



MEMORANDUM

Date: August 25, 2003
To: Dean Grover, U.S. Forest Service Region 6
From: Steve Padula, Long View Associates (LVA); Emily Andersen, LVA
Subject: Ramping Rates

LVA has completed its research on ramping rate conditions as part of a FERC license and/or settlement agreement relating to a relicensing process (see attached summary table). Our research was based on a review of hydropower projects 50+ MW in size that have been granted or are awaiting the issuance of a new license by FERC since 1994. In addition to reviewing the issued license, we reviewed the FERC-issued NEPA document and settlement agreement (where applicable) to complete this exercise.

Pursuant to the USFS scope of work, the attached summary table includes the following information:

- Location of project (river and state), size of project (MW) and length of license term and the date license was issued.
- Ramping rate in inches/hr (also cfs/hr if available).
- Rationale for establishing a ramping rate (recreation, bank protection, fish resource protection, etc.). If for fish protection identify species and life stage(s) if available.
- Schedule of ramping rate (by month or season) and rationale for schedule.

In summary, of the 35 projects¹ in our database, 22 have established ramping rate regimes. For a number of these 22 project complexes, there are multiple developments/dams/bypass reaches. Accordingly, in the summary table we have identified the number of facilities for each project and which facility is assigned a ramping rate regime. We found that for sixty four (64) of the 109 developments/dams/bypass reaches (59%) that comprise the 22 project complexes (or of the 174 total developments/dams/bypass reaches (37%) that comprise the 35 projects reviewed), a ramping rate regime has been established.

¹ Twenty-six (26) projects have been issued licenses and nine (9) projects are awaiting issuance of a new license.



Please let us know if you have any questions or need additional information. Thank you.

Enclosures

RAMPING RATES AS CONDITIONS OF A FERC LICENSE AND/OR SETTLEMENT AGREEMENT - REVIEW OF 50+ MW PROJECTS RELICENSED¹ SINCE 1994 (ORGANIZED FROM NEWEST TO OLDEST LICENSES)

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|---------------------------------|-----------|---|--|---|---|
| 1. Pit No. 1 (2687) 1 development <i>40-yr license issued 03/19/03</i> | Fall and Pit rivers, CA | 69.3 | NA | Generator loading rate: 2 MW/min; unloading rate: 0.5 MW/min | None specified | To reduce impacts (i.e., stranding) of flow fluctuations downstream of powerhouse on aquatic habitat. Fish assemblage located downstream of Project dominated by rainbow trout, Sacramento squawfish, Sacramento sucker, and hardhead. ² |
| 2. Chippewa River: Holcombe (1982), Wissota (2567), Dells (2670) 3 projects; 3 developments <i>31-yr license(s) issued 12/31/02</i> | Chippewa River, WI | 78.5 | Dells Project (most downstream) | See Notes | June 1 – March 31 (April 1 – May 31 considered spawning season) | To simulate to the extent possible instantaneous run-of-river flows in the Chippewa River, effectively reducing the impact of flow fluctuations downstream of the project on aquatic resources. Rough fishes (primarily sucker family) dominate below the dam. |
| Notes: Incrementally decrease flows discharged from the Dells Project such that there is at least one step-wise reduction in discharge (to the midpoint between the ongoing discharge and the required minimum flow), with at least 30 minutes elapsing before the next reduction in discharge under the following conditions: 1) when inflow to Dells Pond is between 1,800 cfs and 6,000 cfs and project discharge is more than twice the minimum flow required in Article 403; and 2) during power demand contingencies as defined in Article 403. | | | | | | |
| 3. Carpenter-Rommel (271) 2 developments <i>50-yr license issued 12/30/02</i> | Ouachita River, AR | 65.3 | None | -- | -- | -- |
| 4. Upper Hudson River: Stewarts Bridge (2047), West (2318), Hudson River (2482), Feeder (2554) 4 projects; 5 developments <i>40-yr license(s) issued 09/25/02</i> | Sacandaga and Hudson rivers, NY | 135.6 | None | -- | -- | -- |
| 5. Fifteen Mile (2077) 3 developments <i>40-yr license issued 04/08/02</i> | Connecticut River, NH/VT | 291.4 | None | -- | -- | -- |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|-------------------------------|--------------|--|-----------------------------------|--------------------------------|---|--|
| | | | | Daylight | Night | | |
| 6. Cowlitz River (2016) 2 developments 5-yr license issued 03/13/02 | Cowlitz River, WA | 462.0 | Mayfield Dam (most downstream) | No ramping 1 in/hr 2/ in/hr | 2 in/hr 1 in/hr 2/ in/hr | Feb 16 – June 15 June 16 – Oct 31 Nov 1 – Feb 15 Applied to flows < 6,000 cfs | To protect fish from stranding. The dominate fish species found downstream of the Mayfield Dam include spring and fall chinook salmon, coho salmon, chum salmon, winter and summer steelhead trout, sea-run cutthroat trout, white sturgeon, pacific lamprey, and Columbia River smelt. The schedule is based on the Washington Department of Fish and Wildlife's (WDFW's) criteria that were designed to mimic natural river conditions (Hunter 1992). The February 16-June 15 criterion is established for salmon fry and the June 16-October 31 criterion is established for steelhead and trout fry. |
| Notes: Licensee had voluntarily been instituting this ramping rate schedule for the 10 years prior to receiving a new license. | | | | | | | |
| Daylight is defined as one hour before sunrise to one hour after sunset, and night is defined as one hour after sunset to one hour before sunrise. | | | | | | | |
| 7. Raquette River: Carry Falls (2060), Upper (2084), Middle (2320), Lower (2330) 4 projects; 14 developments 32-yr license(s) issued 02/13/02 | Raquette River, NY | 161.5 | Middle Raquette River Project; 3 of 4 developments (Colton, Hannawa, and Sugar Island) | See Notes | | See Notes | Scheduled whitewater boating releases are to be based upon a ramping schedule. |
| Notes: Per the settlement agreement: "The licensee shall be required to incorporate flow ramping when ascending to, or descending from, the desired peaks of any scheduled release. Energy losses associated with ramping flows shall be included as part of the whitewater budget. The licensee, at its own discretion, shall provide ramping utilizing turbine operations, gate releases, or a combination of both. Within the Colton, Hannawa, and Sugar Island bypass reaches, instream flows are being provided (see Section 3.3.3). The instream flow required at the prevailing time of year at each development will serve as the starting point of ramping up to the whitewater peak flow. The basic ramping scheme adopts an hourly doubling of the flow when ascending to the peak flow and an hourly halving of the flow when descending from the peak flow. These ratios are approximate since they are subject to equipment limitations." | | | | | | | |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|--|------------------------------------|--------------|---|---|---|------------------------------------|---|
| | | | | Up- East Branch Feather rate (see notes) | Down- East Branch Feather rate (see notes) | | |
| 8. Rock Creek-Cresta (1962) 2 developments <i>33-yr license issued 10/24/01</i> | North Fork Feather River, CA | 196.0 | Rock Creek and Cresta developments | 300/400 cfs/hr (see notes) | 150 cfs/hr | Mar – May | The licensee and the other signatories to a settlement agreement developed ramping rate criteria with the objective of matching the more natural flow changes that occur in the unregulated East Branch NFFR to allow fish to adjust to changing river conditions and protect aquatic resources from the effects of rapid and frequent flow changes by limiting excessive scouring of spawning gravels and preventing the stranding of trout fry. Rainbow trout, brown trout, Sacramento sucker, Sacramento pikeminnow, hardhead, sculpin, and occasionally smallmouth bass, carp, pond smelt, wakasagi, and bluegill are found in the Project area. |
| | | | | 400 cfs/hr | 150 cfs/hr | June | |
| | | | | | | July - Feb | |
| Notes: Rise and fall of E. Branch Feather rate to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (± 100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June. 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations. No ramping rates would be imposed for operation when uncontrolled spill flows would be above 3,000 cfs. | | | | | | | |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|--|--------------|---|---------------------|---|---|--|
| | | | | Up | Down | | |
| 9. Mokelumne River (137) 11 developments (4 hydro; 7 storage) <i>30-yr license issued 10/11/01</i> | Mokelumne, North Fork Mokelumne and Bear rivers, CA | 215.0 | N. Fork Mokelumne | 25%/hr ³ | 20%/hr > 300 cfs; 25 cfs/hr < 300 cfs | Nov 1 – June 15 | The proposed pulse flows based on the unimpaired hydrograph, in combination with the proposed ramping rates, would allow the removal of fine sediments and silt from stream channels and would replenish sediments and gravels in the downstream reaches. The ramping rates would continue to provide navigable flows in all whitewater runs for approximately 1-2 hours before and after the scheduled release period. Also, the ramping rates would extend the length of time that each run is navigable during each scheduled release, and reduce the likelihood of stranding boaters mid-run. |
| | | | | 25 cfs/hr | 50%/day diff between initial and target flows 4 steps/day < 250 cfs; 50%/day diff between initial and target flows 4 steps/day > 250 cfs | June 16 – Oct 31 | |
| | | | Bear River below L. Bear River Reservoir | 25%/hr | 20%/hr > 300 cfs; 25 cfs/hr < 300 cfs | Nov 1 – May 31 (or after spill stops if later than 5/31) | |
| | | | | 25 cfs/hr | 50%/day of diff between initial and target flows 4 steps/day | June 1 – Oct 31 (or after spill stops if later than June 1) | |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|--|--------------|---|---|---|------------------------------------|--|
| | | | | | | | |
| | | | Cole Creek below Bear River Tunnel Diversion | 50%/hr | 20%/hr > 200 cfs; 25 cfs/hr , < 200 cfs | Nov 1 – May 31 | |
| | | | | 25 cfs/hr | 50%/day of diff between initial and target flows 4 steps/day | June 1 – Oct 31 | |
| | | | Blue and Meadow creeks | 25%/hr 15 cfs/hr | 10 cfs/hr 5 cfs/hr | Nov 1 – May 31 June 1 – Oct 31 | |
| | | | Tiger Creek below Tiger Creek Regulator Dam | 5 cfs/hr 5 cfs/hr | 5 cfs/hr 2 cfs/hr | Nov 1 – May 31 June 1 – Oct 31 | |
| | | | | | | | |
| 10. Haas-Kings River (1988) 2 developments <i>40-yr license issued 03/06/01</i> | North Fork Kings River, CA | 193.1 | None | -- | -- | -- | -- |
| 11. Michigamme (1759) 8 projects; 10 dams <i>40-yr license issued 01/12/01</i> | Menominee, Paint and Michigamme rivers, WI/MI | 61.1 | Way Dam Project (most upstream on Michigamme) | Flows shall not change more than 20% in any 2-hr period or more than 50% in any 24-hr period with some exceptions (see Notes) | | None specified | Increased minimum flows and restrictions to flow changes generally stabilize the quantity of water and reduce the fluctuation in riverine sections between the Way Dam Project and Peavy Pond. |
| Notes: Ramping restrictions do not apply if: 1) natural changes to project inflows occur that exceed the specified ramping rates; 2) the Michigamme Reservoir elevation is between 1,373.8 and 1,374.3 feet NGVD; or 3) flows are being changed at Way Dam to provide for the restoration of flow at the Hemlock Falls Dam disrupted from a trip of the generating unit at the Hemlock Falls Project. | | | | | | | |

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|--|---------------------------------|-----------|---|--|-------------------------------|--|---|
| 12. Missouri-Madison (2188) 9 developments (8 hydro, 1 storage) 40-yr license issued 09/27/00 | Missouri and Madison rivers, MT | 326.9 | Hebgen Development (most upstream on Madison) | < 10%/day change in outflow | | Year round | To reduce potential for erosion at Quake Lake (impoundment above Hebgen Development). |
| | | | Madison Development | Up- and downramping rate of 100 cfs/hr | | | To reduce the chance of stranding fish and washing fish downstream. |
| | | | Hauser and Holter developments | No more than 5% change from the previous hour's average flow | | | Species located in the tailwaters and river segments downstream of the developments include rainbow, brown trout, kokanee and mountain whitefish. |
| | | | Morony Development (most downstream on Missouri) | No more than 7.5% change from the previous hour's average flow | | | |
| 13. Curtis-Palmer (2609) 2 developments 40-yr license issued 04/27/00 | Hudson River, NY | 58.3 | Curtis and Palmer developments | Up- and downramping rate of 1 ft/hr | | None specified | The further limitation of impoundment drawdowns to 1.5 feet for the June 16 – February 28/29, including the specified ramping rate, will provide protection for recreational uses of the impoundment. |
| 14. Clark Fork River (2058) 2 developments 45-yr license issued 02/23/00 | Clark Fork River, ID/MT | 697 | None | -- | | -- | -- |
| 15. Cushman (460) 2 developments 40-yr license issued 07/30/98 | N. Fork Skokomish River, WA | 131.0 | Dam No. 2 (most downstream) | <u>Daytime</u> | <u>Nighttime</u> | Feb 16 – June 15 June 16 – Oct 31 Nov 1 – Feb 15 | To minimize impacts to downstream aquatic resources. Fish populations below Dam No. 2 include chinook, coho, and chum salmon, and steelhead and sea-run cutthroat trout. See Cowlitz River Project above for explanation of schedule. |
| | | | | 0 in/hr 1 in/hr 2 in/hr | 2 in/hr 1 in/hr 2 in/hr | | |
| Notes: Until critical flows (i.e., flows released from the project for which the site-specific ramping rates should be implemented) have been determined, the Licensee is to operate the project to meet the general ramping rates outlined above. | | | | | | | |
| 16. Kingsley (1417) 29 dams (4 hydro) 40-yr license issued 07/29/98 | N. Platte and Platte rivers, NE | 105.9 | None (see Notes) | -- | | -- | -- |
| Notes: There is no indication in the license that ramping rates were a requirement; however, the FEIS is not available through FERC's on-line database, so we could not confirm this point. | | | | | | | |
| 17. Wyman (2329) 1 development 40-yr license issued 11/25/97 | Kennebec River, ME | 72.0 | None | -- | | -- | -- |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|--|--------------|---|---|---|--|--|
| | | | | Up- 100 cfs/day | Down- 50 cfs/day | | |
| 18. Deerfield (2323) 8 developments (7 hydro; 1 storage) <i>40-yr license issued 04/04/97</i> | Deerfield River, VT/MA | 76.9 | Somerset Development (most upstream) | Up- 100 cfs/day | Down- 50 cfs/day | Aug 1 – Apr 30 | Protection of fish resources in the Deerfield River, particularly the fry and juvenile life stages. Brook trout and landlocked Atlantic salmon are the representative species found below the development. |
| Notes: The 100-cfs upramping requirements may be suspended as necessary to lower the reservoir to meet the common loon nesting target elevation by May 1 as required by Article 406 of the license. | | | | | | | |
| 19. Nisqually River (1862) 2 developments <i>40-yr license issued 03/07/97</i> | Nisqually River, WA | 115.0 | La Grande Development (most downstream) | Daytime (down-) 0 in/hr 1 in/hr 2 in/hr | Nighttime (down-) 2 in/hr 1 in/hr 2 in/hr | Feb 16 – June 15 June 16 – Oct 31 Nov 1 – Feb 15 | For downstream fish protection in the La Grande bypass reach, specifically by reducing flow fluctuation and flood effects. Fish species that potentially utilize habitat in the bypass reach include chinook, coho, chum, pink and sockeye salmon, and steelhead and sea-run cutthroat trout. See Cowlitz River Project above for explanation of schedule. |
| 20. Penobscot Mills (2458) 5 developments (4 hydro; 1 storage) <i>30-yr license issued 10/22/96</i> | Penobscot River and Millinocket Creek, ME | 70.6 | None | -- | -- | -- | -- |
| 21. North Georgia (2354) 6 developments <i>40-yr license issued 10/03/96</i> | Tallulah, Chattooga, and Tugalo rivers, SC/GA | 166.4 | None (see Notes) | -- | -- | -- | -- |
| Notes: There is no indication in the license that ramping rates were a requirement; however, the FEIS is not available through FERC's on-line database, so we could not confirm this point. | | | | | | | |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|---|--|-----------|--|---|------------------------------|--|
| 22. St. Louis River (2360) 9 developments (4 hydro (35 dams); 5 storage) 40-yr license issued 07/13/95 | St. Louis, Whiteface, and Cloquet rivers, MN | 88.6 | Whiteface Reservoir (on Whiteface) | 0-50 cfs flows, 3-7 cfs/6 hr; > 50 cfs flows, as needed to maintain pond level | None specified | To protect fish. The rivers support up to 32 species of fish in 12 families, mostly sunfish, cyprinids, percids, and catfish. |
| | | | Island Lake (most downstream on Cloquet) | 0-350 cfs flow, 25-35 cfs/6 hr; > 350 cfs flow, as needed to maintain pond level | | |
| | | | Knife Falls and Scanlon (Knife Falls most upstream on St. Louis) | 0-1,000 cfs flow, 75-125 cfs/6 hr, 1,000-2,000 cfs flow, 200-300 cfs/6 hr; > 2,000 cfs flow, as needed to maintain pond level | | |
| | | | Thomson Bypass Reach | 0-1,000 cfs flow, 75-125 cfs / 6 hr, 1,000-2,000 cfs flow, 200-300 cfs/6 hr, 2,000-3,000 cfs flow, 400-600 cfs/2 hr, 3,000-5,000 cfs flow, 900-1,100 cfs / 2 hr; > 5,000 flow, as needed to maintain pond level | | |
| | | | Fond du Luc Bypass Reach (most downstream on St. Louis) | 0-1,000 cfs flow, 75-125 cf/6 hr, 1,000-2,000 cfs flow, 200-300 cfs/6 hr, > 2,000, as needed to maintain pond level | | |
| Notes: Licensee is to develop a ramping rate plan, but until the formal plan is developed, the licensee shall implement the interim ramping rate plan outlined above. | | | | | | |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|--|---|--------------|---|---|--|---|--|
| | | | | Daytime (down) Salmon < 4,700 cfs, none > 4,700 cfs 1,500 cfs/hr | Nighttime (down-) Salmon 3,000 cfs/hr | | |
| 23. Skagit River (553) 3 developments 30-yr license issued 05/16/95 | Skagit River, WA | 689.4 | Gorge Development (most downstream) | <i>Steelhead</i> < 4,000 cfs, 500 cfs/hr > 4,000 cfs 500 cfs/hr | | During salmon and steelhead fry protection period (June 1 – Oct 15 for steelhead) | Salmon and steelhead fry protection downstream of development. |
| 24. Lynn Lake (2459) 1 development 30-yr license issued 12/27/94 | Cheat River, WV/PA | 51.2 | None | -- | -- | -- | -- |
| 25. Walters (432) 1 development 40-yr license issued 11/04/94 | Pigeon River, NC | 108 | None | -- | -- | -- | -- |
| 26. Foote (2436) + 10 projects 11 projects; 11 developments 40-yr license(s) issued 07/15/94 | Muskegon, Manistee, and Au Sable rivers, MI | 123.7 | All projects | Maintenance ramping for the 11 projects analyzed together: 1 ft/day for 7 projects; 2 ft/day for 4 projects | | None specified | Reduce adverse effects to aquatic resources. Fish species occurring in the reservoirs include white sucker, rock bass, yellow perch, and emerald and spottail shiner. Fish species occurring in the riverine sections include rainbow trout, brown trout, brook trout, walleye, smallmouth bass, largemouth bass and northern pike. Also present downstream of the Foote Dam (most downstream on Au Sable) are steelhead, walleye, chinook and pink salmon, channel catfish and lake sturgeon. |

| Project | Location (river and state) | Size (MW) | Project/development with ramping rate requirement | Ramping rate(s) | Schedule (monthly, seasonal) | Rationale for ramping rates and associated schedule |
|--|-------------------------------|--------------|---|---|------------------------------------|--|
| 27. North Umpqua (1927) 8 developments <i>New license not issued to date; current license expired 01/29/97</i> | North Umpqua River, OR | 185.5 | Bypassed reaches (all developments) and Fish Creek | 0.5 ft/hr for year 1 of new license and 0 ft/hr after year 1 except for maintenance and emergencies | None specified | To protect steelhead and salmon fry. |
| | | | Full-flow reaches above Soda Springs Dam (most downstream) | Ramping (1) reduced below Lemolo No. 2 by routing flows into an expanded wetland complex; (2) to be determined in Slide Creek; and (3) 0 ft/hr in Toketee Reach | | |
| | | | Wild and Scenic River downstream of Soda Springs Dam | > 1,600 cfs, 0.1 to 0.4 ft/hr depending on reach (see Notes) | | |
| Notes: FERC has yet to issue a license, but the FERC staff recommends the ramping rate regime outlined above (as stipulated to in the settlement agreement) over two other alternatives (no action and NGO's proposal) analyzed in its NEPA document. | | | | | | |
| 28. Mid-Snake River: Bliss (1975), Lower Salmon Falls (2061), Upper Salmon Falls (2777), Shoshone Falls (2778) 4 developments <i>New license not issued to date; current license(s) expired 12/31/97, 02/28/98 and 05/31/99</i> | Snake River, ID | 182.0 | Lower Salmon | 2.5 ft/hr and 5 ft/day | None specified | To improve aquatic habitat downstream of the Project. The dominant species in the fish community downstream of the Project is white sturgeon. |
| | | | Bliss (most downstream) | 3 ft/hr and 6 ft/day (see Notes) | | |
| Notes: FERC has yet to issue a license, but according to FERC's FEIS, the Licensee has proposed the ramping regime outlined above. FERC did not make a recommendation on any issues, rather it provided a comparison of proposed actions and alternatives. | | | | | | |
| 29. Big Creek 4 (2017) 1 development <i>New license not issued to date; current license expired 02/28/99</i> | San Joaquin River, CA | 98.8 | NA | Up- 150 cfs/day | None specified | Not specified. |
| | | | | Down- 100 cfs/day (see Notes) | | |
| Notes: FERC has yet to issue a license, but the FERC staff recommends in its FEIS (and the USFS requires under its 4(e) conditioning authority) the ramping rate regime outlined above. | | | | | | |

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|--|------------------------------------|-----------|--|--|---|---|
| 30. C.J. Strike (2055) 1 development <i>New license not issued to date; current license expired 11/30/00</i> | Snake and Bruneau rivers, ID | 82.8 | NA | 2.5 ft/hr and 4 ft/day | None specified | To improve aquatic habitat downstream of the Project. The dominant species in the fish community downstream of the Project is white sturgeon. |
| Notes: FERC has yet to issue a license, but according to FERC's FEIS, the Licensee has proposed the ramping regime outlined above. FERC did not make a recommendation on any issues, rather it provided a comparison of proposed actions and alternatives. | | | | | | |
| 31. Roanoke Rapids-Gaston (2009) 2 developments <i>New license not issued to date; current license expired 01/31/01</i> | Roanoke River, NC/VA | 278.0 | Roanoke Rapids Dam (most downstream) | On peak days: Ramp up from minimum flow plus 5,000 cfs, hold for one hour, ramp up according to licensee peaking needs Ramp down from peak down to minimum flow plus 5,000 cfs, hold for one hour, ramp down to minimum flow; not to ramp down slower than 2,000 cfs/hr Change from one to next weekly declaration cannot exceed 5,000 cfs/hr | March 1-31 April 1-June 15 | General objective of the proposed target flow releases: to protect the water quality standards and enhance the biological integrity of the Roanoke River downstream of the dam. |
| Notes: FERC has yet to issue its NEPA document or a license, but according to the proposed Settlement Agreement, the stakeholders have agreed to the proposed ramping regime outlined above. No additional details regarding rationale are provided in the Settlement Agreement. | | | | | | |
| 32. Bear River: Soda (20), Oneida (472), Grace/Cove (2401) 3 projects; 4 developments <i>New license(s) not issued to date; current license(s) expired 10/01/01</i> | Bear River, ID | 84.5 | Soda (most upstream) Oneida (most downstream) | 1.2 ft/hr Downramping: 3 in/15 min | None specified | To reduce erosion and turbidity downstream of the developments. |
| Notes: FERC has yet to issue a license, but according to FERC's FEIS, the Licensee has proposed the ramping regime outlined above, which is consistent with the proposed settlement agreement and draft water quality certification conditions. FERC recommends implementation of the proposed regime. | | | | | | |

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|--|-------------------------------|--------------|---|----------------------------------|------------------------------------|---|
| 33. Box Canyon (2042) 1 development <i>New license not issued to date; current license expired 01/31/02</i> | Pend Oreille River, ID/WA | 60.0 | NA | 3 in/hr at flows < 90,000 cfs | None specified | To reduce erosion downstream of the project. |
| Notes: FERC has yet to issue a license, but according to FERC's DEIS, the Licensee has proposed the ramping regime outlined above, which is consistent with USDI's proposal (under its 4(e) authority). FERC recommends implementation of the proposed regime. | | | | | | |
| 34. Pit No. 3, 4, 5 (233) 3 developments; 4 dams <i>New license not issued to date; current license expires 10/31/03</i> | Pit River, CA | 325.0 | TBD (see Notes) | Not specified (see Notes) | None specified | To avoid rapid termination of spills when river flows come under control of the Project, which could have the effect of stranding fish. Sacramento sucker, hardhead and rainbow trout are the dominant species of the riverine fish communities. |
| Notes: FERC has yet to issue a license, but according to FERC's DEIS, the Licensee has proposed to develop a plan for ramping the tail end of spill flows, which FERC concurs with. | | | | | | |
| 35. St. Lawrence – FDR (2000) 4 developments <i>New license not issued to date; current license expires 10/31/03</i> | St. Lawrence River, NY | 912.0 | None (see Notes) | -- | -- | -- |
| Notes: FERC has yet to issue a license, but according to FERC's DEIS, there are no ramping rates proposed for the project, though the USDI does recommend the development and implementation of a Water Levels Monitoring and Management Plan (WLMMP) designed to document and assess the individual and combined causes and effects of water level fluctuations on the physical and biological environment of the Project area. | | | | | | |

Notes:

- 1 Projects that have yet to be issued a new license since undergoing relicensing as early as 1994, for which FERC has issued a NEPA document (DEA/DEIS or FEA/FEIS) and/or the relicensing participants have filed a settlement agreement, have been included in the summary for a more comprehensive review.
- 2 In most cases where the purpose of the ramping rate is for fish protection, the target species and/or life stage of the ramping rate requirement is not specified in the source document. As an alternative, we have indicated what the dominant fish species are downstream of the affected project/development unless otherwise noted.
- 3 Ramping rates defined as a percent/hour shall change by that percent in each hour, up or down. The percent shall be applied to the current hour streamflow value to get the next hour streamflow value of a ramping progression.