effects.
Use storage above elevation 2449 for summer flow augmentation, gradually released to produce a smoothed discharge shape to benefit juvenile white sturgeon and bull trout in the Kootenai River downstream.
Maintain stable discharge from Libby Dam between the sturgeon spawning and salmon flow augmentation operations. This discharge may be between 4 kcfs and 10 kcfs.

Ramp stream flows in the Kootenai River at a rate that does not strand or otherwise adversely impact bull trout. This ramp rate should not exceed a 10% change within a day or between days.
Montana also submits the following guidelines for the Sturgeon Operation
When low elevation runoff increases flows to 15 kcfs at Bonners Ferry, use Libby discharge as needed to maintain or increase flows (simulating a natural ascending limb of the runoff hydrograph) during the start of Sturgeon Spawning.
Then release full powerhouse capacity for up to 42 days. Goal 35 kcfs at Bonners Ferry release Libby discharge as needed to meet the "tiered flow objective" at Bonners Ferry as described in the WS Recovery Plan and cited literature [Note: there seems to be some confusion about the operation specified by the WS Recovery Plan].
Maintain stable discharge from Libby Dam between (Montana says after) the sturgeon spawning and salmon flow augmentation operations. This discharge may be between 4 kcfs and 10 kcfs.

Triggers

Reservoir inflow forecasts
Refill date should occur on or within a few days of the date on which inflows decline to within turbine capacity.
Initiation of sturgeon spawning.
Guidelines developed by FWS for sturgeon and bull trout flows.
Flow at Bonners Ferry
Temperature at Bonners Ferry
Local inflow to the Kootenai River between Libby Dam and Bonners Ferry is increasing or believed to be near the annual peak.

Albeni Falls

Objectives

Operate to meet 90% confidence of refill by April 20th flood control.
Meet Minimum Flow Requirements
Provide local and system flood control.

Triggers

Reservoir inflow forecasts

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

NMFS: Paul Wagner\Chris Ross BPA: Scott Bettin\Robyn MacKay

USFWS: Marv Yoshinaka\Bob Hallock\Susan Martin

OR: Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit MT: Jim Litchfield

COE: Cindy Henriksen\Rudd Turner

March 9, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. *Welcome, Introductions.*
2. *Review last TMT meeting minutes.*
3. *Air temperature and its effect on water temperature and fish (BPA, NMFS).*
4. *Tribal 2000 River Operation Plan (CRITFC).*
5. *Flood control planning and operations (COE).*
6. *Water temperature modeling, DWR and BRN summer releases (COE, NMFS).*
7. *Decision-making Criteria for TMT (draft and NMFS revisions /Idaho revisions of lower Snake and draft Upper Columbia objectives). Continue review of goals, objectives, and triggers.*
8. *Water Management Plan, comment on draft 2000 Plan.*
    - TMT Guidelines.
9. *Recommended River Operations (review SORs):*
    - *Chum salmon operation*
    - *Spring Creek Hatchery Release*
    - *Nez Perce Request (Clearwater River Flow)*
10. *Other*

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

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OR: Chuck Tracy\Christine Mallette WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner

March 27, 2000 1300-1600 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

1. Welcome, Introductions.

2. Air temperature and its effect on water temperature and fish -- analysis (BPA, NMFS).

3. Water Management Plan – comment on draft 2000 Plan.

- TMT Guidelines (draft 2000 Guidelines).

4. Decision-making Criteria for TMT (current draft and revisions of lower Snake objectives). Review goals, objectives, and priorities.

5. Review Reservoir Operations (SORs # 2000-5 and 2000-6).

6. Other.

- Set agenda for 30 March meeting; adjourn.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner

March 30, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of last meeting.
3. Water temperature modeling (EPA, NMFS).
4. Snake River water temperature monitoring plan (NMFS).
5. Update on Idaho waiver of TDG standard (NMFS).
6. Review this week's reservoir operations.
7. Review new system operational requests.
8. Recommended operations.
9. Other

- Set agenda for April 6 meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

Proposal for a Regional Water Temperature Monitoring Plan and Protocol for the Snake River

Prepared by the Water Temperature Monitoring Committee of the Water Quality Team

Background

Water temperature conditions have a complex array of effects on salmonids. Intergravel water temperatures affect the rate of embryonic development, with about 500 degree days needed for emergence (Weatherley and Gill 1995). Post-emergence growth rates are directly related to water temperature. Water temperatures experienced by out migrating juvenile salmon have been shown to affect survival (Connor, et al. 1998, Smith 1998, Muir, et al. 1999). An emerging issue is potential water temperature effects on juvenile out-migration timing. The working hypothesis is that Snake River juvenile fall chinook out-migration timing is delayed by cooler than historical water temperatures during incubation and early rearing life stages. This effect may be exacerbated by delayed spawning due to excessively warm fall temperatures. Because water temperature conditions and juvenile salmon mortality rates increase from mid-July through mid-September, delaying out-migration timing reduces juvenile fall chinook survival through Lower Granite Reservoir.

Immigrating adults can be delayed by excessively warm water temperatures (Karr et al. 1998). In addition, fall chinook spawning is inhibited by temperatures above 61E F (McCullough). Delay can reduce the ability of adult fish to survive to spawning and vigor and fecundity during spawning.

Water temperature also indirectly affects salmon survival. Foraging rates of piscivorus fish are directly related to temperature (Vigg and Burley 1991) and the rates of infectivity and mortality of several diseases are known to be directly related to temperature (NMFS 1998).

Reservoir existence and operation can have strong effects on water temperatures, both within the reservoir and in downstream reaches. Snake River basin reservoirs are known to affect water temperatures (Yearsley 1999), by greatly extending water residence times and by changing the heat exchange characteristics of affected river reaches. Thus, operation of these reservoirs affects both the thermal characteristics of the river and the thermally-regulated aspects of salmon survival. For this reason, the thermal effects of reservoir operation are an important consideration in developing system operations aimed at protecting and restoring listed salmonids.

Purpose

The issue of managing Snake River basin reservoir operations to minimize adverse water temperature effects has been investigated for many years. A wide array of data have been collected and there are extensive water temperature data available (Appendix A). Several mathematical models have been developed to examine the water temperature effects of the reservoirs (Yearsley 1999, COE 2000).

Concomitantly, fisheries biologists have been investigating the effects of water temperature conditions on salmon. These studies have focused on adult migration delays (Karr et al. 1998) and juvenile survival (Connor et al. 1998, Smith 1998, Muir et al. 1999).

Two basic questions drive our interest in this issue: *What effects do Snake River basin reservoirs have on water temperatures and associated salmon survival?*; and, *How should reservoir operations be managed to avoid or minimize those effects?*

The water temperature monitoring committee surveyed regional interested parties to identify particular issues and concerns (Appendix B). Both through this effort and internal discussions we determined that the spatial and temporal dynamics of water temperature conditions in Lower Granite Reservoir and the effects of upstream reservoir operations on those temperatures are of particular concern. Therefore, this report focuses on a proposal to develop a study for this issue.

Modelers familiar with the available data also identified an issue with the quality of available data (John Yearsley,

personal communication). As shown in Appendix A, there are copious data available. Unfortunately, the quality of these data varies substantially. There is also a lack of detailed meteorological data to define the near-river heat flux conditions forcing modelers to estimate key parameters. The issue of water temperature modeling is also affected by a lack of consistent data on project operations at the time of data collection.

Thus we propose that the region:

- **develop and implement a systematic water temperature and meteorological monitoring scheme and model(s) capable of fully describing the water temperature conditions likely to be experienced by migrating salmon from Hells Canyon and Dworshak Dams to Lower Granite Dam, and**

- **develop and implement a water temperature and meteorological data collection protocol for all regional entities collecting such data.**

Neither of these proposals have been developed to the point where they are ready to implement. Rather we suggest the characteristics we believe important in the final designs and the steps necessary to complete and implement the proposals.

Rationale for Focusing on Water Temperature Effects at and above Lower Granite Reservoir

Lower Granite Reservoir occupies the Snake River from river mile (RM) 108 to RM 148 and backs water into the Snake and Clearwater Rivers a few miles upstream from their confluence near Lewiston, Idaho. It is the first major reservoir encountered by emigrating Snake River juvenile salmon and the last major reservoir negotiated by immigrating adults. A substantial portion of juvenile fall chinook salmon mortality occurs in Lower Granite Reservoir (Smith 1998, Connor 1998, Muir et al. 1999).

During the summer, all emigrating juveniles collected at Lower Granite Dam are transported to release points downstream from Bonneville Dam, the lowermost dam on the Columbia River. In recent years up to 50 percent of the outmigrating Snake River fall chinook juveniles passing Lower Granite Dam have been collected and transported (Peters et al. 1999). For these transported fish, Lower Granite Reservoir is the last reservoir occupied on their seaward migrations.

Survival of pit-tagged juvenile fall chinook salmon from release points in the Snake and Clearwater Rivers to Lower Granite Dam is strongly correlated with water temperature in Lower Granite Reservoir (Figure 1). To minimize water temperature-related impacts on juvenile fall chinook, Dworshak Dam on the North Fork Clearwater, about 2 river miles upstream from the Clearwater River and 60 miles from Lower Granite Reservoir, is routinely operated to release relatively large amounts of cool water to reduce water temperatures in Lower Granite Reservoir and downstream reaches. Dworshak Reservoir is a deep impoundment (over 600 feet at full pool) that stratifies in the summer and Dworshak Dam is equipped with a variable intake depth release structure that facilitates selecting a specific discharge water temperature. During July and August reservoir managers typically release water at 48E to 50E F at the request of regional salmon managers. Cooler releases are possible but may result in adverse juvenile salmon growth conditions at a downstream hatchery and the Clearwater River.

This operation of Dworshak Reservoir has created controversy among local interests and fishery professionals. The principal concerns are that summer drafting at Dworshak diminishes the aesthetic, cultural, and recreational value of the lake; may adversely affect fish populations in the reservoir and downstream river reaches; and, reduces the amount of water available to provide temperature protection and attraction flows to adult salmon (primarily steelhead) in the early fall.

Water temperatures in Lower Granite Reservoir are also strongly affected by water temperatures in the Snake River upstream. (The Snake River provides about 2/3 of the summer inflow to Lower Granite Reservoir.) Snake River water temperatures in turn are affected by the discharge water temperature from Hells Canyon Dam, the lowermost dam of Idaho Power Company=s Hells Canyon Complex and the current upstream limit of occupied salmon habitat on the Snake River. Temperatures approaching the Upper Incipient Lethal Temperature for salmonids (68E F) are common in this portion of the Snake River during the summer (Karr et al. 1998).

The role of Lower Granite Reservoir in processing these heat inputs is not well known. Data collected during a previous study (Karr et al. 1998) shows that Lower Granite Reservoir stratifies during the summer. For example, on August 27, 1991 there was a 6E F difference in water temperatures between the upper 50 feet of the reservoir (70E F) and water at depths greater than 100 feet (64E F). It is likely that even stronger temperature gradients occur during hot summer periods when cool water is being discharged from Dworshak Dam (1991 was prior to these operations). This stratification can also be inferred from temperature data collected upstream of each dam at shallow depth (c. 12 feet) as part of the dissolved gas monitoring program. For example, on August 17, 1995 the water temperature upstream from Lower Granite Dam was 75.2E F. Yet temperatures recorded at Little Goose Reservoir over the next week never exceeded 69E F. It is unlikely that this difference in temperature was due to cooling in Little Goose Reservoir. Rather, this difference was likely primarily due to release water temperature at Lower Granite Reservoir being substantially cooler than the surface temperature. The powerhouse intake is located at the bottom of the reservoir and captures water from the bottom 50 feet of the reservoir, the coolest water available.

Early results of a juvenile fall chinook salmon radio-tracking study show that juveniles occupying Lower Granite Reservoir in the summer are typically found within 20 feet of the surface (David Venditti, USGS, personal communication). This suggests that emigrating fall chinook are often exposed to the warmest water temperatures found in the reservoir.

The three downstream Snake River reservoirs exhibit progressively weaker stratification, becoming virtually homothermic in Lower Monumental and Ice Harbor Reservoirs (Karr et al. 1998).

Efforts are underway to understand the thermal characteristics of the Hells Canyon Complex (Myers and Pierce 1999) with the intent of identifying measures to minimize that project=s adverse temperature effects on salmon survival.

We conclude that understanding the thermal characteristics of the Snake River from Hells Canyon Dam to Lower Granite Dam, including Lower Granite Reservoir and the Clearwater River downstream from Dworshak Dam, is of primary concern in devising operations and other measures to protect listed fish from adverse temperature conditions in the lower Snake River. Existing data and models are useful, but available 1-dimensional models are not sufficient to explain phenomena that vary in three dimensions. The reduced spatial variation in temperatures downstream from Lower Granite Dam and the shorter fish residence times in downstream reaches suggest that existing 1-dimensional approaches may be adequate downstream from Lower Granite Dam. Given limitations in research budgets, ongoing efforts (e.g. IPC relicensing studies) that could be incorporated into the study design, and the level of impact and concern, detailed investigation of the water temperature characteristics of this portion of the Snake River is clearly warranted.

Water Temperature Study

Purpose: To develop a model or series of models capable of estimating water temperatures of the Snake River from Hells Canyon Dam to Lower Granite Dam and from Dworshak Dam to Lower Granite Dam, including Lower Granite Reservoir within " 0.5E F on a bulk average flow basis based on reservoir discharge water temperatures and meteorological data. The model would be capable of simulating the outcomes of alternative operations and discharge temperatures at Hells Canyon, Dworshak, and Lower Granite Dams.

A two-dimensional (or three-dimensional) model of Lower Granite Reservoir=s temperature characteristics should also be developed. The level of accuracy achievable for such a model is unknown, but to be useful it should be capable of estimating bulk average temperatures within 0.5E F and provide estimated temperatures on a relatively small 2-d scale (say 10 foot depth H 100 foot longitudinal). The distribution of flow (velocities) is another important component to understanding and modeling reservoir temperature characteristics. A density current could develop along the bottom of the reservoir, conveying the coldest water through the reservoir with little effect on the temperature conditions in the occupied near-surface waters.

Until a modeling technique is selected, defining a data collection scheme is somewhat risky. That is, better data could possibly be developed at lower cost if the data needed to effectively drive the model was perfectly understood. Statistical tests may be available to identify the data needs (John Yearsley, personal communication). However, it is

clear that both additional water temperature and meteorological data are needed.

As the Snake and Clearwater are rapid, turbulent rivers it is reasonable to assume that the free-flowing portion of the rivers are relatively homothermic at any given point and time. Existing tri-level thermograph data (Karr et al. 1998) from the Clearwater River inlet also supports this assumption. Thus, a single well-placed temperature probe at each selected station in the free-flowing portions of the study streams would accurately define the water temperature at that point.

It is difficult to estimate the number of additional meteorological stations needed to achieve the desired model accuracy. Given that the geographic scale of weather variations can be quite small, particularly during the summer (e.g summer convective storms), it is unlikely that all errors associated with extrapolation of site specific conditions could be eliminated with any reasonable number of new stations. Again, a statistical analysis should be conducted to define the most important locations for new meteorological stations. All additional stations should discretely measure all of the meteorological variables necessary to construct a deterministic model of heat flux. Measured variables should include: air temperature, relative humidity, barometric pressure, wind speed and velocity, solar radiation, and evaporation rates.

We cannot at this time reasonably define the methods, or data needs for this proposal. However, Appendix B outlines the sort of water temperature data collection network needed for development of a multi-dimensional view of Lower Granite Reservoir water temperatures.

Product: The model(s), when completed should be usable in the public domain. A wide array of interested parties should have access to the model (or an input interface) through a website or other distribution mechanism. Because the model initially would necessarily be based on limited data, an interesting possibility would be to make the model continually calibrate itself based on available verified data.

Data Collection Protocols

Available water temperature data throughout the basin has been collected by various entities for an array of purposes (Appendix A). For some data, quality assurance/quality control programs ensure that data are collected with sufficient precision, accuracy, and frequency to serve a variety of purposes. For other data, this is not the case. Much of the data collected is from relatively imprecise instruments and may be subject to errors in accuracy. For example, turbine scroll case water temperatures may be collected sporadically, using instruments capable of reading to the nearest 1E F, subject to inaccurate reading by observers (dial-type thermometers subject to parallax errors).

Further, few researchers perceived the need to correlate temperature conditions with current and antecedent reservoir operations information. As can be clearly illustrated by the temperature information given above, temperatures in downstream reaches are affected by reservoir operations. Water temperatures downstream from Lower Granite Dam could vary at a given point in time depending on the relative contribution of spill (which comes from warmer near-surface water) to total discharge. If viewed alone, temperature data from such operational effects could appear to be errors in a 1-dimensional model.

Thus, we recommend that the various entities collecting and using water temperature data strive to develop a single water temperature data collection protocol. At a minimum such a protocol should include descriptions of instrument precision and accuracy, measures to ensure quality control, consistent and reliable recording of time and date; and, for data collected in reservoirs, depth. The U.S. Environmental Protection Agency is the logical entity to develop such a protocol with inputs from state, private, and tribal interests. We see no need to further elaborate this issue here but would suggest that once developed, such a protocol be adopted as a minimum standard for water temperature data collected under projects supported by the NPPC=s Fish and Wildlife Program.

This recommendation should not be construed to infer that existing data would not be useful in developing the water temperature models described above. Existing data have successfully been used to model Snake River water temperatures in a bulk-flow 1-dimensional manner (Yearsley 1999). It is these data that we anticipate using to define the extent and locations of new data collection sites. A detailed inventory of these data has been conducted and much of this information would be useful in calibrating the model(s).

Next Steps

If the Water Quality Team and the Implementation Team support this concept, a detailed study plan should be developed. Such a plan could be developed by WQT participants (given sufficient access to the time of principal scientists familiar with water temperature modeling), or a contract could be let to develop the plan. Detailed plan development should be completed by May 2000.

Tentative Schedule:

- March 2000 - Select agencies or contractors to develop detailed study plan
- March 2000 - Identify and pursue funding source - estimated cost $150,000 to $300,000
- May 2000 - Complete and approve study plan
- June 2000 - Release a Request for Proposals
- July 2000 - Sign contract and initiate study
- October 2002 - Project completion

Research on the distribution, timing, and mortality of salmonids passing through Lower Granite Reservoir should also be continued and expanded. Of particular interest is the distribution of fish relative to temperature conditions in the reservoir. Investigation of the location, diet, and consumption rate of piscivorus fish should also be conducted. Given that temperature-related mortality in Lower Granite Reservoir is a substantial concern, we are interested in investigating potential mitigative measures. Improved biological data are needed to define the likely biological effects of potential mitigative measures prior to implementation.

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TECHNICAL MANAGEMENT TEAM

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April 6, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Hanford reach update (Grant PUD).
4. Idaho TDG exemption update (NMFS).
5. Scenarios for EPA temperature model (COE).
6. Review TMT decision criteria, goals, and objectives.
7. Review current reservoir operations.
8. Review new operations requests.
9. Develop recommended operations.
10. Other

- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner

April 13, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.

2. Review minutes of previous meeting.

3. Hanford reach update (Grant PUD).

4. Idaho TDG exemption update (NMFS).

5. Status of fish curves (USFWS, WDFW).

6. Status of lower Columbia chum emergence (USFWS).

7. Upper Snake 427 kaf update (BOR).

8. Scenarios for EPA temperature model (COE).

9. Water Management Plan – comment on draft 2000 Plan.

- TMT Guidelines
- TMT decision criteria, goals, and objectives

10. Review current reservoir operations.

11. Review new operations requests.

12. Develop recommended operations.

13. Other

- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner

April 20, 2000 0900-1330 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.

2. Review minutes of previous meeting.

3. Hanford reach update (Grant PUD).

4. Scenarios for EPA temperature model (COE, BPA).

5. Status of fish curves (USFWS, WDFW).

6. Status of lower Columbia chum emergence (USFWS).

7. Review current reservoir operations.

8. Review new operations requests.

9. Develop recommended operations.

10. Water Management Plan – comment on final 2000 Plan

and develop decision criteria.

- TMT Guidelines
- TMT decision criteria, goals, and objectives

11. Other

- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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April 27, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Hanford reach update (Grant PUD).
4. Temperature modeling update (COE, NMFS).
5. Status of fish curves (USFWS, WDFW).
6. Status of lower Columbia chum emergence (USFWS).
7. Milner flows and 427 KAF from the Upper Snake (BOR).
8. Review current reservoir operations.
9. Review new operations requests.
10. Develop recommended operations.
11. TMT decision criteria, goals, objectives.
12. Other.

- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

May 4, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Hanford reach update (Grant PUD).
4. Temperature modeling results (COE).
5. Status of fish curves (USFWS, WDFW).
6. Upper Snake -- Milner flow update (BOR, USFWS).
7. IT recommendations. (TMT issue statement)
8. Review new operations requests. (flow spreadsheet, SORs)
9. Develop recommended operations.
10. Other.

- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

May 11, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of previous meeting.
   - Review of May 8 emergency TMT call
3. Hanford reach update (Grant PUD).
4. Status of fish curves (USFWS, WDFW).
5. Status of Milner flows (USFWS, USBR).
6. Review current system operations.
   - Reservoirs
   - Fish
7. Review new operations requests.
8. Develop recommended operations.
9. Status of TMT goals and objectives.
10. Other
    - Status of May 18 meeting.
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner,

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May 18, 2000 0900 - 1000 conference call

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

TMT conference call will be held on May 18,

0900 - 1000 hours.

Call in number is 503-808-5190.

Purposes of call:

(1) develop flow recommendation for week ending 28 May.

(2) respond to SOR from Spokane Tribe regarding Grand Coulee elevations.

Meet-me number is 503/808-5190. Questions about the call may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

NMFS: Paul Wagner\Chris Ross BPA: Scott Bettin\Robyn MacKay

USFWS: Marv Yoshinaka\Bob Hallock\Susan Martin

OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

May 25, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda May 25, 2000

1. Welcome, introductions.

2. Review minutes of previous meeting and conference call.

3. Hanford reach update (Grant PUD).

4. Status of fish curves (USFWS, WDFW).

5. Status of Milner flows http://mac1.pn.usbr.gov/hydromet/burtea.html (USFWS, USBR).

6. Review current system conditions.

- Reservoir operations
- Spill & TDG
- Fish migration
    - **Juvenile Migrants**
    - Indices:
    - Tables: http://www.fpc.org/2000Daily/passindx.htm
    - Cumulative Graphs: http://www.fpc.org/Passgraphs/passgraph.asp

PIT-tags:

- Snake River Wild Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
- Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
- Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00

- Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/archive/matrix.3w99
- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

7. Review new operations requests.
8. Develop recommended operations.
9. Discuss need for TMT meetings until July.
10. Other
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

June 1, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda June 1, 2000

1. Welcome, introductions.

2. Review minutes of previous meeting and conference call.

3. Hanford reach update (Grant PUD).

4. Temperature modeling update (NMFS; EPA not available this week).

5. Report on runoff volume and flow forecasts – methods and differences (RFC, COE).

6. Libby sturgeon flows update (USFWS, COE).

7. Status of Milner flows http://mac1.pn.usbr.gov/hydromet/burtea.html (USFWS, USBR).

8. Review current system conditions.

- Reservoir operations
- Spill & TDG
- Fish migration
    - **Juvenile Migrants**
    - Indices:
    - Tables: http://www.fpc.org/2000Daily/passindx.htm

- Cumulative Graphs: http://www.fpc.org/Passgraphs/passgraph.asp

- **PIT-tags:**
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  - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/archive/matrix.3w99
  - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

9. Review new operations requests.
10. Develop recommended operations.
11. Discuss need for TMT meetings.
12. Other
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

June 8, 2000 0900-1000 Conference Call

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda June 8, 2000

1. Welcome, introductions.
2. Libby sturgeon flows update (USFWS, COE).
3. McNary transportation.
4. Review current river operations requests.
5. Develop recommended operations.
6. Discuss need for TMT meetings.
7. Other
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

June 15, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda June 15, 2000

1. Welcome, introductions.

2. Review minutes of previous meeting and conference call.

3. Hanford reach update (Grant PUD).

4. Report on June 6 Dworshak meeting with Idaho and Nez Perce Tribe (IDFG, CRITFC).

5. Cool water affects on migrating adults (CRITFC).

6. Water temperature modeling results (EPA, NMFS).

7. Update on snails at Milner (USFWS).

8. Libby sturgeon flows update (USFWS, COE).

9. Update: End fish spill on lower Snake River (NMFS, COE).

10. Update: Start transport and end fish spill at McNary (NMFS, COE).

11. Review current system conditions.

- Reservoir operations
- Spill & TDG
- Fish migration
    - **Juvenile Migrants**

    - Indices:

- Tables: http://www.fpc.org/2000Daily/passindx.htm
- Cumulative Graphs: http://www.fpc.org/Passgraphs/passgraph.asp
- Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
- **PIT-tags:**
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  - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
  - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
  - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/archive/matrix.3w99
  - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

12. Review new operations requests.
13. Develop recommended operations.
14. Other
    - IT meeting, July 12 will include SYSTDG model update by Mike Schneider (WES). Desire for TMT presentation also?
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

June 22, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda June 22, 2000

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Hanford reach update (Grant PUD).
4. Libby sturgeon flows update (USFWS, COE).
5. Water temperature modeling results (COE).
6. Snake River summer reservoir operations.
7. Review current system conditions.

- Reservoir operations
- Spill & TDG
- Fish migration
    - **Juvenile Migrants**
    - Indices:
    - Tables: http://www.fpc.org/2000Daily/passindx.htm
    - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
    - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
    - **PIT-tags:**

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- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

8. Review new operations requests.

9. Develop recommended operations.

10. Other

- Chum salmon -- Ives Island habitat mods., Gorley Springs.
- Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

June 29, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

TMT Agenda June 29, 2000

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Libby sturgeon flows update (USFWS, COE).
4. Hungry Horse subgroup update (BOR)
5. Power System Emergency Update (BPA).
6. Snake River water temperature modeling and summer flows - update and discussion.
7. Review current system conditions.

- Reservoir operations (COE)
- Spill & TDG COE
- Fish migration
  - **Juvenile Migrants**
  - Indices:
  - Tables: http://www.fpc.org/2000Daily/passindx.htm
  - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
  - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
  - **PIT-tags:**

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- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

8. Review new operations requests.
9. Develop recommended operations.
10. Other
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

July 6, 2000 0900-1200 Lapwai, Idaho

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions: (James Holt, CRITFC; Nez Perce Tribe Natural Resources Committee)
2. Review minutes of previous meeting.
3. Libby sturgeon flows update (USFWS, COE).
4. Hungry Horse subgroup update (BOR)
5. Review current system conditions.

- Reservoir operations (COE)
- Spill & TDG
  - Lower Granite
  - Little Goose
  - Lower Monumental
  - Ice Harbor
  - McNary
  - John Day
  - The Dalles
  - Bonneville
- Fish migration
  - **Juvenile Migrants (indices)**

  - Passage Tables: http://www.fpc.org/2000Daily/passindx.htm

  - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm

  - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm

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  - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
  - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
  - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

6. Snake River summer operations - update and discussion.
   - Public Comments.
7. Review new System Operation Requests.
8. Develop recommended operations.
9. Review current system conditions.
   - Set agenda and date for next meeting; adjourn

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

July 13, 2000 0900-1100 Conference Call

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of previous meeting.
3. Snake River summer operations update; outcome of July 7 IT call (COE, NMFS)
4. Review current system conditions.
    - Reservoir operations (COE)
        - Libby operation
    - Spill & TDG
        - Lower Granite
        - Little Goose
        - Lower Monumental
        - Ice Harbor
        - McNary
        - John Day
        - The Dalles
        - Bonneville
    - Fish migration
        - **Juvenile Migrants (indices)**
        - Passage Tables: http://www.fpc.org/2000Daily/passindx.htm
        - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
        - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
        - **PIT-tags:**
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- Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
- Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00

- Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants**
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

5. Review new System Operation Requests.
6. Develop recommended operations.
7. Other.
    - Set agenda and date for next meeting; adjourn

Meet-me number is 503/808-5190. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

TMT AgendaJuly 20, 2000 0900 – 1100 h

Conference Call

1. Welcome, introductions
2. Review minutes of 6 July and 13 July meetings
3. Brownlee operation updates (NMFS, BPA, IPC)
    - Flow shaping and August operations
    - Review of BPA/IPC contract stipulations
4. McNary summer operations and temperature test (COE) Test Plan
5. Dworshak operations for temperature and flow (COE)
6. Review current system conditions
    1. Reservoir operations (COE)
        - Libby operation
    2. Spill & TDG (COE)
        - Lower Granite
        - Little Goose
        - Lower Monumental
        - Ice Harbor
        - McNary
        - John Day
        - The Dalles
        - Bonneville
        - Dworshak
    3. Water temperature
        - Dworshak, Peck and Lewiston Temperature data
        - Lower Granite Forebay and Tailwater Temperature
        - Dworshak Reservoir Temperature Profile (07/17/00)
    4. Fish migration (NMFS)

        1. Juvenile Migrants (indices)

            - Passage Tables:http://www.fpc.org
            - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm

Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm

2. PIT-tags:

   - Snake River Wild Spring/Summer Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
   - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
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   - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
   - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

3. Adult Migrants:

   - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

6. Review new operations requests
7. Develop recommended operations
8. Other

. Set agenda and date for next meeting; adjourn

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

TMT Agenda July 27, 2000 0900 - 1100 h

Conference Call

1. Welcome, introductions
2. Review minutes of 20 July meeting
3. Brownlee operation updates (NMFS, BPA, IPC)
    - IPC responses to requests (SOR #2000-26 and WDFW letter)
4. McNary temperature test update (COE)
5. Review current system conditions
    1. Reservoir operations (COE)
        - Libby operation
    2. Spill & TDG (COE)
        - Lower Granite
        - Little Goose
        - Lower Monumental
        - Ice Harbor
        - McNary
        - John Day
        - The Dalles
        - Bonneville
        - Dworshak
    3. Water temperature
        - Dworshak, Peck and Lewiston Temperature data
        - Lower Granite Forebay and Tailwater Temperature
        - Dworshak Reservoir Temperature Profile (07/17/00)
    4. Fish migration (NMFS)
        - Juvenile Migrants (indices)
            - Passage Tables:http://www.fpc.org
            - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
            - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
        - PIT-tags:
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        - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
        - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
        - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
        - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
    - Adult Migrants:
        - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm
6. Review new operations requests
7. Develop recommended operations
8. Other
    - Pierce Island field trip for TMT members in August
    - Set agenda and date for next meeting
    - Adjourn

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

TMT Agenda July 31, 2000 1100 - 1300 h

Conference Call

1. Current and projected power system conditions (BPA)
2. BPA list of measures to increase generation during power system emergency (attached)
3. Salmon managers' recommendation relative to emergency measures (attached)
4. Develop appropriate emergency measures

- REVISED BPA list of measures to increase generation during power system emergency

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

August 3, 2000 0900 - 1200 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions
2. Review minutes of 27 July meeting and 31 July conference call.
3. McNary temperature test update (COE)
4. Hungry Horse discharge incident update (BOR).
5. Power system emergency update (BPA).
6. Minimum spill level at Ice Harbor (NMFS).
7. Review current system conditions
    1. Reservoir operations (COE)
        - Libby operation
    2. Spill & TDG (COE)
        - Lower Granite
        - Little Goose
        - Lower Monumental
        - Ice Harbor
        - McNary
        - John Day
        - The Dalles
        - Bonneville
        - Dworshak
    3. Water temperature
        - Dworshak, Peck and Lewiston Temperature data
        - Lower Granite Forebay and Tailwater Temperature
        - Dworshak Reservoir Temperature Profile (07/17/00)
    4. Fish migration (NMFS)
        - Juvenile Migrants (indices)
            - Passage Tables:http://www.fpc.org
            - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
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        - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
        - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
    - Adult Migrants:
        - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm
8. Review new operations requests
9. Develop recommended operations
10. Other
    - Pierce Island / Hardy Creek field trip.
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

NMFS: Paul Wagner\Chris Ross BPA: Scott Bettin\Robyn MacKay

USFWS: Marv Yoshinaka\Bob Hallock\Susan Martin

OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

August 10, 2000 0900 - 1200 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 3August meeting.
3. McNary temperature test update (COE, WDFW).
4. McNary flow objective - 3 August IT recommendation (NMFS).
5. Power system emergency update (BPA).
6. Comments on TMT emergency operations protocols.
7. Ice Harbor minimum spill level, FPOM update (NMFS,COE).
8. Review current system conditions
    - Reservoir operations (COE)
9. Spill & TDG (COE)
    - Lower Granite
    - Little Goose
    - Lower Monumental
    - Ice Harbor
    - McNary
    - John Day
    - The Dalles
    - Bonneville
    - Dworshak
10. Water temperature
    - Dworshak, Peck and Lewiston Temperature data
    - Lower Granite Forebay and Tailwater Temperature
    - McNary Dam Forebay and Tailwater Temperature
    - Dworshak Reservoir Temperature Profile (07/17/00)
11. Fish migration (NMFS)
    - Juvenile Migrants (indices)
        - Passage Tables:http://www.fpc.org
        - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
        - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm

- PIT-tags:
  - Snake River Wild Spring/Summer Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
  - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
  - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
  - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
  - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
- Adult Migrants:
  - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

12. Review new operations requests

13. Develop recommended operations

14. Other

- Set agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

August 17, 2000 0900 - 1200 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 10 August meeting.
3. McNary temperature test update (COE, WDFW).
4. Updated Emergency Protocols (BPA).
5. Comments on TMT emergency operations protocols.
6. E mail list for Emergency Notification (BPA).
7. Review current system conditions
    - Reservoir operations (COE)
    - Hourly operations data from Reclamation projects.
        - Recent hourly data by river basin http://mac1.pn.usbr.gov/hydromet/realtime.html
        - Historic daily average data http://mac1.pn.usbr.gov/pn6200/webhydarcread.html
8. Spill & TDG (COE)
    - Bonneville
    - Dworshak
9. Water temperature (COE)
    - Dworshak, Peck and Lewiston Temperature data
    - Lower Granite Forebay and Tailwater Temperature
    - McNary Dam Forebay and Tailwater Temperature
    - Dworshak Reservoir Temperature Profile
10. Fish migration (NMFS)
    - Juvenile Migrants (indices)
        - Passage Tables:http://www.fpc.org
        - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
        - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
    - PIT-tags:
        - Snake River Wild Spring/Summer Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
        - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
        - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
        - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00

        - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
    - Adult Migrants:
        - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

12. Review new operations requests

13. Develop recommended operations

14. Other

    - September Operations at Montana Reservoirs
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Dick Cassidy, (503) 808-3938.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

August 24, 2000 0900 - 1200 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 17 August meeting and 21 August conference calls.
3. McNary temperature test update (COE, WDFW).
4. Emergency Protocals
   - Emergency list (BPA).
   - Email list for Emergency Notification (BPA)
   - Emergency operations protocols, Water Management Plan, Appendix 2 change
5. Discussion of NMFS Fish Mitigation Measures
6. Update on Power Emergency: Minutes of August 21 conference call.
7. Libby operations in September
8. Review current system conditions
   - Reservoir operations (COE , BOR)
9. Spill & TDG (COE)
   - Bonneville
   - Dworshak
10. Water temperature (COE)
    - Dworshak, Peck and Lewiston Temperature data
    - Dworshak Reservoir Temperature Profile
    - Dworshak Dam Selector Gate Drawings
11. Fish migration (NMFS)
    - Juvenile Migrants (indices)
      - Passage Tables:http://www.fpc.org
      - Cumulative Graphs: http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
      - Daily Passage Graphs: http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm
    - PIT-tags:
      - Snake River Wild Spring/Summer Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
      - Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
      - Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
      - Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00

        - Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
    - Adult Migrants:
        - http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

12. Review new operations requests

13. Develop recommended operations

14. Other

    - Lower Snake River Projects: Operating Range.
    - Stopping Spill for End Season.
    - September 7, 2000 Hardy Creek and Pierce Island Field Trip
    - Set agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Dick Cassidy, (503) 808-3938.

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

August 31, 2000 0900 - 1200 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 24 August meeting.
3. Dworshak operation: review 28 August conference call (COE).
4. End of MOP at lower Snake River projects (NMFS).
5. End of project spill for fish passage (NMFS).
6. Need for fish mitigation measures for power system emergency operations since 10 August (NMFS).
7. Revised language changes to Water Management Plan, Appendix 2, Emergency Operations Protocols (COE).
8. Review current system conditions.
    - Reservoir operations (COE and BOR)
    - Spill & TDG (COE)
    - Fish migration (NMFS)
    - Juvenile Migrants (indices):
        - `Passage Tables:` http://www.fpc.org/2000Daily/passindx.htm
        - `Cumulative Graphs:` http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
        - `Daily Passage Graphs:` http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm

- **PIT-tags:**
- Snake River Wild Spring/Summer Chinook http://www.cqs.washington.edu/dart/esu/matrix.1w00
- Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
- Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
- Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00
- Adult Migrants:
- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

9. Review new operations requests.

10. Develop recommended operations.

11. Other.

- Hardy Creek and Pierce Island field trip, 6 September
- Frequency of fall TMT meetings
- TMT items to report to IT on 6 September
- Set date and agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Dick Cassidy, (503) 808-3938.

TECHNICAL MANAGEMENT TEAM

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

September 20, 2000 1300 - 1600 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 31 August meeting.
3. Update on 15 Mile Creek chemical spill (COE).
4. End of lower Snake MOP operation (COE).
5. Endorse final language for Water Management Plan, Appendix 2, Emergency Operations Protocols.
6. Scope of one-year BiOp plan (NMFS).
7. Report to IT on year 2000 operations (COE).
8. Review current system conditions.
    - Reservoir operations (COE and BOR)
    - Fish migration (NMFS)
    - Juvenile Migrants (indices):
        - `Passage Tables:` http://www.fpc.org/2000Daily/passindx.htm
        - `Cumulative Graphs:` http://www.fpc.org/Passgraphs/PassgrphSubmit.htm
        - `Daily Passage Graphs:` http://www.fpc.org/Passgraphs/dayPassgrphSubmit.htm

- **PIT-tags:**
- Snake River Wild Spring/Summer Chinook
  http://www.cqs.washington.edu/dart/esu/matrix.1w00
- Snake River Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.sts00
- Snake River Sockeye http://www.cqs.washington.edu/dart/esu/matrix.sc00
- Snake River Wild Fall Chinook http://www.cqs.washington.edu/dart/esu/matrix.3w00
- Mid-Columbia Wild Steelhead http://www.cqs.washington.edu/dart/esu/matrix.stc00

- **Adult Migrants:**

- http://www.fpc.org/2000Daily/7_Day_Adults2000.htm

9. Review new operations requests.

10. Develop recommended operations.

11. Other.

- Set date and topics for post-season review.
- Set date and agenda for next meeting; adjourn.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Dick Cassidy, (503) 808-3938.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

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MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

October 11, 2000 1330 - 1600 h Rm 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of 20 September meeting.
3. Lower Granite pool operation: Impacts of Lewiston levee and bank stabilization work near Hell's Gate (COE).
4. TMT post-season review and report to IT.
5. Review current system conditions.
    - Reservoir operations (COE and BOR)
    - Fish migration (NMFS)
6. Memo on Bonneville operations (USFWS, WDFW).
7. Review new operations requests.
8. Develop recommended operations.
9. Other.
    - Topics for post-season review: 25 October, 1300 – 1600 hours, in-person meeting.

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Dick Cassidy, (503) 808-3938.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

October 25, 2000 1300 - 1600 h Rm 118

Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.
2. Review minutes of October 11 meeting.
3. TMT post-season review and report to IT.
    - Fish, flow temperature, McNary operations
    - Review process
        - Where do we go from here
        - What works, what doesn't
        - TMT guidelines
4. Information review
5. Review new operations requests.
6. Develop recommended operations.
7. Other.
        - Develop agenda for November 8

Meet-me number is 503/*808-5190*. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or

Dick Cassidy, (503) 808-3938.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

NMFS: Paul Wagner\Chris Ross BPA: Scott Bettin\Robyn MacKay

USFWS: Marv Yoshinaka\Bob Hallock\Susan Martin

OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

November 15, 2000 900 - 1300 h Rm 118

Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.

2. Review minutes of October 25 meeting.

3. Report back from 1 November IT meeting (COE).

4. Continue post-season review – issues, new developments, and questions to consider.

    Process to develop TMT recommendations:

        what worked or did not work in 2000

        what kind of information is needed and when

        options for increasing efficiency of meetings and info exchange

        review and update TMT guidelines

    How should the fish, flow, TDG, temperature, and operations data and models be brought together to learn the most from them?

5. Review current system conditions.

- Reservoir operation (COE, BOR)
- Fish migration (NMFS, USFWS, WDFW)

6. Review new operations requests.

7. Develop recommended operations.

8. Other.

- Set date and agenda for next meeting.

Meet-me number is 503-808-5190. Questions about the meeting may be referred to Cindy Henriksen, 503-808-3945, or Rudd Turner, 503-808-3935.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

November 29, 2000 1300 - 1600 h Rm 118

Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.

2. Review minutes of November 15 meeting.

3. Review current system conditions.

    - Reservoir operation (COE, BOR)
    - Fish migration (NMFS, USFWS, WDFW)

4. Review new operations requests.

5. Develop recommended operations.

6. Continue post-season review – issues, new developments, and questions to consider.

Process to develop TMT recommendations:

what worked or did not work in 2000

what kind of information is needed and when

options for increasing efficiency of meetings and info exchange

review and update TMT guidelines

How should the fish, flow, TDG, temperature, and operations data and models be brought together to learn the most from them?

7. Define TMT need for additional information or training: reservoir refill probabilities, power system reliability.

8. Other.

- Reports for next meeting:
  - Hanford reach stranding by Paul Hoffarth (WDFW)
  - Snake River fall chinook by Billy Connor (USFWS, NMFS)
- Set date and agenda for next meeting.

Meet-me number is 503-808-5190. Questions about the meeting may be referred to Cindy Henriksen, 503-808-3945, or Rudd Turner, 503-808-3935.

TECHNICAL MANAGEMENT TEAM

BOR: Pat McGrane

NMFS: Paul Wagner\Chris Ross BPA: Scott Bettin\Robyn MacKay

USFWS: Marv Yoshinaka\Bob Hallock\Susan Martin

OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

December 7, 2000 1000 - 1100 hours PST Conference Call

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

Potential for winter cold snap operation for the power system. (BPA)

Meet-me number is 503-808-5191.

Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.

TECHNICAL MANAGEMENT TEAM

BOR: Kim Fodrea\Pat McGrane

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OR: Christine Mallette\Chuck Tracy WA: Jim Nielsen ID: Ed Bowles\Steve Pettit

MT: Jim Litchfield COE: Cindy Henriksen\Rudd Turner\Dick Cassidy

December 12, 2000 1300 - 1600 h Rm 118

Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome, introductions.

2. Review current system conditions.

    - Status of power system operation for cold snap (BPA)
    - Reservoir operation (COE, BOR)
    - Fish migration (NMFS, USFWS, WDFW)

3. Review new operations requests.

4. Develop recommended operations.

5. Report: Fall chinook stranding, by Paul Hoffarth (WDFW).

6. Report: Snake River fall chinook migrations in 2000, by Billy Connor (USFWS).

7. Define TMT needs for additional information or training: reservoir refill probabilities, power system reliability, other.

8. Other.

    - Set date and agenda for next meeting.

Meet-me number is 503-808-5190. Questions about the meeting may be referred to Cindy Henriksen, 503-808-3945, or Rudd Turner, 503-808-3935.

TECHNICAL MANAGEMENT TEAM

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COE: Cindy Henriksen\Rudd Turner

January 12, 2000 0900-1200 Rm. 118 Custom House

All members are encouraged to call Donna Silverberg with any issues or concerns they would like to see addressed. Please e-mail her at dsilverberg@cnnw.net or call her at (503) 248-4703.

AGENDA

Following discussion of the amount of work that needs to happen in TMT, members agreed to increase the frequency of upcoming meetings. Next meetings are scheduled for:

Wednesday, January 12th, 9:00 – 12:00

Wednesday, January 26th 10:00 – 3:00

(it was suggested that there be a short break followed by a working lunch)Proposed Agenda Items:

Air temperature and its effect on water temperature and fish. Scott Bettin (BPA)/Chris Ross (NMFS).

TMT Guidelines: Any changes in TMT meeting schedule? Any changes re: SOR submission or decision-making criteria? Open/closed executive sessions: conclusions from attorneys and executive policy discussions. Update on IT feedback from January 6th meeting. Group.

Decision-making criteria for TMT. Review goals/objectives/triggers information. Begin developing specific criteria. Group.

Recommended river operations.

Meet-me number is 503/808-5191. Questions about the meeting may be referred to Cindy Henriksen, (503) 808-3945, or Rudd Turner, (503) 808-3935.