

## ***Memorandum For The Record***

15 April 2003

**Subject: Flood Control and Erosion Control Task Force Meeting**  
**RE: Headwaters ROPE Study**

1. On Monday, 14 April 2003, beginning at 3pm, the subject meeting of the Flood Control and Erosion Control Task Force met at the Corps Gull Lake Recreation Area Administration Building near Brainerd, Minnesota. There were 8 participants at this meeting. In addition to Corps representatives, agency and stakeholders represented included: a representative of the Forest Service, a rep from Big Sandy Lake Association, a engineering rep from the Wolf Lake, and a key representative from The Nature Conservancy (See the attached Sign-In Roster for listing and details regarding participants).
2. The objective of this meeting was to discuss the planning models to be used for the ROPE Study and to begin to get technical inputs and inventory information from this task force regarding flood control and erosion control issues in the ROPE Study area. The agenda used for the meeting is shown below:

### **AGENDA**

1. **Status of ROPE Study**
    - a. **Overall Study**
    - b. **Structures Inventories**
  2. **Overview on Planning Models to be used to formulate operating plans**
    - a. **Optimization Model**
    - b. **Simulation Model**
  3. **Specific Modeling Nodes Identified**
  4. **Discussion about nodes (see nodes file attached for details)**
    - a. **Additional nodes needed**
    - b. **Inputs and reference elevations/flow**
    - c. **Qualitative inputs about uses/problems at selected nodes**
  5. **Brainstorming about the Erosion Control Damage curves**
    - a. **Inventories needed**
  6. **Other inventories needed (boat dock, boat houses, etc...)**
  7. **Planned Future Task Force Activities**
3. There were a number of noteworthy discussions and points which were raised and discussed at this meeting:
    - The Corps and Forest Service have now entered into a partnership for completion of the ROPE Study. This means that both Federal agencies will be funding the study and will be using the ROPE Study and associated EIS as their decision document for operation of their Headwater Reservoir/s.
    - After considerable exploration of possible planning models for use in the ROPE Study, two models have now been selected for application on the ROPE Study. These are the HEC-PRM optimization models (supported by the Corps Hydraulic Engineering Center

in Davis, CA) and the STELLA simulation model (supported by the Institute for Water Resources in Fort Belvoir, VA). A workshop will be held the last week of April to take advantage of the expertise of the IWR and HEC model expert skills and at the end of that week a working HEC-PRM and STELLA model will be prepared for the Headwaters. This will be a rough/skeleton model, which will be fleshed-out over the next year to identify, evaluate, and compare a variety of systemwide Headwater operating plans. Uses and acceptability inputs from each of the volunteer citizen and task forces will be sought to flesh-out these models.

- There are 46 geographic nodes that have been identified up to this point where data for input into the models will be sought (see the attached nodes map and spreadsheet with hydrographs for more details). Additional nodes that may be useful to capture problem areas or opportunities in the study area are being sought and this group was asked to evaluate the nodes and identify others that may be added. There was discussion about how these nodes were identified and also discussion about the sample hydrographs that were provided as handouts (see the hydrograph handout attached for more information). These hydrographs represent monthly elevations (for the lakes) or flow (for river reaches) and were prepared using a period of record from 1930-1976. A suggestion was made to convert all flow hydrographs into elevation hydrographs for consistency and ease of visualizing the physical conditions. This should be possible for all river reaches where a gage is nearby and will be added to the revised hydrograph handouts...
- It was identified that a number of the hydrographs did not take into account the Corps adjustments in the reservoir operations and other physical features that could affect the elevation or flow hydrograph displays (i.e., a diversion channel that was installed in the early 1950's at Aitkin is not accounted for in the display). A footnote to account for these problems is, at a minimum, needed. It was mentioned that these hydrographs would be revised and enhanced with additional information that helps to identify key elevations related to use of the lakes (e.g., the current Corps and Service operating range, interconnecting channel elevations, etc. would be added to the hydrographs). This will be incorporated into a handout that will be provided to the task force prior to the next meetings – most likely in early June.
- There was considerable discussion about the flowage rights that were acquired at the time the Federal dams were constructed. It was mentioned that a GIS based display of the limits of the rights are being finalized and that the legend describing these rights is being coordinated. This information will soon be placed on the ROPE Website. The main concern is that many landowners currently are unaware that their land has a flowage right enforce. How to make this clear to the land surveyors and county register of deed and abstract vendor was discussed... There was considerable discussion about economic justice associated with upstream cabins verse downstream homes. It was mentioned that the modeling that will be done as part of the ROPE study will fully evaluate economic and environmental justice as part of the evaluation of alternatives.
- A presentation and discussion regarding the inventory of flood prone structures occurred. The Corps indicated that inventories of structures that are flood prone are now completed and are extensive. The flood damage evaluations to be done as part of the ROPE evaluation should be very complete and defensible (i.e., there is adequate data and models to evaluate fully flood damages). However, there still was a question as how to handle docks, boathouses, and septic systems. Generally, the group felt that these

secondary damageable structures did not need extensive inventory to be adequately addressed in the ROPE flood damages evaluations. Some inventories around Big Sandy are now available and would be sought. This data would be useful for getting some concept of secondary damages and such data could then be extrapolated and used for incorporation into the planning models.

- There was considerable discussion about how to evaluate erosion in this ROPE Study. Recent serious ice damage to many Headwater Lake shorelines was discussed as one erosion factor that should be inventoried and/or addressed in some way by the ROPE Study. There was discussion about the potential of developing a GIS evaluation erosion susceptibility model for selected/demo lake or lakes and using that analysis to extrapolate affects for other lakes in the study area. An inventory of existing erosion sites, current erosion protection limits, and susceptibility criteria overlays (ice affects, slope and soils evaluations, etc) could be generated for the selected/demo lake/s. This could be integrated into the GIS based evaluation model... It was mentioned that the Forest Service has an inventory of Service lands affected by erosion. Further coordination on this inventory and the potential of developing a erosion susceptibility model is needed. Other concepts of how to inventory and evaluate erosion and integrate this into the planning models is needed and this task force is asked to think about this and provide any insights about methods and inventories...
4. This meeting was very productive but a number of key task force representatives were unavoidably not able to attend. So, the intent of the meeting was not fully realized and further coordination with those members will be sought. This meeting was useful in defining adjustments to presentation handouts associated with preparing for other upcoming task force and citizen group meetings.
  5. Our next group meeting will likely be scheduled for the first part of June. Pre-meeting handout information and specific meeting logistics information will be distributed to task force members in advance of the next meeting to help them to prepare for that meeting. At the upcoming meeting, we should be able to run the STELLA and HEC-PRM models to better understand them and also start to get node use inputs for incorporation into the planning models.

/ s /

Ed McNally  
Project Manager &  
Downstream Citizens Group Champion

**Encls. 2**

**Sign-in Sheet  
Meeting Handouts (a number of enclosures attached)**

**Subject:** Flood Control/Erosion Control T.F. Mtg. - 14 April 2003 - Gull Lake Recreation Area  
**RE:** Headwaters ROPE Studies

## Sign-In Roster

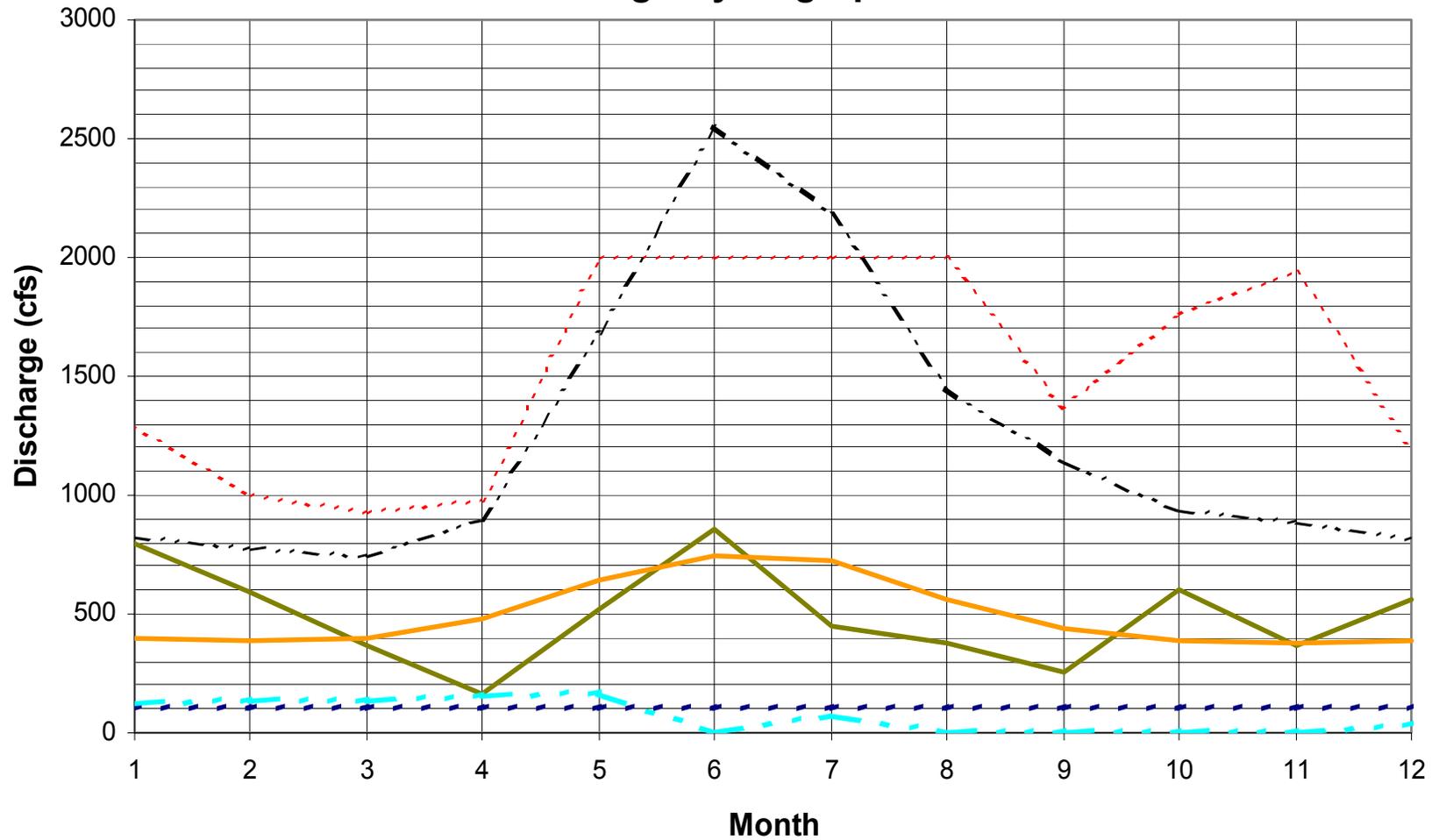
	<u>Name</u>	<u>Organization</u>	<u>Email and/or Telephone</u>
1.	Pete Swanson	Wolf Lake	218-751-4651
2.	Jim Murphy	COE	651-290-5608
3.	Rick Carlson	COE	651-290-5259
4.	Nancy Salminen	COE/USFS	218-335-8600
5.	Catherine McCalvin	The Nature Conservancy	(608) 534-6514
6.	Bob GREIFZU	Big SANDY LAKE ASSOC.	218-426-4055
7.	Gregg Struss	COE-Gull Dam	218-829-2797
8.	Ed McNally	COE PM-A	651-290-5387
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## Nodes and Water Use Demands

Node No.	Node Description	Wild Rice Penalty/ Reward	Flood Control & Drawdown Penalty/ Reward	Hydropower Penalty/ Reward	Erosion Control Penalty/ Reward	Recreation Penalty/ Reward	Environmental For Lake Stages Penalty / Reward	Environmental For Link/ river Discharge Penalty/ Reward	Tribal Interest Penalty/ Reward	Cultural Interest Penalty/ Reward	Navigation, Waste Assimilation, and Water Supply Penalty/ Reward
1	Bemidji /Irving Lakes			X	X	X	X	X		X	
2	Wolf Lake		X		X	X	X			X	
3	Andrusia & Big Lakes		X		X	X	X		X	X	
4	Cass Lake		X		X	X	X	X	X	X	
5	Winnibigoshish Lake	X	X		X	X	X	X	X	X	
6	Little Winni Lake	X			X	X	X		X	X	
7	Leech Lake	X	X		X	X	X	X	X	X	
8	Big Boy Lake	X	X		X	X	X		X	X	
9	Mud & Goose Lakes	X				X	X	X	X	X	
10	Confluence Miss & Leech Rivers	X	X		X	X		X	X	X	
11	Confl. Miss & Ball Club Rivers	X	X		X	X		X	X	X	
12	Ball Club Lake	X	X		X	X	X		X	X	
13	White Oak Lake	X	X		X	X	X		X	X	
14	Little White Oak Lake	X	X		X	X	X		X	X	
15	Days High Landing Gage	X	X		X	X		X	X	X	
16	Pokegama Dam and Lake		X		X	X	X	X	X	X	X
17	Blandin Dam at Grand Rapids			X		X	X			X	
18	Lawrence Lake	X			X	X	X			X	
19	Prairie Lake and Dam	X		X	X	X	X		X	X	
20	Confl. Miss & Prairie Rivers		X			X		X	X	X	
21	Miss near Sandy Lake		X		X	X		X	X	X	
22	Big Sandy Lake	X	X		X	X	X	X		X	
23	Begin Aitkin Diversion		X			X		X		X	
24	City of Aitkin		X			X		X		X	
25	End Aitkin Diversion		X			X				X	
26	Confl. Miss & Pine Rivers		X			X		X		X	
27	Big Pine Lake	X	X		X	X	X	X		X	
28	Whitefish (Cross Lake & Pine Dam)		X		X	X	X			X	
29	Gull Lake Dam and Chain		X		X	X	X	X		X	
30	Confl. Gull & Crow Wing (Sylvan Dam)		X	X	X	X				X	
31	Confl. Miss & Crow Wing Rivers		X		X	X		X		X	
32	City of Brainerd and Potlatch Dam			X	X	X				X	X
33	City of Little Falls and Dam			X	X	X				X	X
34	Town of Royalton			X	X	X				X	
35	Town of Sartell			X	X	X				X	X
36	City of St. Cloud			X	X	X		X		X	X
37	City of Elk River				X	X		X		X	
38	City of Coon Rapids and Dam			X	X	X				X	X
39	Town of Monticello				X	X				X	X
40	Town of Becker				X	X				X	X
41	Brooklyn Center				X	X				X	X
42	Upper St. Anthony Falls Dam			X	X	X		X		X	X
43	Lock and Dam No. 1			X		X		X		X	X
44	High Bridge Power Plant					X				X	X
45	Metro Waste Control					X				X	X
46	City of St. Paul					X		X		X	X

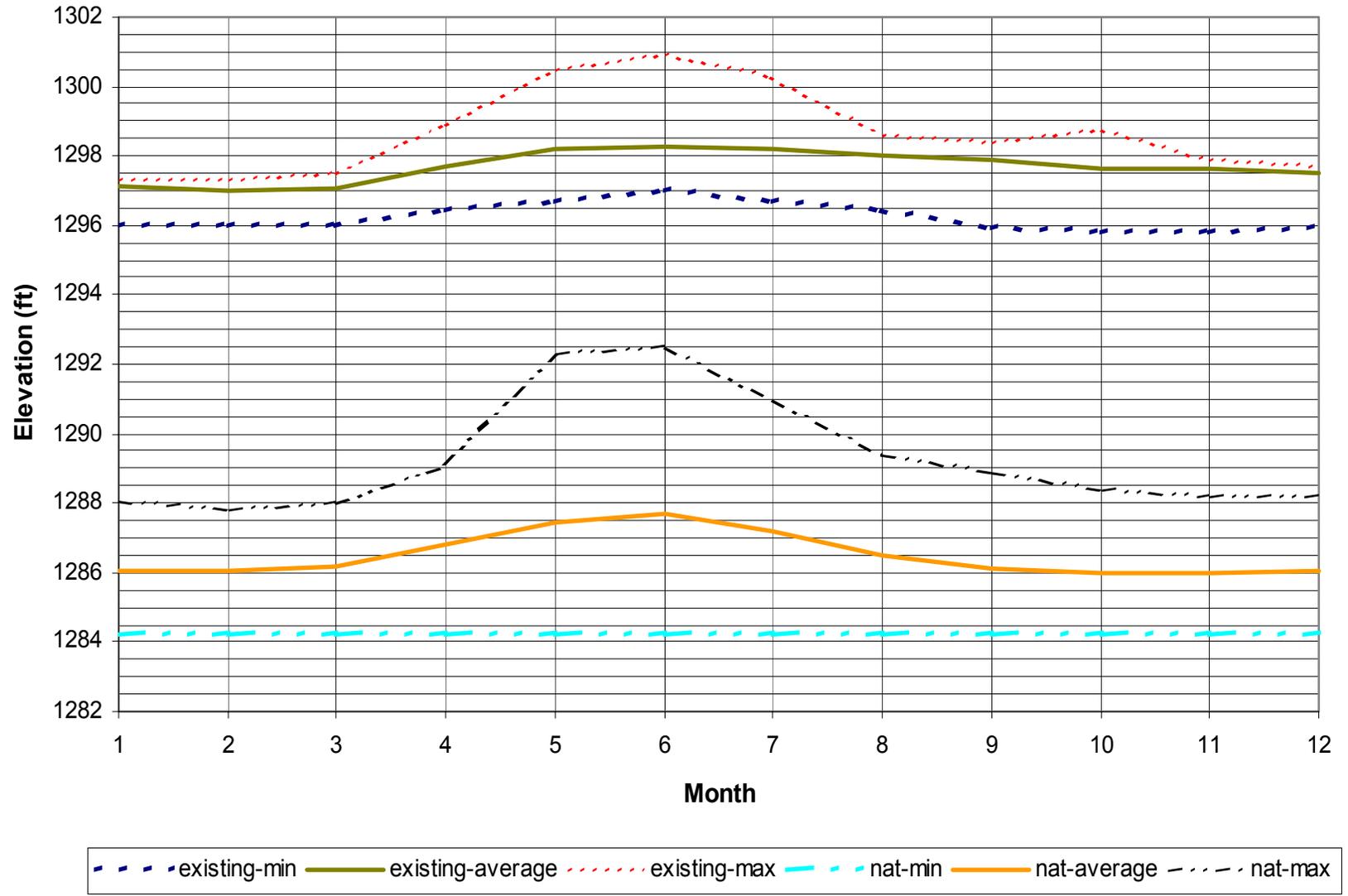
	Location	DA	DA Ratio	Local Flow Computation (multiply by DA ratio)	Total Flow Computation
1	Bemidgi Lakes & Irving lakes	562			
2	Wolf Lake	45.3			
3	Andrusia & Big lakes	40.3			
4	Cass Lake	1088		Winni Inflow	Route thru Cass Lake
5	<b>Winni</b>	<b>1442</b>			
6	Little Winni	-		Same as Winni	Same as Winni
7	Big Boy Lake	342	0.294	Leech Inflow	Winni Outflow + Local Flow
8	<b>Leech</b>	<b>1163</b>			
9	Mud/Goose	1287	1.107	Leech Inflow	Leech Outflow + Local Flow
10	Miss/Leech Conf	2899	1.113	Winni + Leech Inflows	Winni + Leech Outflows + Local Flow
11	Miss/Ball Club Conf	2945	0.515	Poke Inflow - (Leech + Winni Outflow)	Winni + Leech Outflows + Local Flow
12	Ball Club (46.5)	2945			
13	White Oak	3031	0.645	Poke Inflow - (Leech + Winni Outflow)	Winni + Leech Outflows + Local Flow
14	Little White Oak	3042	0.662	Poke Inflow - (Leech + Winni Outflow)	Winni + Leech Outflows + Local Flow
15	Day High Landing Gage	3050	0.674	Poke Inflow - (Leech + Winni Outflow)	Winni + Leech Outflows + Local Flow
16	<b>Pokegama Dam</b>	<b>3265</b>			
17	Blandin Dam/Gr Rapids	3370	1.032	Poke Inflow	Poke Outflow + Local Flow
18	Lawrence Lake	-			
19	Prairie Lake Dam	519			
20	Miss/Praire R Conf	3859	0.331	Libby Flow - PokeOutflow	Poke Outflow + Local Flow
21	<b>Big Sandy</b>	<b>421</b>			
22	<b>Miss at Libby</b>	<b>5060</b>			
23	Aitkin Divn (begin)	5960	0.833	Aitkin Flow - Libby Flow	Libby Flow + Local Flow
24	<b>Aitkin</b>	<b>6140</b>			
25	Aitkin Divn (end)	6247	1.099	Aitkin Flow	Local Flow
26	<b>Pine River Dam</b>	<b>562</b>			
27	Big Pine Lake	576	1.025	Pine River Inflow	Pine Outflow + Local Flow
28	Miss/Pine R Conf	7135	0.182	Royalton Flow - Aitkin Flow	Aitkin Flow + Local Flow
29	Brainerd/Potlatch Dam	7320	0.216	Royalton Flow - Aitkin Flow	Aitkin Flow + Local Flow
30	<b>Gull Lake Dam</b>	<b>287</b>			
31	Gull/Crow Wing R Conf	3687			
32	Miss/Crow Wing R Conf	11037	0.897	Royalton Flow - Aitkin Flow	Aitkin Flow + Local Flow
33	Little Falls Dam	11520	0.985	Royalton Flow - Aitkin Flow	Aitkin Flow + Local Flow
34	<b>Royalton</b>	<b>11600</b>			
35	Sartell	12680	0.144	Anoka Flow - Royalton Flow	Royalton Flow + Local Flow
36	St Cloud	13320	0.229	Anoka Flow - Royalton Flow	Royalton Flow + Local Flow
37	Monticello	13740	0.285	Anoka Flow - Royalton Flow	Royalton Flow + Local Flow
38	Elk River	14410	0.375	Anoka Flow - Royalton Flow	Royalton Flow + Local Flow
39	<b>Anoka</b>	<b>19100</b>			
40	Coon Rapids Dam	19220	0.007	St Paul Flow - Anoka Flow	Anoka Flow + Local Flow
41	Brooklyn Center	19560	0.026	St Paul Flow - Anoka Flow	Anoka Flow + Local Flow
42	USAF Dam	19680	0.033	St Paul Flow - Anoka Flow	Anoka Flow + Local Flow
43	L/D No1	19680	0.033	St Paul Flow - Anoka Flow	Anoka Flow + Local Flow
44	High Br. Power Plant	36800	1.000	Same as St. Paul	Same as St. Paul
45	<b>St. Paul</b>	<b>36800</b>			
46	Metro Waste	36800		Same as St. Paul	Same as St. Paul

# Lake Winnibigoshish Discharge Hydrographs

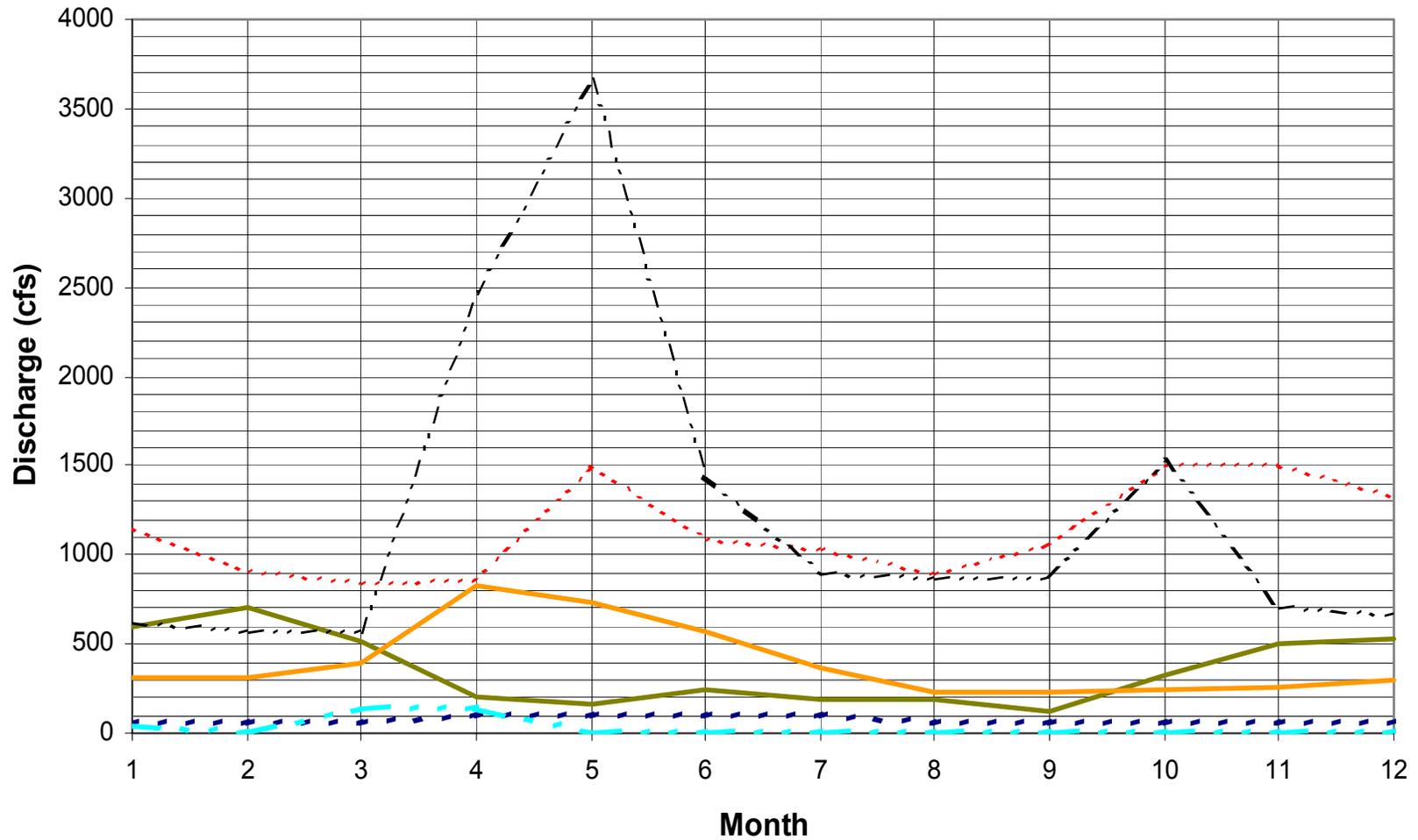


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# Lake Winnibigoshish Elevation Hydrographs

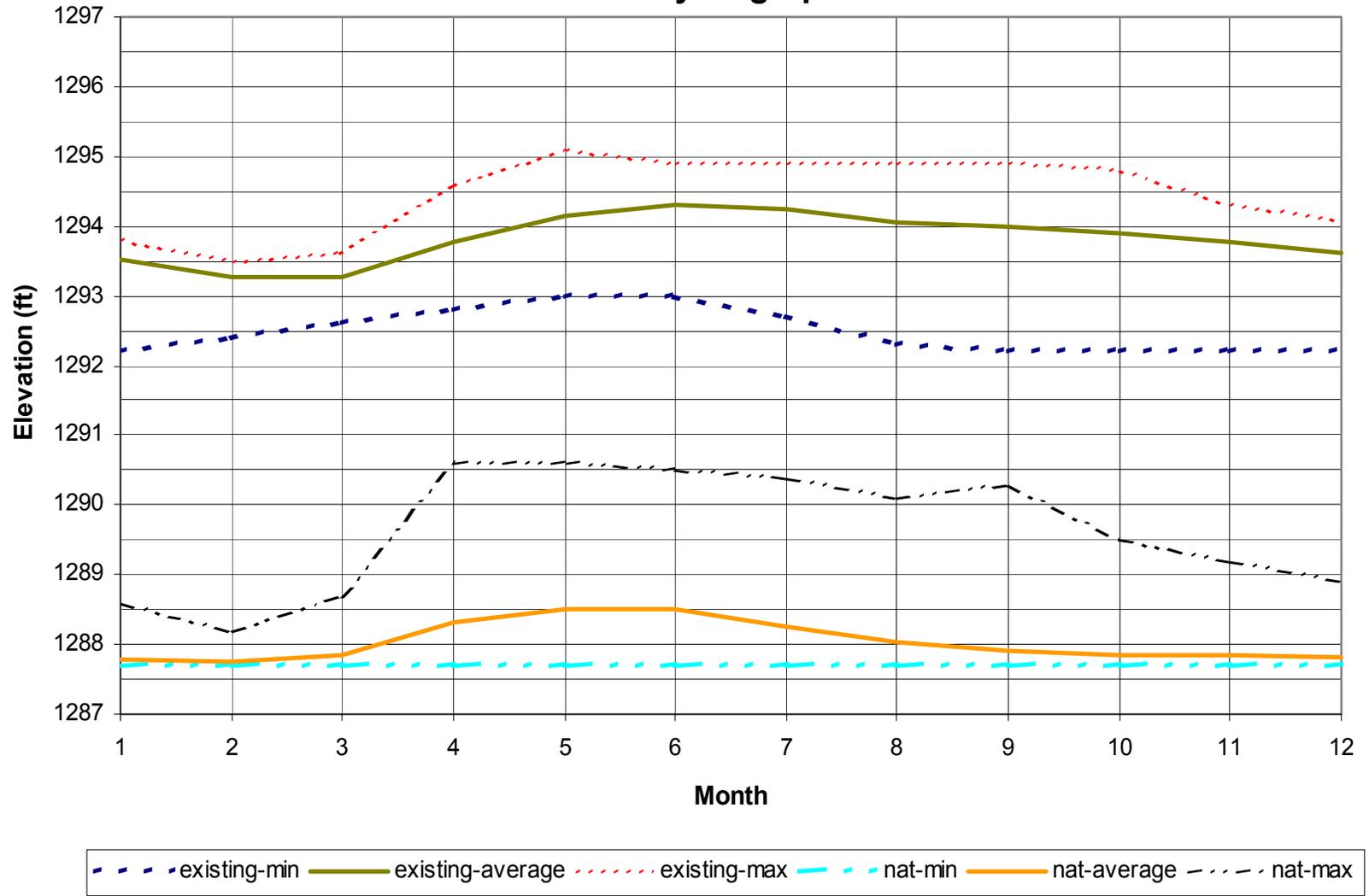


# Leech Lake Discharge Hydrographs

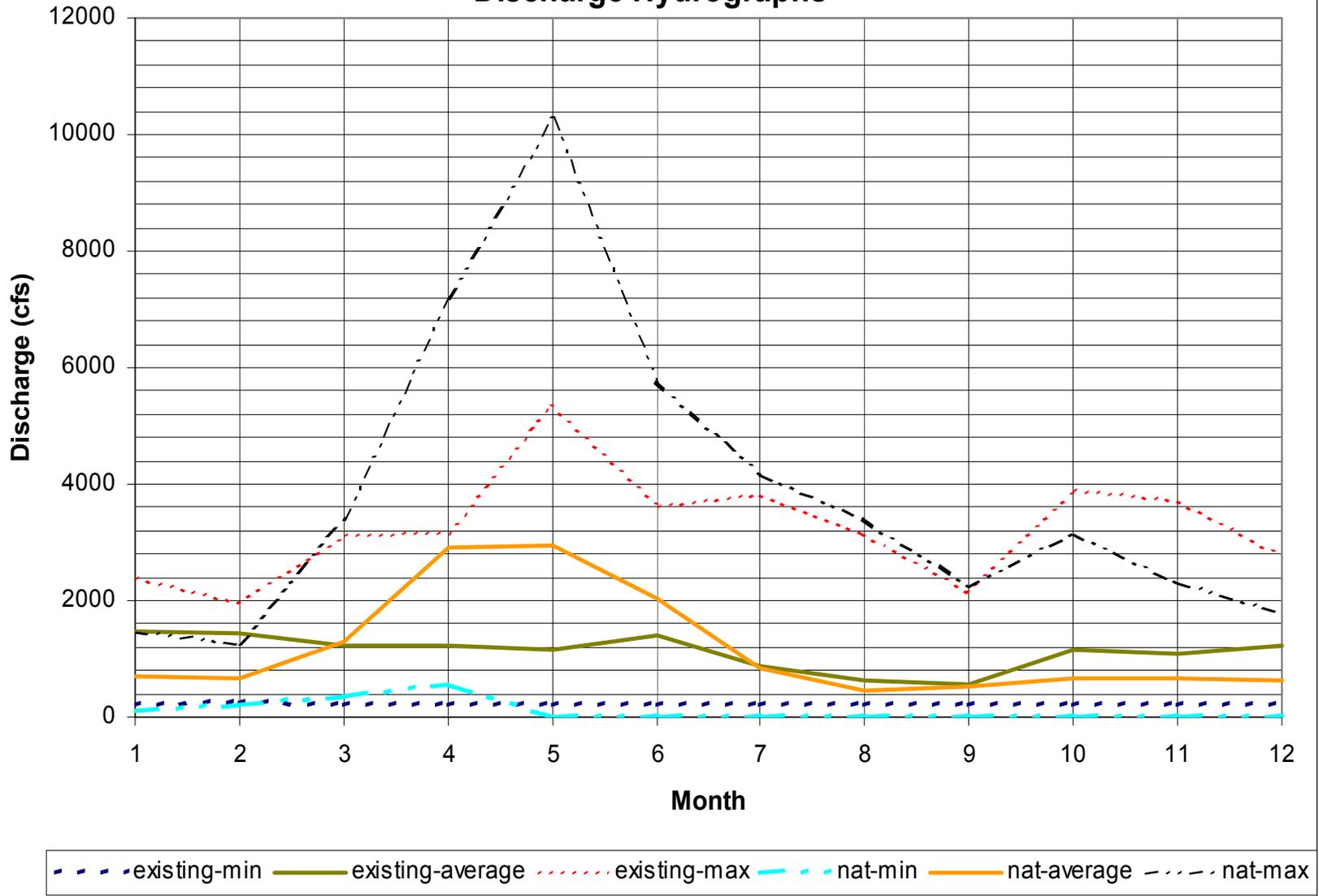


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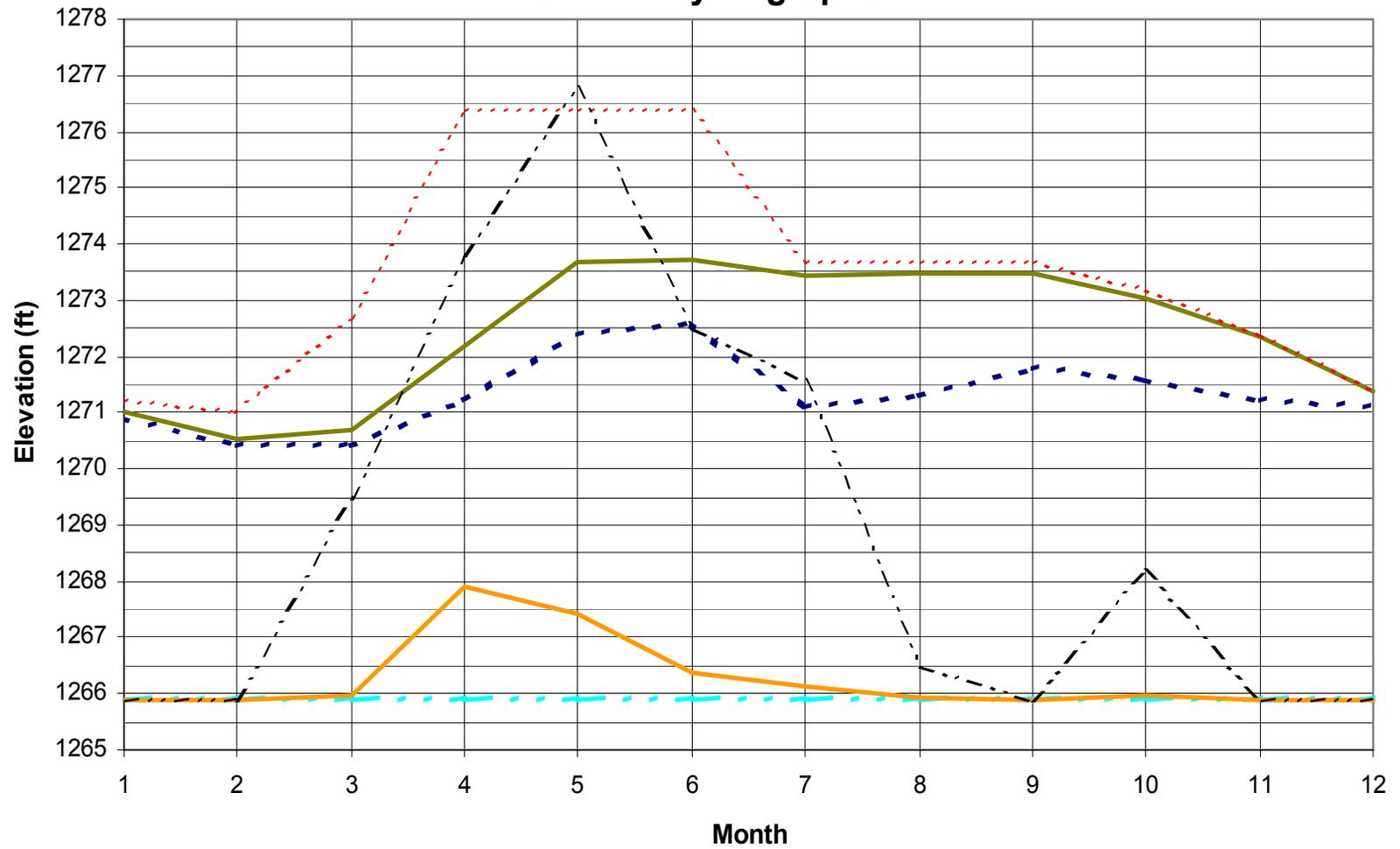
# Leech Lake Elevation Hydrographs



# Pokegama Lake Discharge Hydrographs

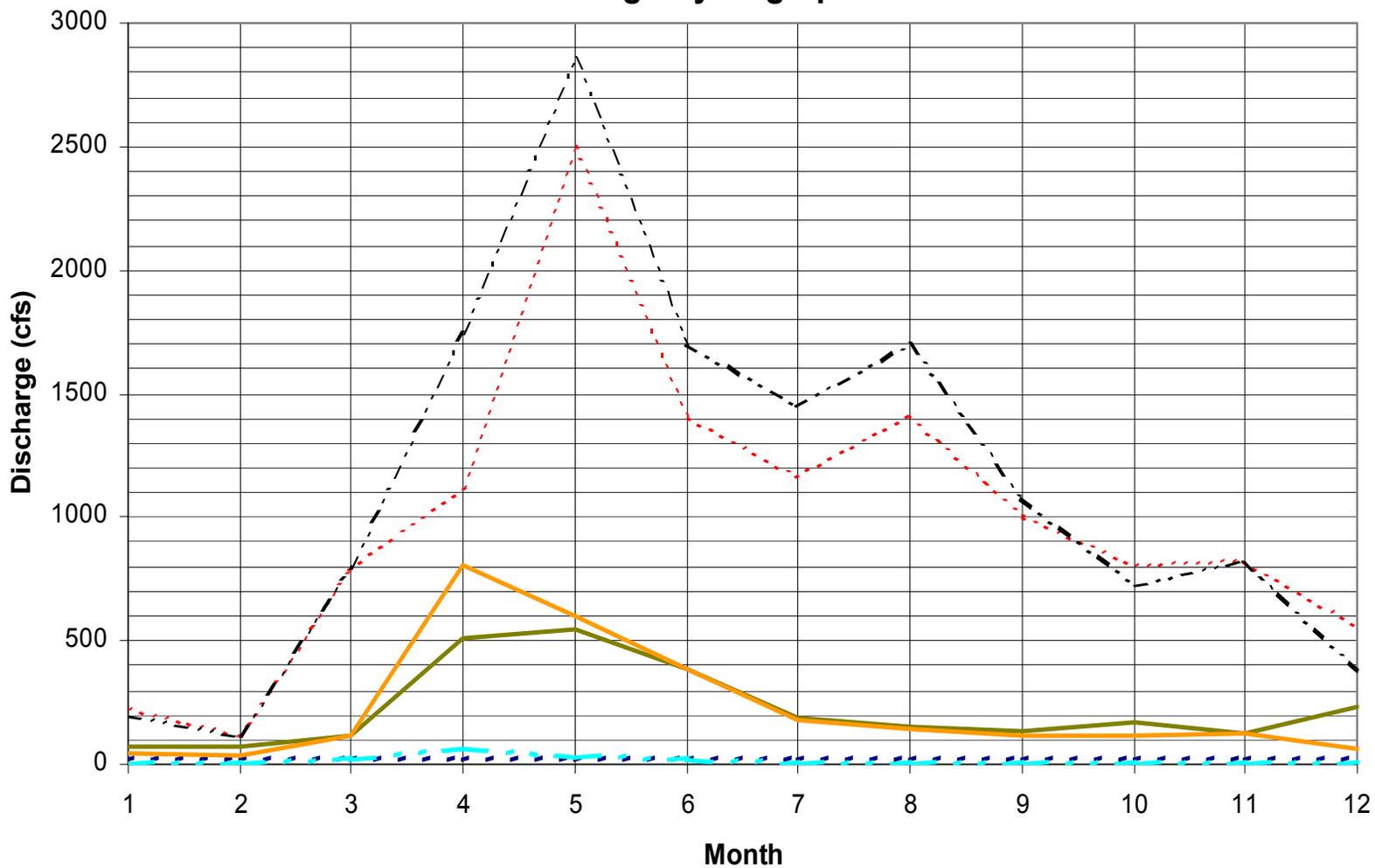


# Pokegama Lake Elevation Hydrographs



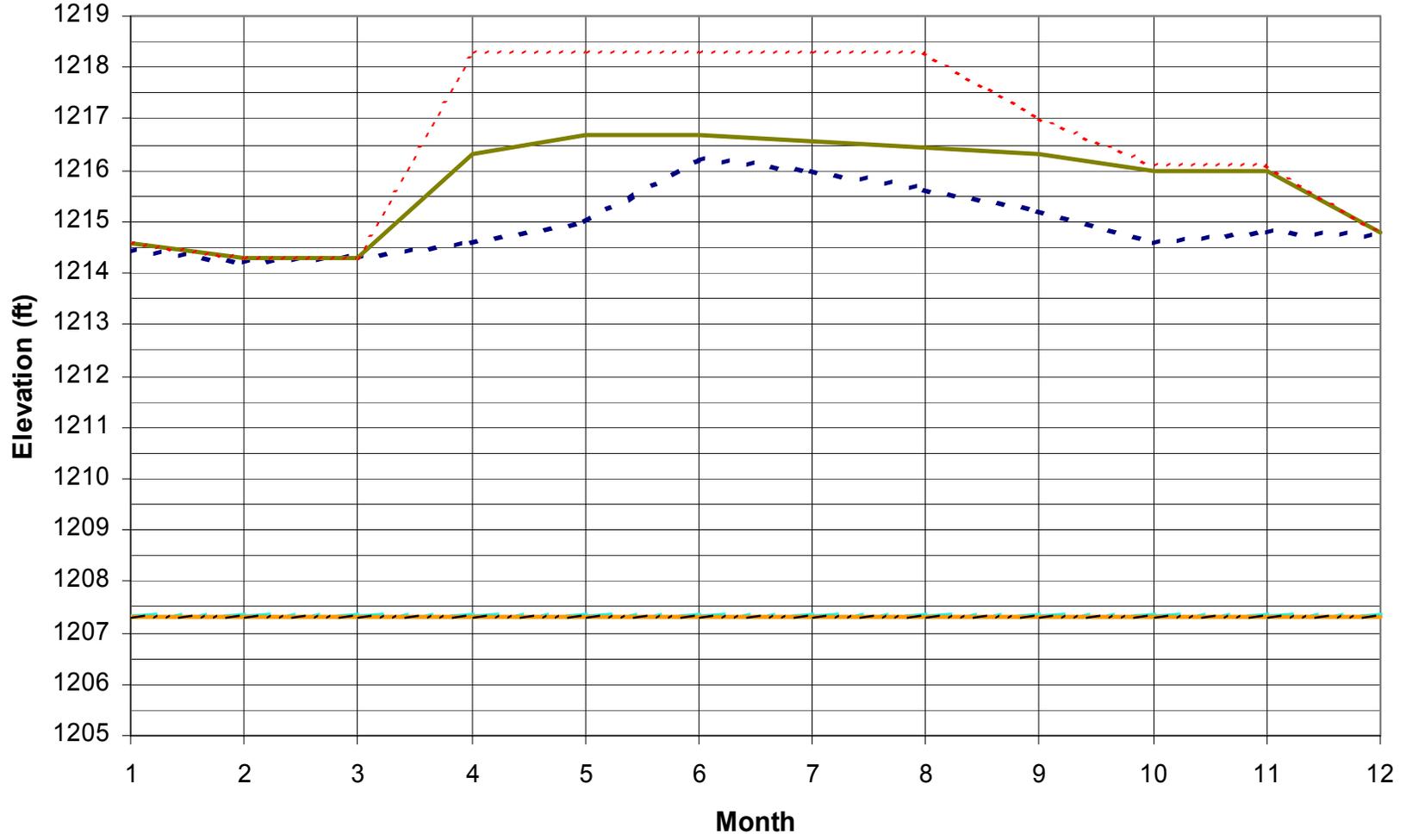
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# Sandy Lake Discharge Hydrographs



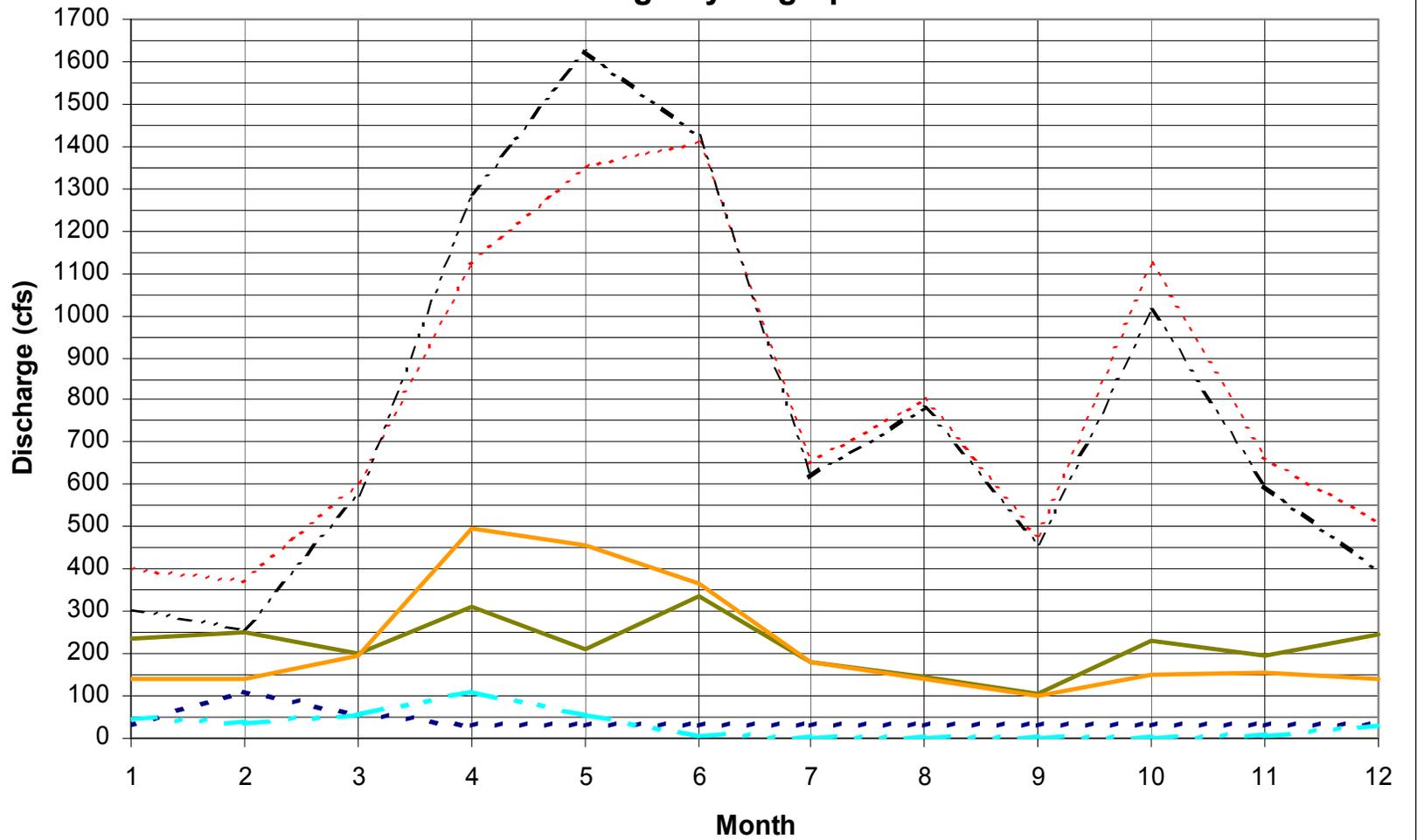
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# Sandy Lake Elevation Hydrographs



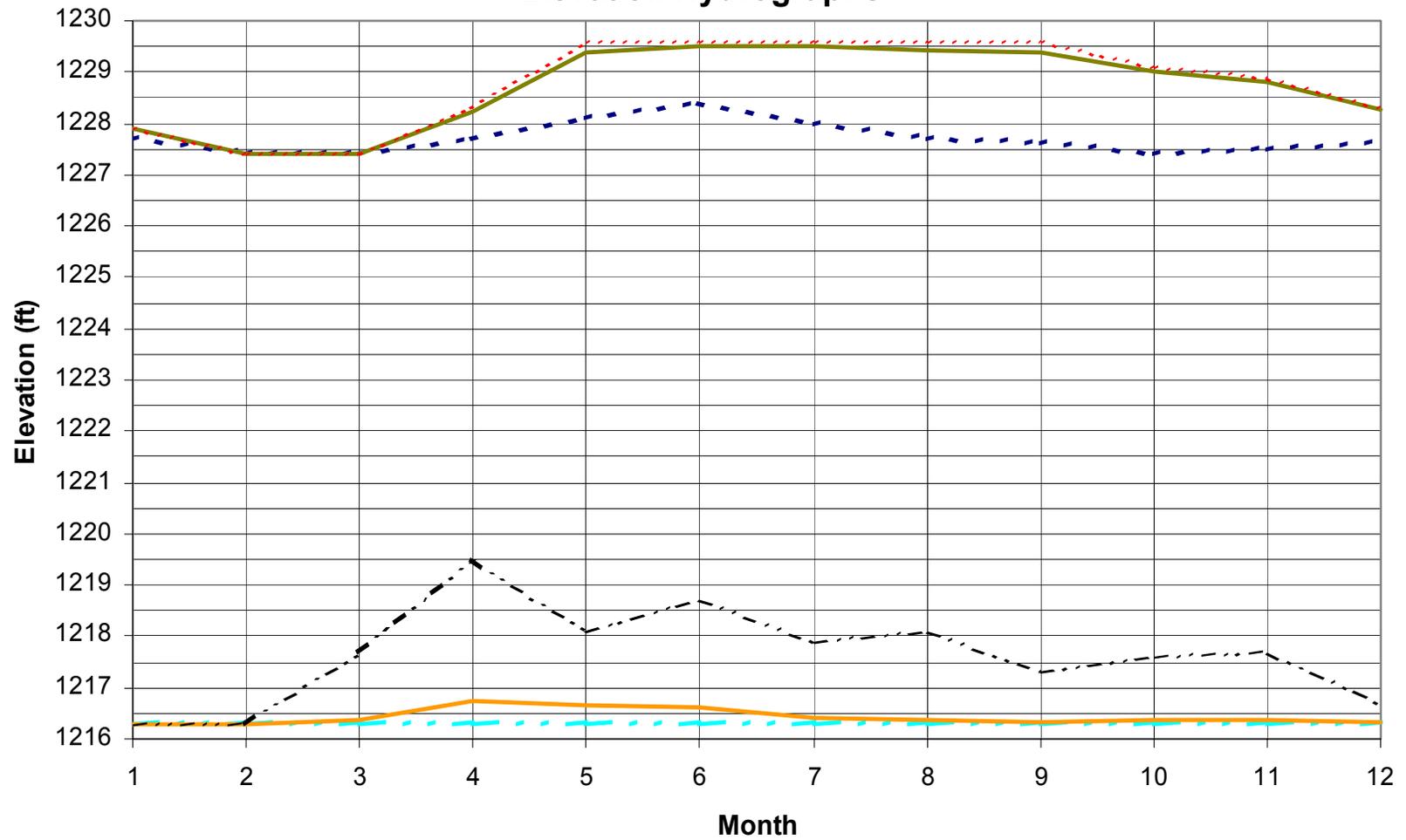
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## Cross Lake Discharge Hydrographs



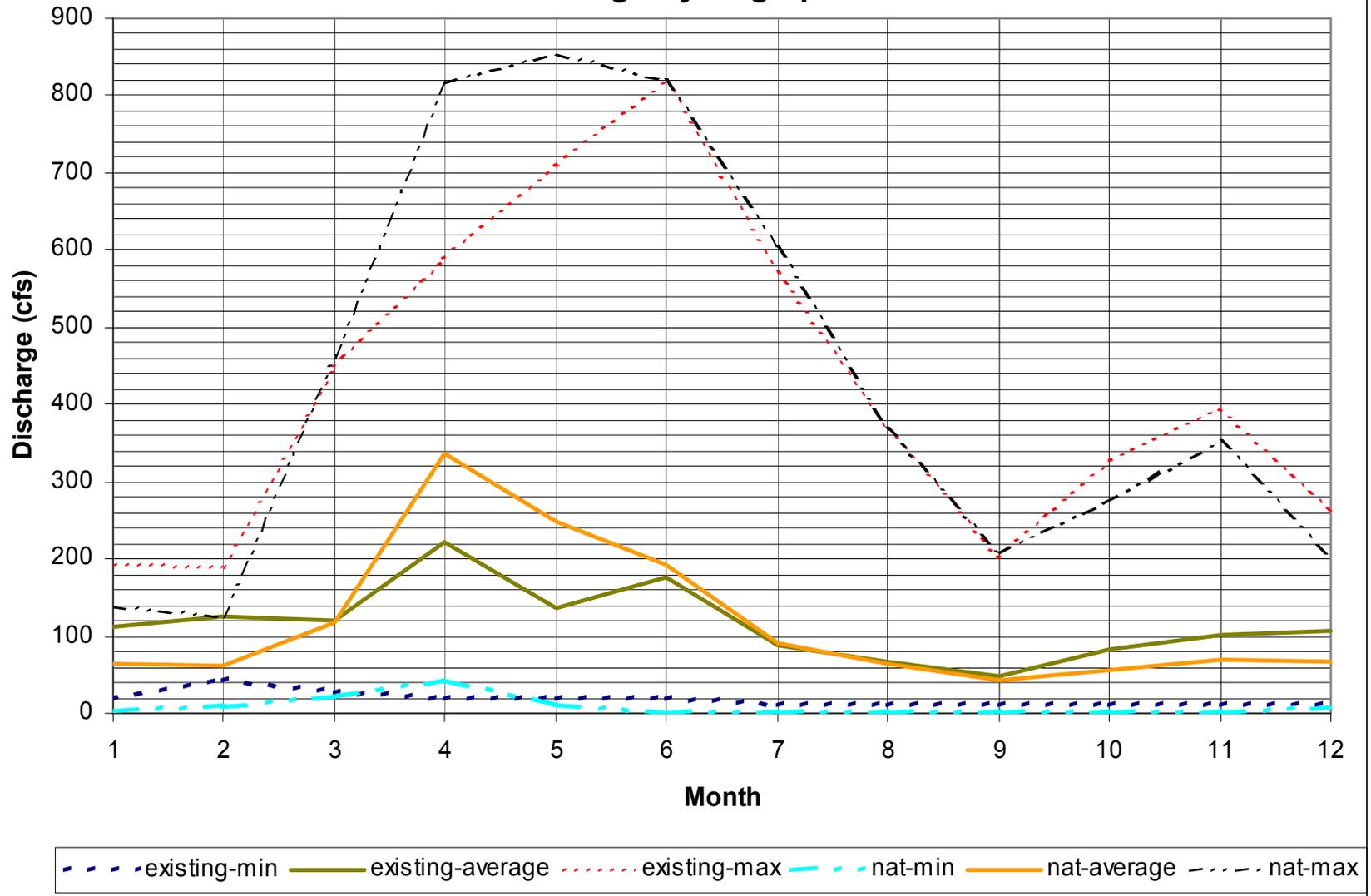
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## Cross Lake Elevation Hydrographs

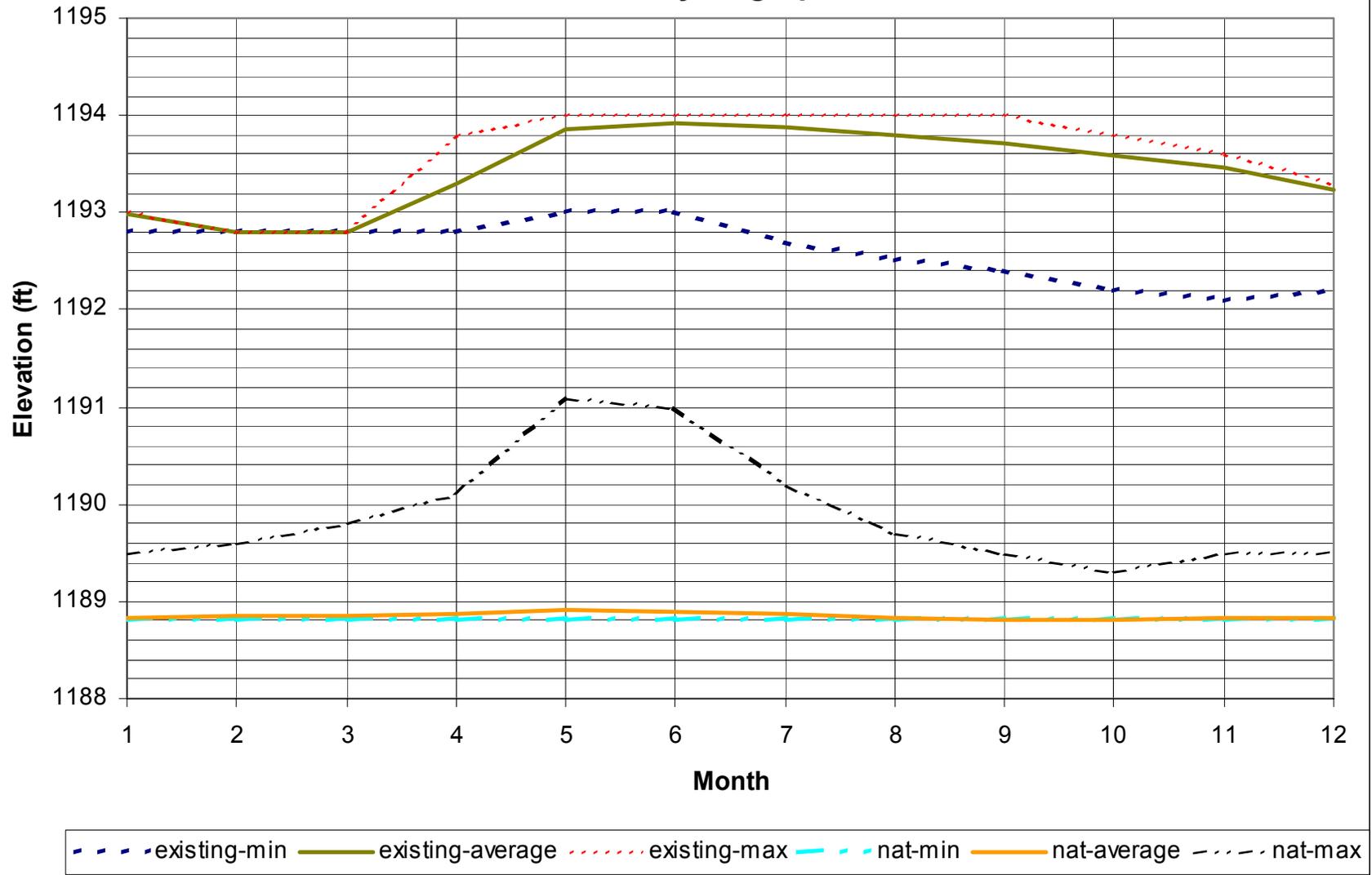


existing-min existing-average existing-max nat-min nat-average nat-max

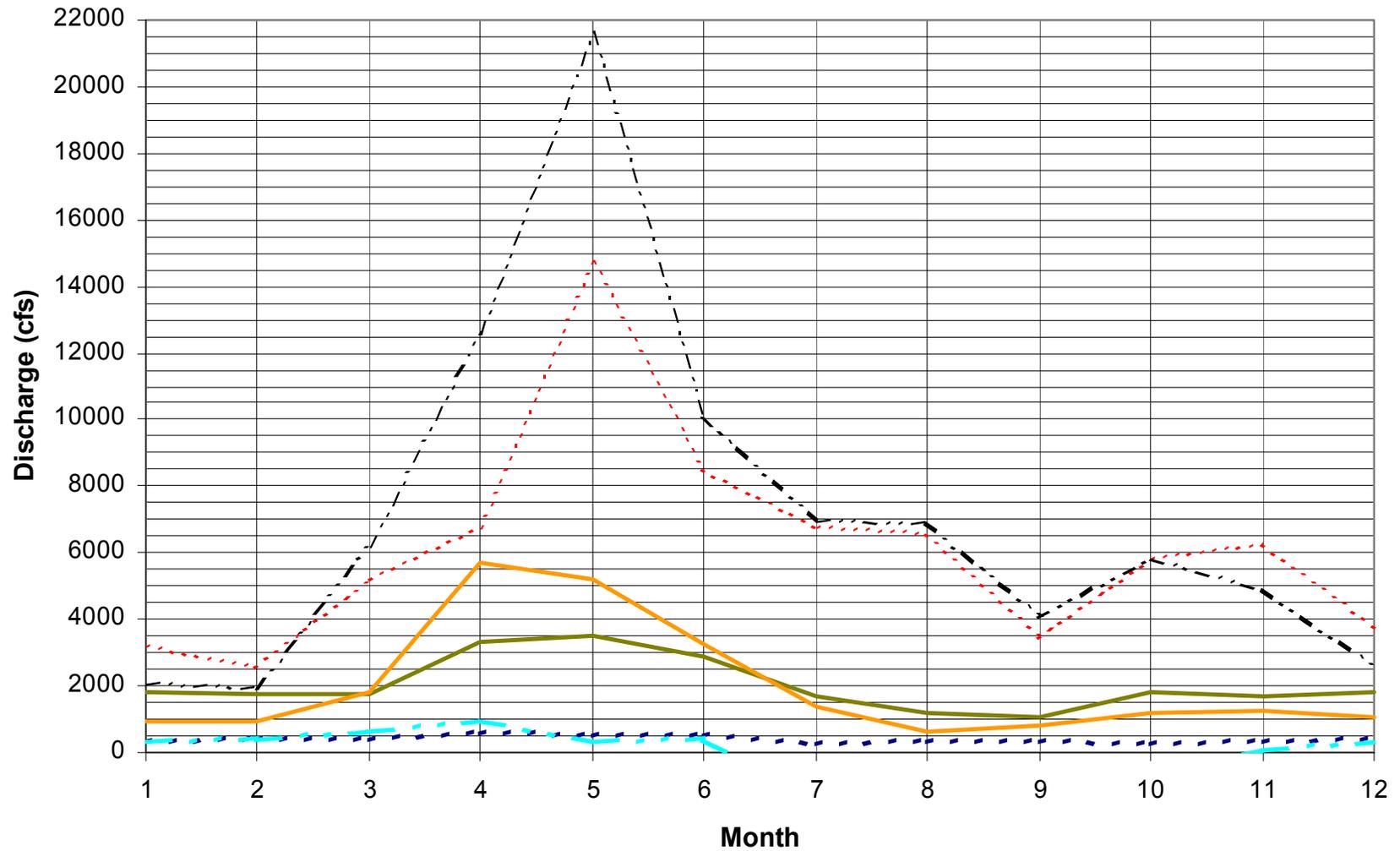
# Gull Lake Discharge Hydrographs



# Gull Lake Elevation Hydrographs

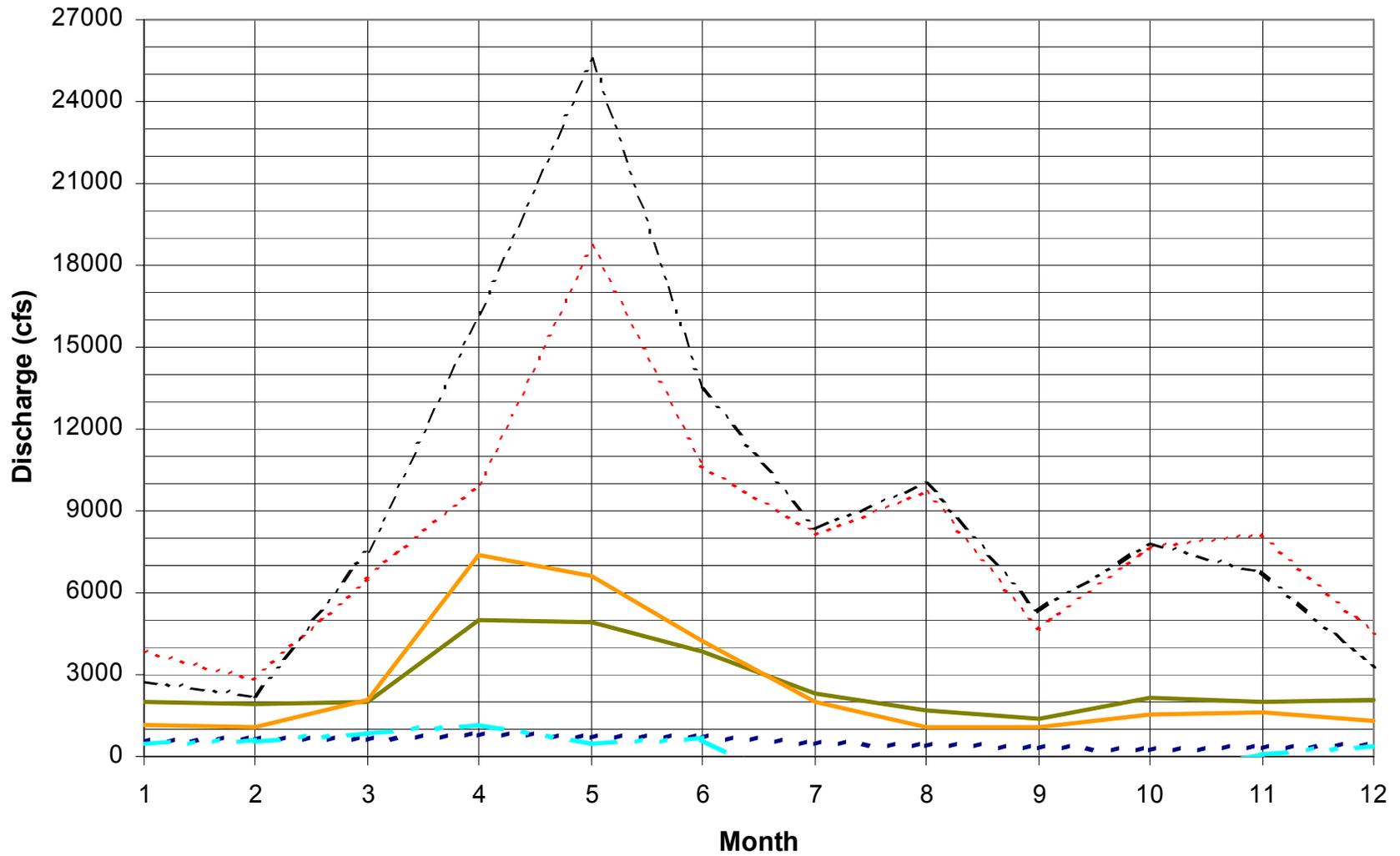


# Libby - Discharge Hydrographs



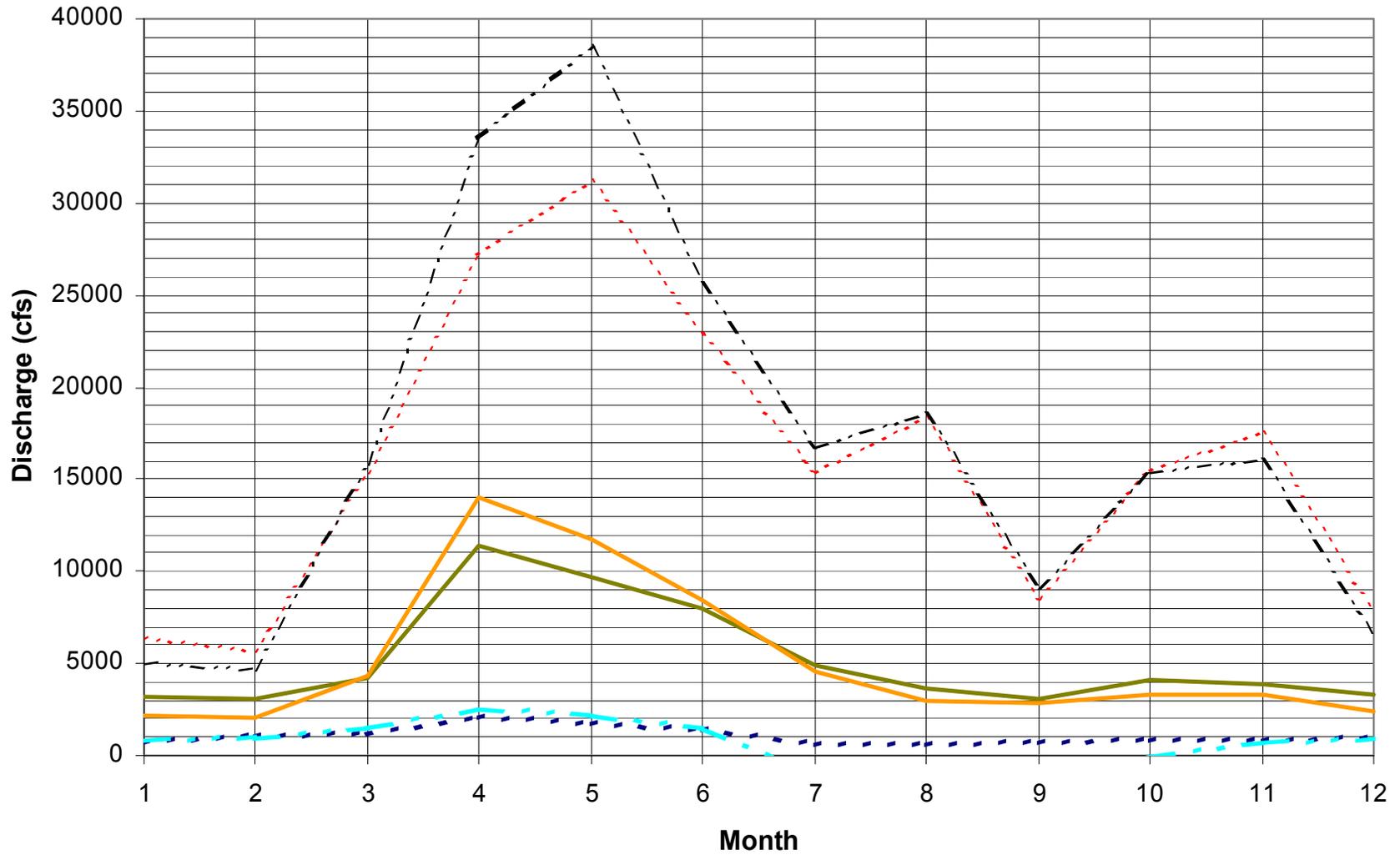
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# Aitkin - Discharge Hydrographs



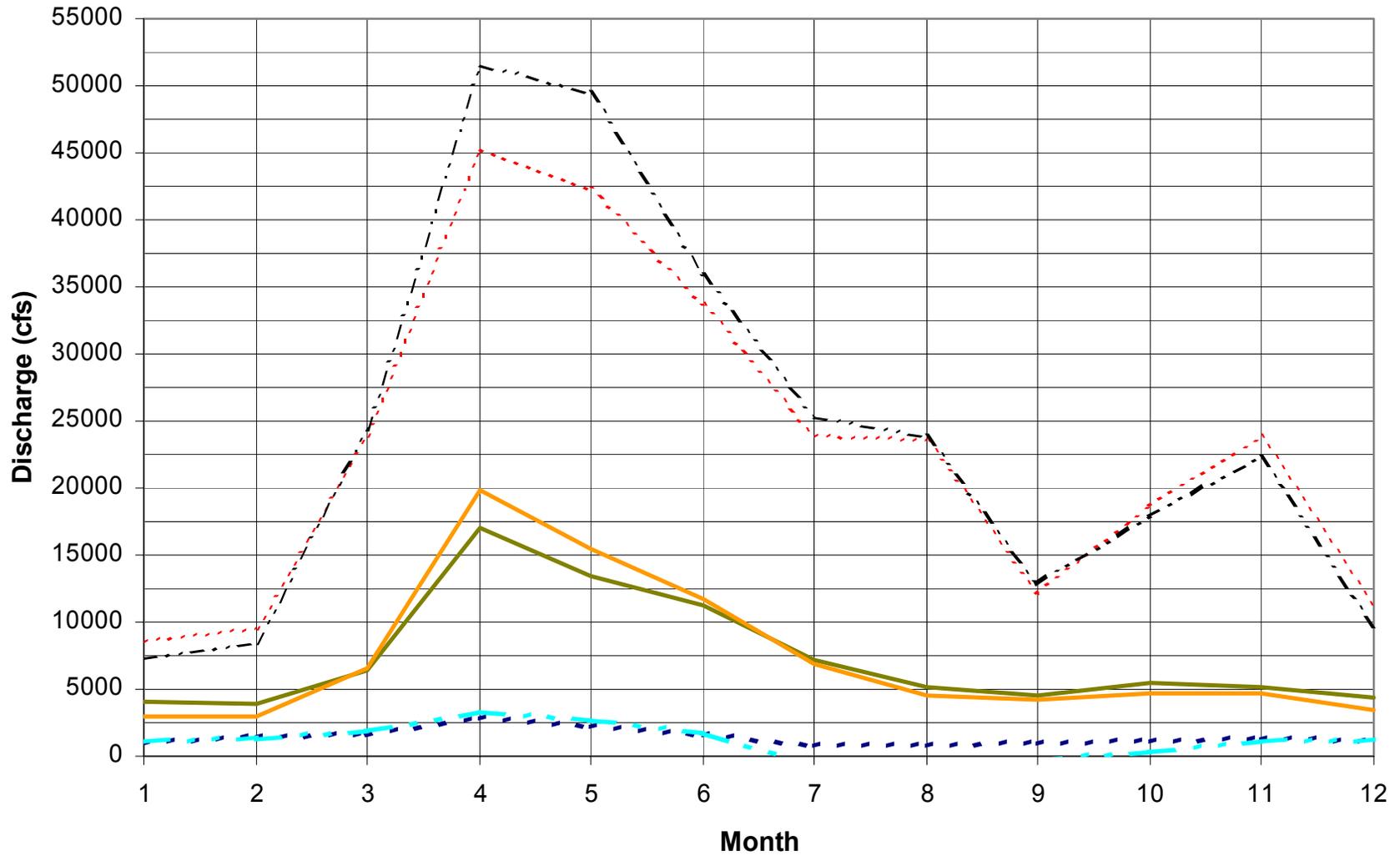
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# St. Cloud - Discharge Hydrographs



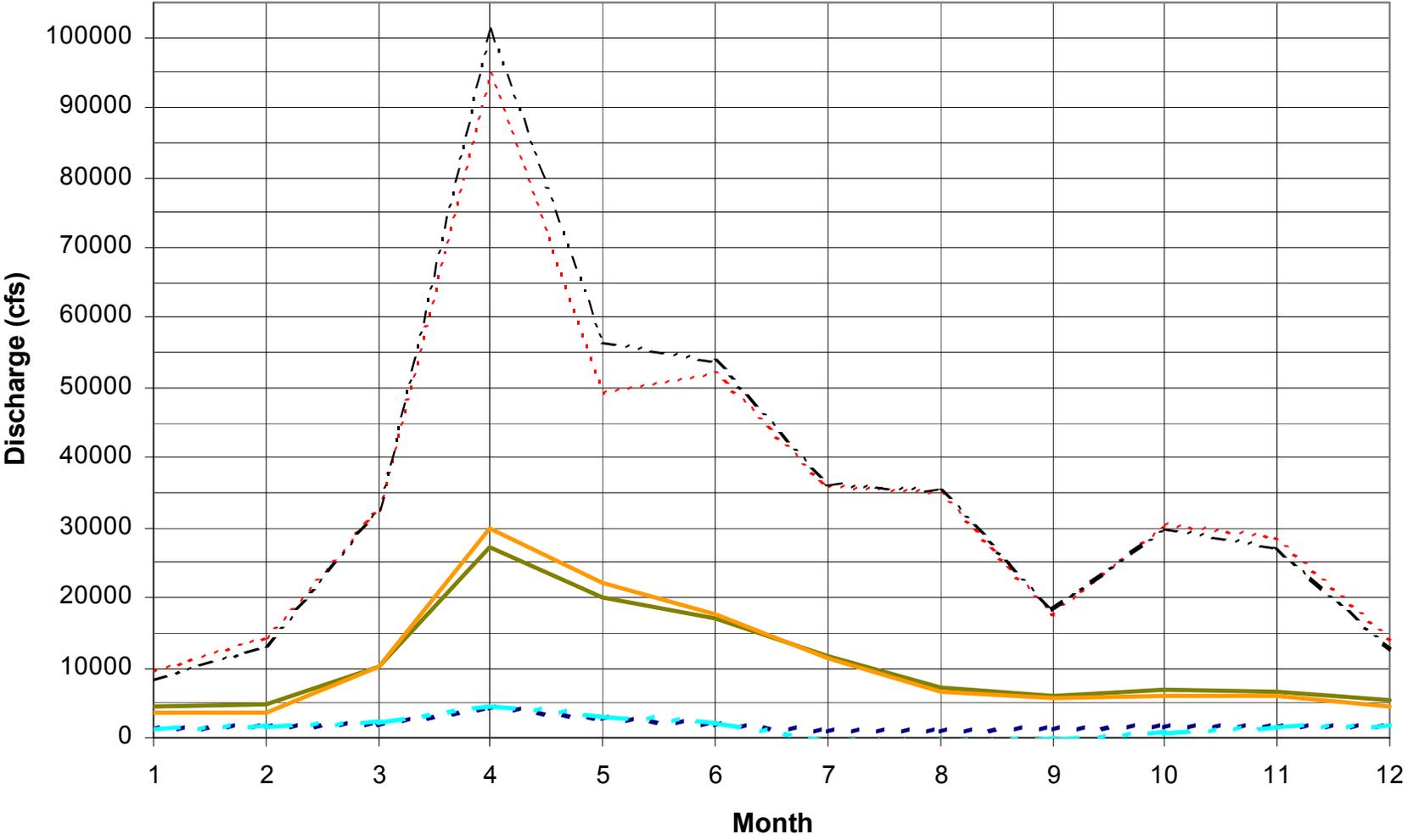
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# Anoka - Discharge Hydrographs



existing-min existing-average existing-max nat-min nat-average nat-max

# St. Paul - Discharge Hydrographs



existing-min existing-average existing-max nat-min nat-average nat-max