Balancing the Water Needs of Coho, Suckers and Agriculture with The Klamath Basin Planning Model

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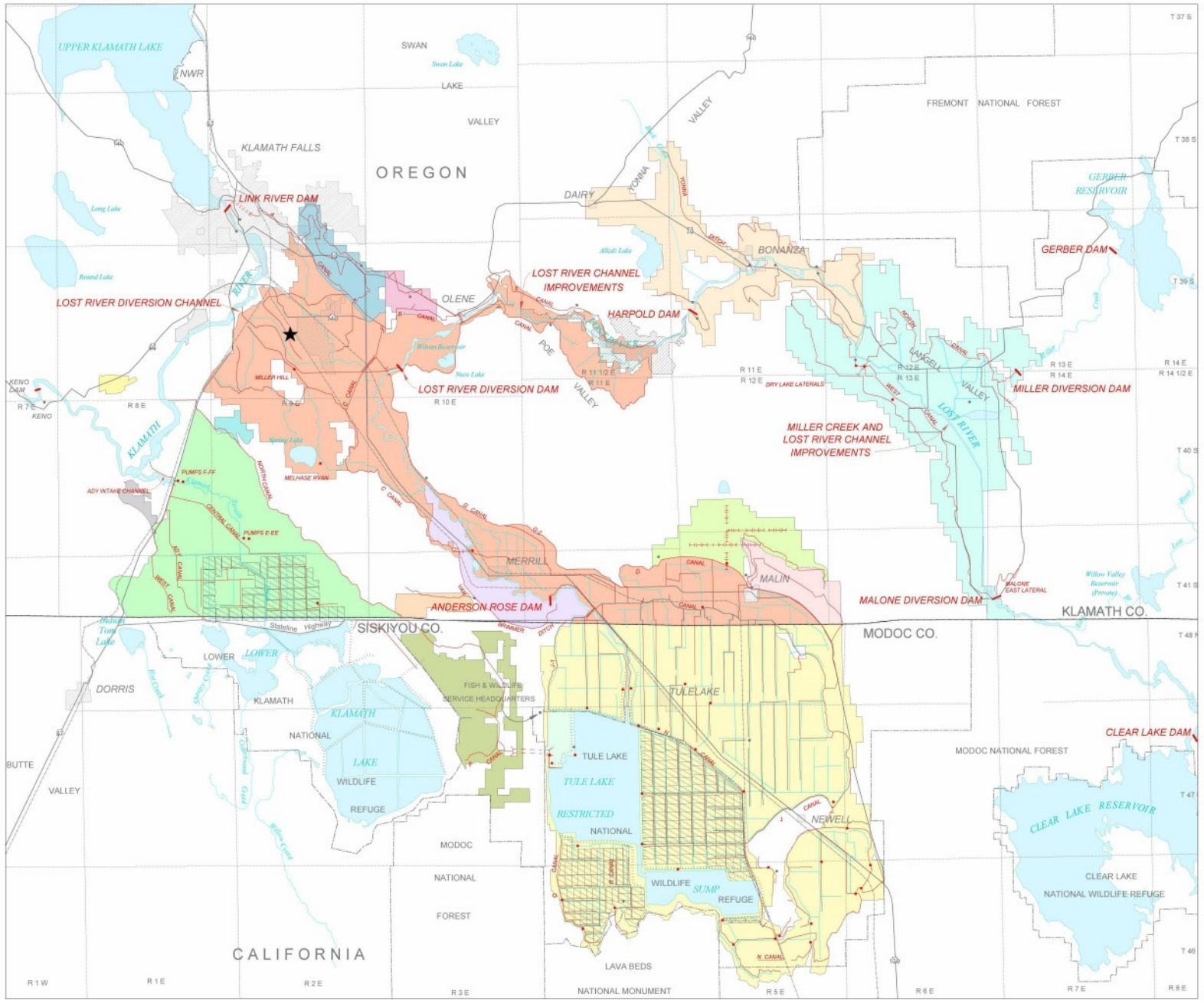
California Water and Environmental Modeling Forum
April 4, 2022


Klamath River Coho Salmon


Upper Klamath Lake Suckers


Klamath Project Potatoes


Suckers
Salmon
Irrigated Land
Pacificorp
Pacific Ocean
Coquille
Roseburg
North Umpqua
DOUGLAS COUNTY
Myrtle Creek
Chemult
LAKE COUNTY
Crater Lake
Klamath Marsh
Williamson
Sycan Marsh
Summer Lake
KLAMATH COUNTY
Sycan
Wood
Sprague
N. Fork
Bly
Agency Lake
Upper Klamath Lake
S. Fork
Lake Abert
Klamath Falls
Link River
J.C. Boyte Dam
Keno Dam
Gerber Res.
Goose Lake
Rogue
JOSEPHINE COUNTY
CURRY COUNTY
Grants Pass
Medford
Illinois
Applegate
Ashland
Jenny Cr.
Brookings
Smith
Iron Gate Dam
Copco 1 Dam
Copco 2 Dam
Meiss Lake
Tule Lake
Willow Cr.
Fletcher Cr.
Klamath
Happy Camp
Clear Cr.
Crescent City
DEL NORTE COUNTY
Elk Cr.
Yreka
Little Shasta
Butte Cr.
Clear Lake Reservoir
Fort Jones
Moffett Cr.
Shasta
Scott
SISKIYOU COUNTY
MODOC COUNTY
Alturas
Klamath
Blue Cr.
Wooley Cr.
Weed
Mt. Shasta
Orleans
N. Fork
Salmon
South Fork
Red Cap Cr.
E. Fork
McCloud
New
North Fork
Mad
Eureka
Weaverville
Trinity Dam
Lewiston Dam
Diversion Tunnel
HUMBOLDT COUNTY
Trinity
TRINITY COUNTY
SHASTA COUNTY
Redding
Fortuna
South Fork
Hayfork Cr.
Eel
Sacramento
Red Bluff
0 10 20 30 40 miles
Eugene
OR
Redding
NV
CA
Sacramento
San Francisco



LOCATION MAP

FEATURES:
- Hydrography
- Canal
- Drain
- Dike
- Tunnel
- Flume
- Siphon
- Pipeline
- Drop
- Pumping Plant
- Irrigation District Pumping Plant
- Private Utility Powerplant
- Project Headquarters
- Project Land Lease Area

MAJOR WATER DISTRICTS:
- Ady Dist. Improv. Co.
- Enterprise I.D.
- Horsefly I.D.
- Klamath Drain. Dist.
- Klamath I.D.
- Langell Valley I.D.
- Malin I.D.
- Midland Dist. Improv. Co.
- P Canal Mutual Water Co.
- Pine Grove I.D.
- Pioneer Dist. Improv. Co.
- Plevna Dist. Improv. Co.
- Poe Valley Improv. Dist.
- Shasta View I.D.
- Sunnyside I.D.
- Tulelake I.D.
- Van Brimmer Ditch Co.
- Westside Improv. Dist.

KLAMATH PROJECT

Oregon - California

N

0 1 2 3 4 5 Miles

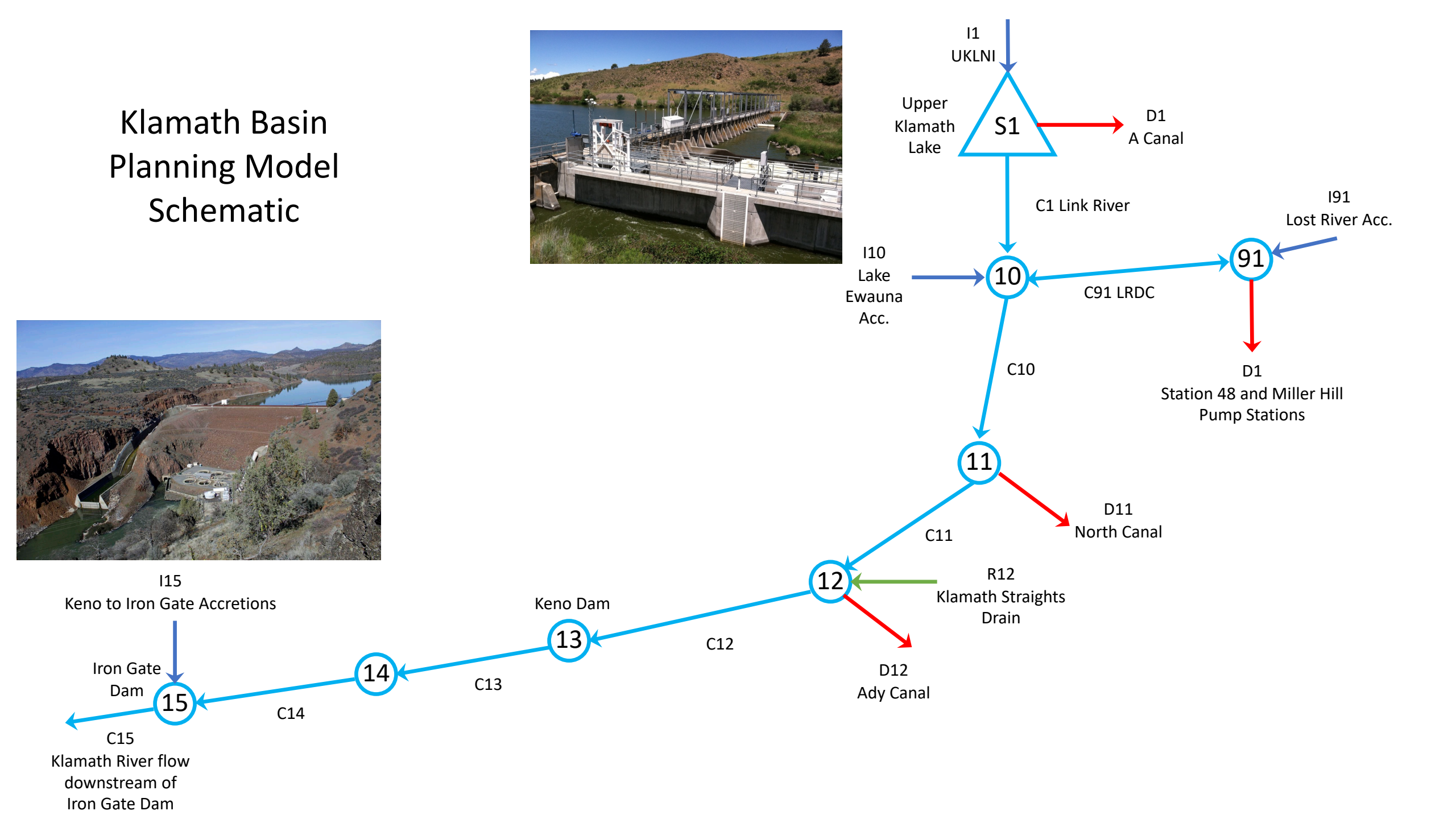
Klamath Project Details

- Approximately 200,000 acre-feet irrigated farmland
- Historical Ag diversions (prior to regulation) varies from 350,000 acre-feet to 450,000 acre-feet per year
- Two National Wildlife Refuges: Tule Lake and Lower Klamath
- Upper Klamath Lake water surface elevations are maintained between 4,138 feet and 4,143.3 feet MSL. This provides an operable storage capacity of 430,000 acre-feet.
- Five gaged points of diversion: A Canal, Station 48 PP, Miller Hill PP, North Canal, and Ady Canal

Klamath Basin Planning Model

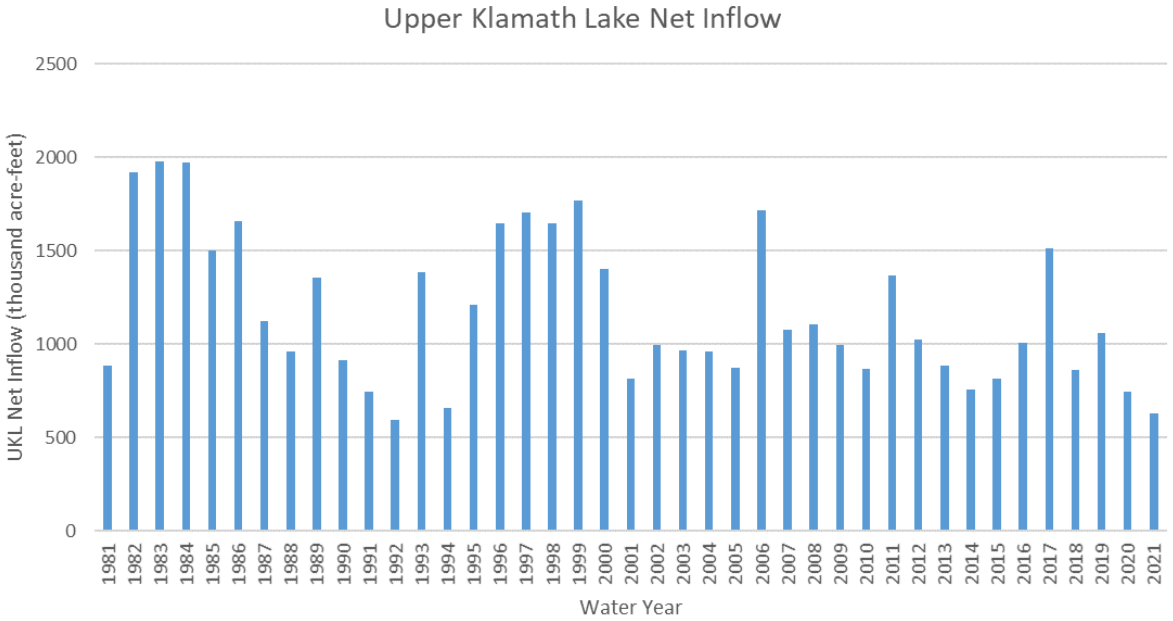
- WRIMS based water supply planning model
- Daily timestep
- First version of the daily timestep model was developed by Nancy Parker and Kristin White around 2011
- Historic hydrologic input over period of record (WY 1981-present)
- Models Klamath Project operations from Upper Klamath Lake to resulting Klamath River flow downstream of Iron Gate Dam

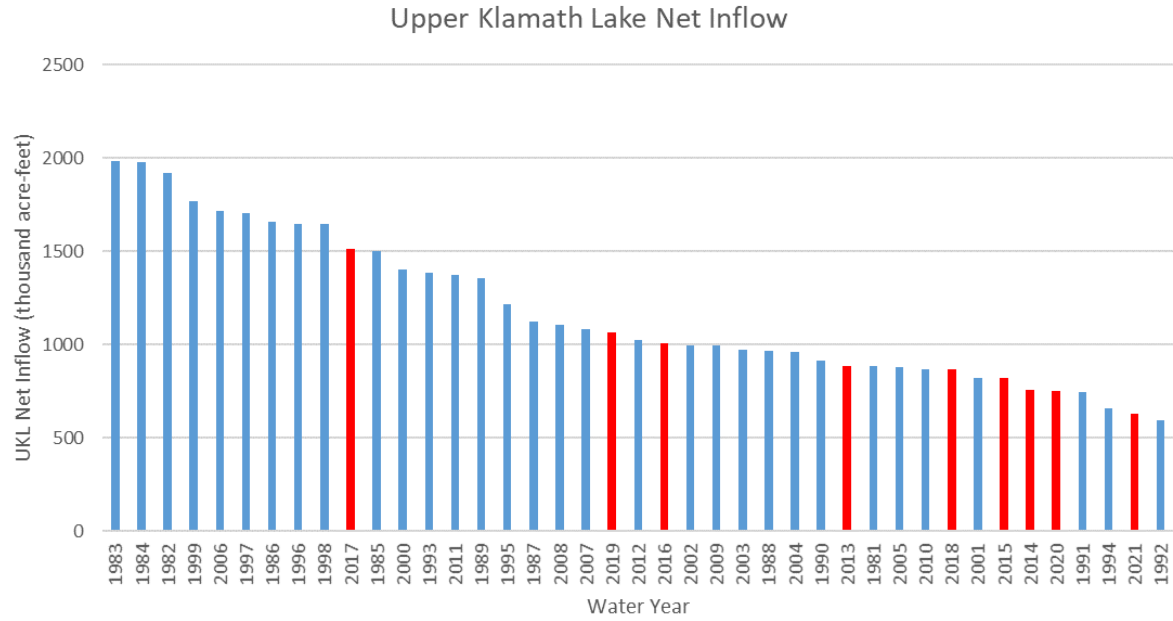
Klamath Basin Planning Model Schematic



KBPM Developed to Support Klamath Project ESA Analysis

- 2013 NMFS and FWS Biological Opinions
  - Placed first nominal upper bound on project surface water supply that varied with hydrologic conditions
- 2016 Update to Biological Opinions
  - Add 20,000 acre-feet to spring Klamath River flow depending on hydrologic conditions, tested first surface flushing
- 2018 Court Injunction of NMFS Biological Opinion
  - Mandated surface flushing flow and dilution flow
- 2019 NMFS and FWS Biological Opinions
  - Klamath River surface flushing flow included
- 2020 Interim Operations Plan
  - Increase spring flow augmentation from 20,000 acre-feet to 60,000 acre-feet depending on hydrologic conditions


Upper Klamath Lake Net Inflow
UKL Net Inflow (thousand acre-feet)
2500
2000
1500
1000
500
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Water Year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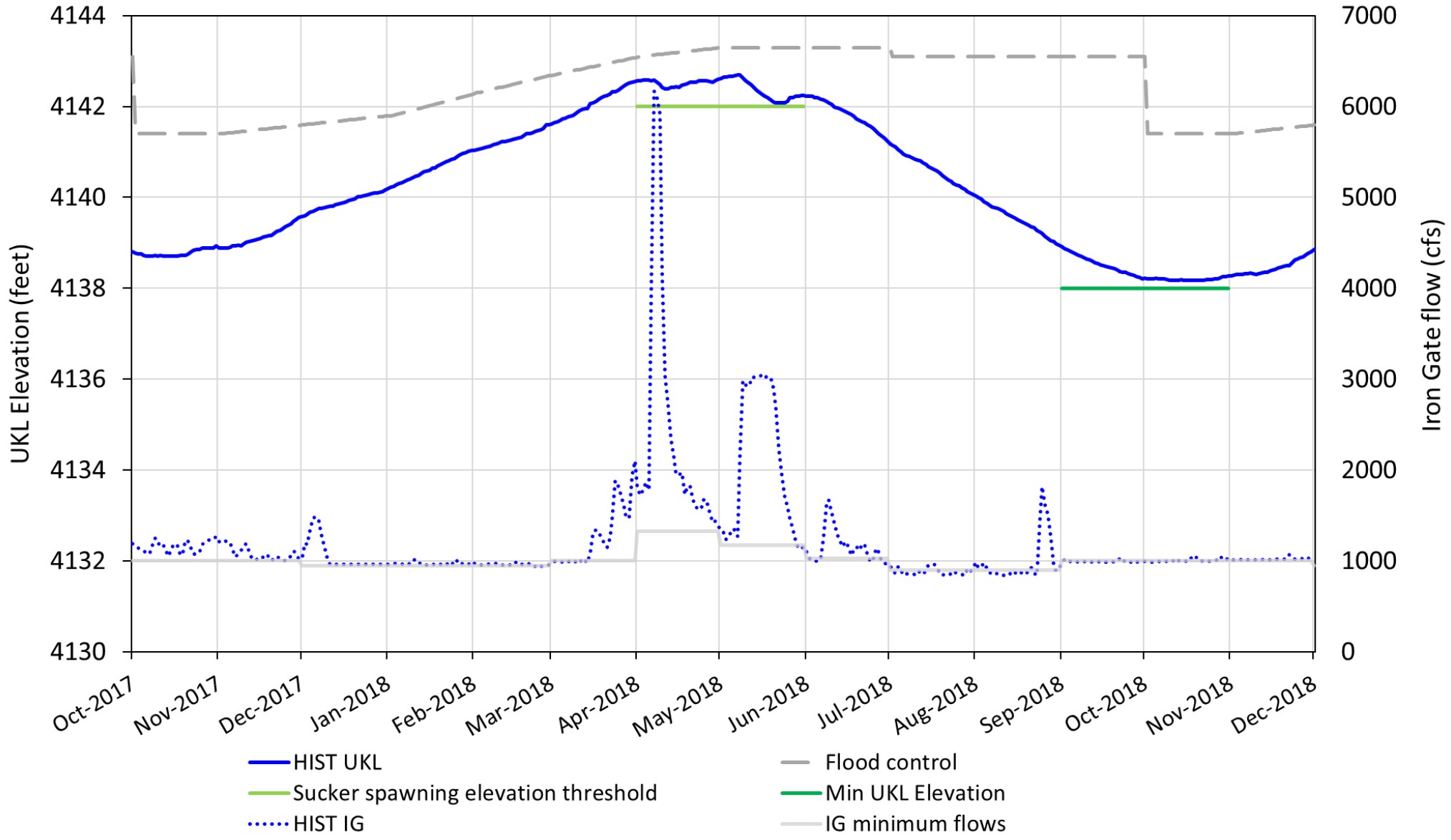
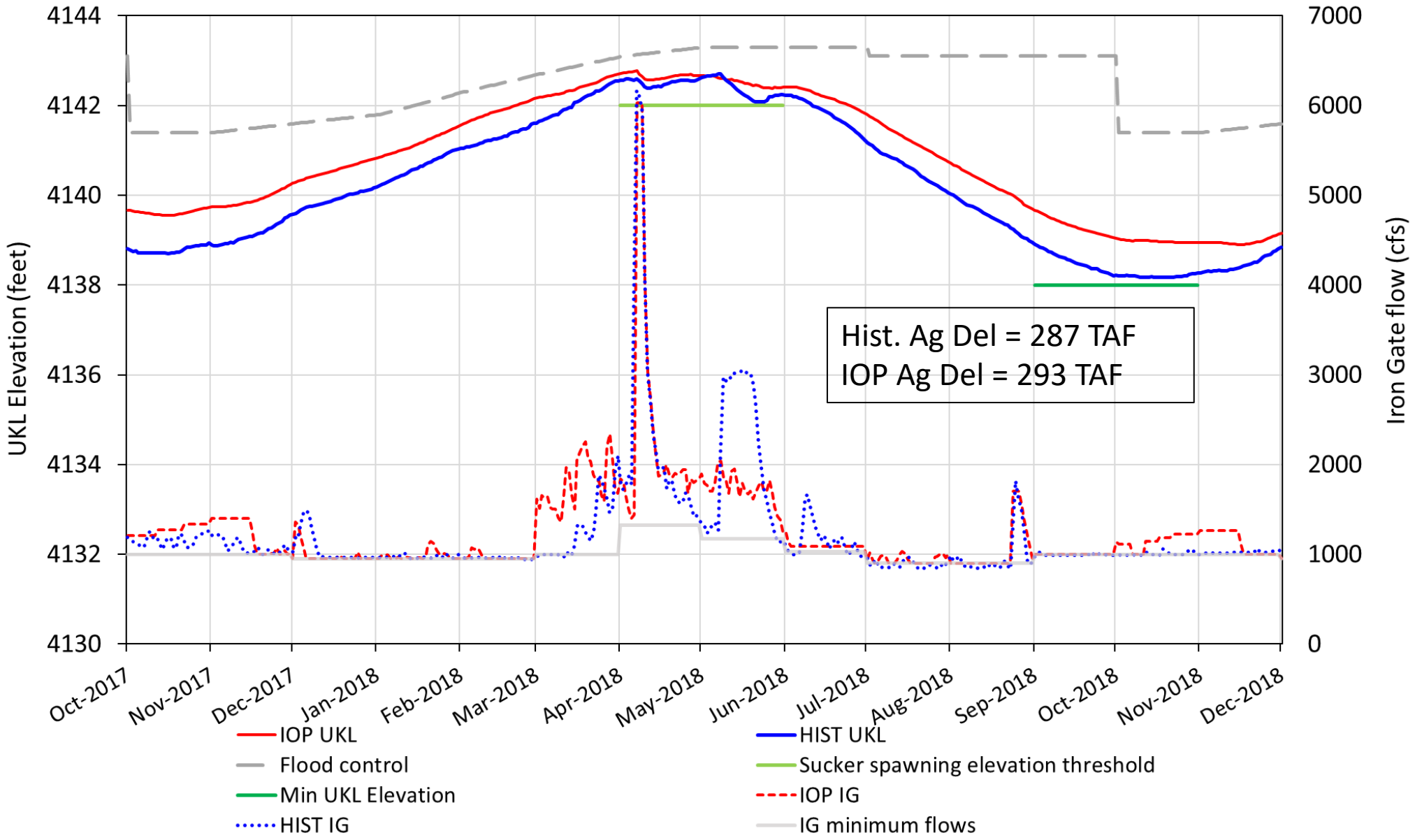
Water Year

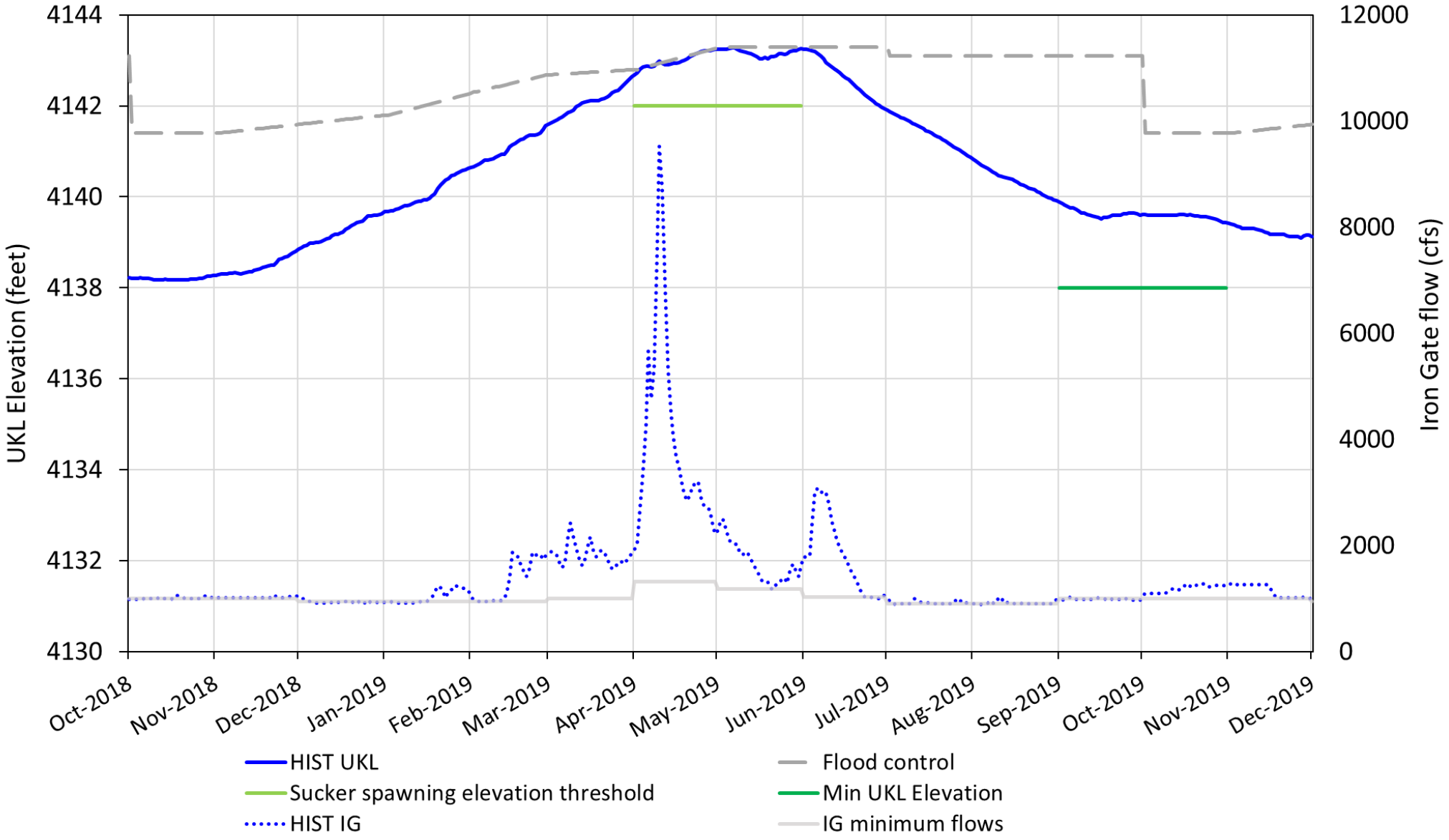
2018 UKL and Iron Gate Operations



2018 UKL and Iron Gate Operations with KBPM IOP Simulation



2019 UKL and Iron Gate Operations



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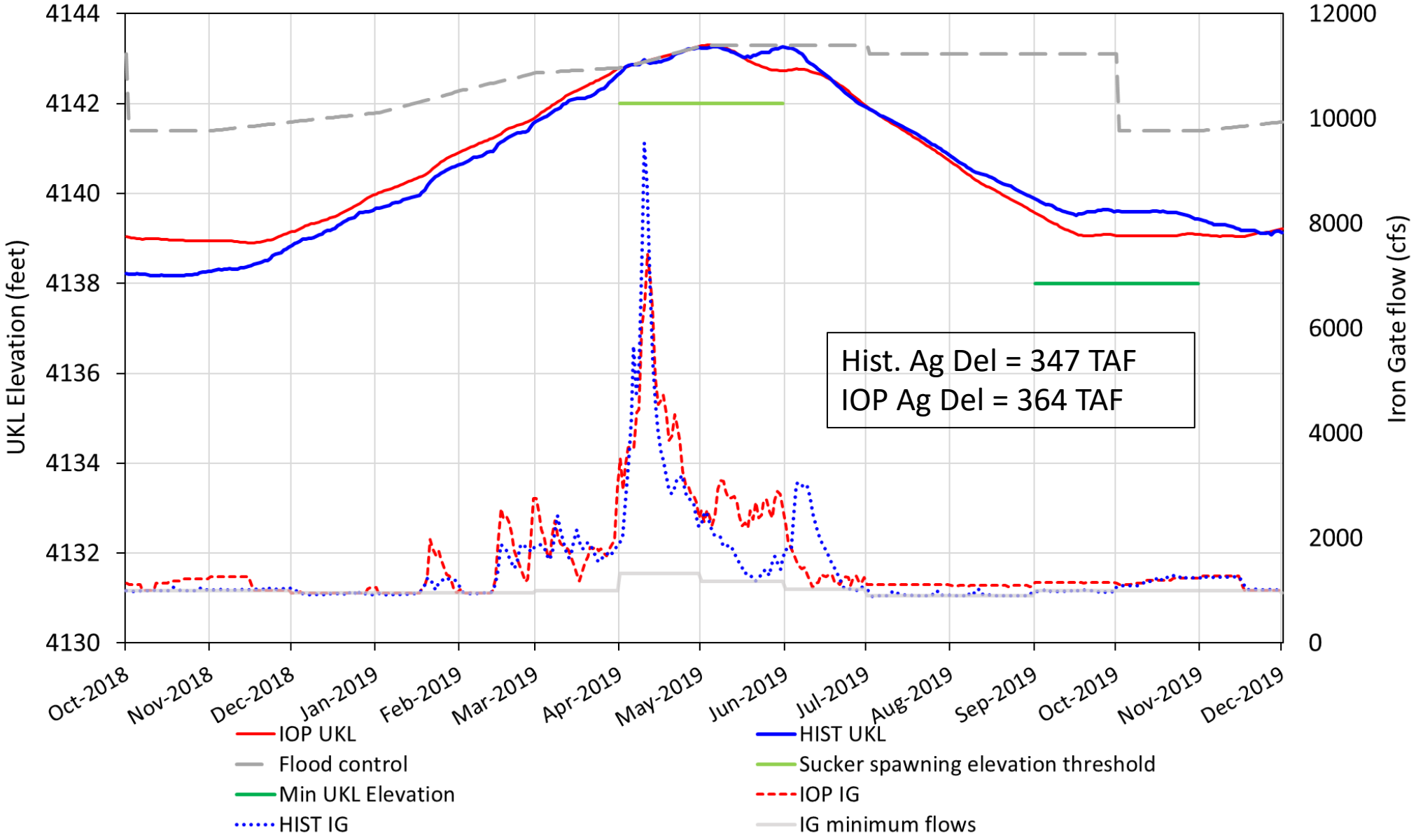

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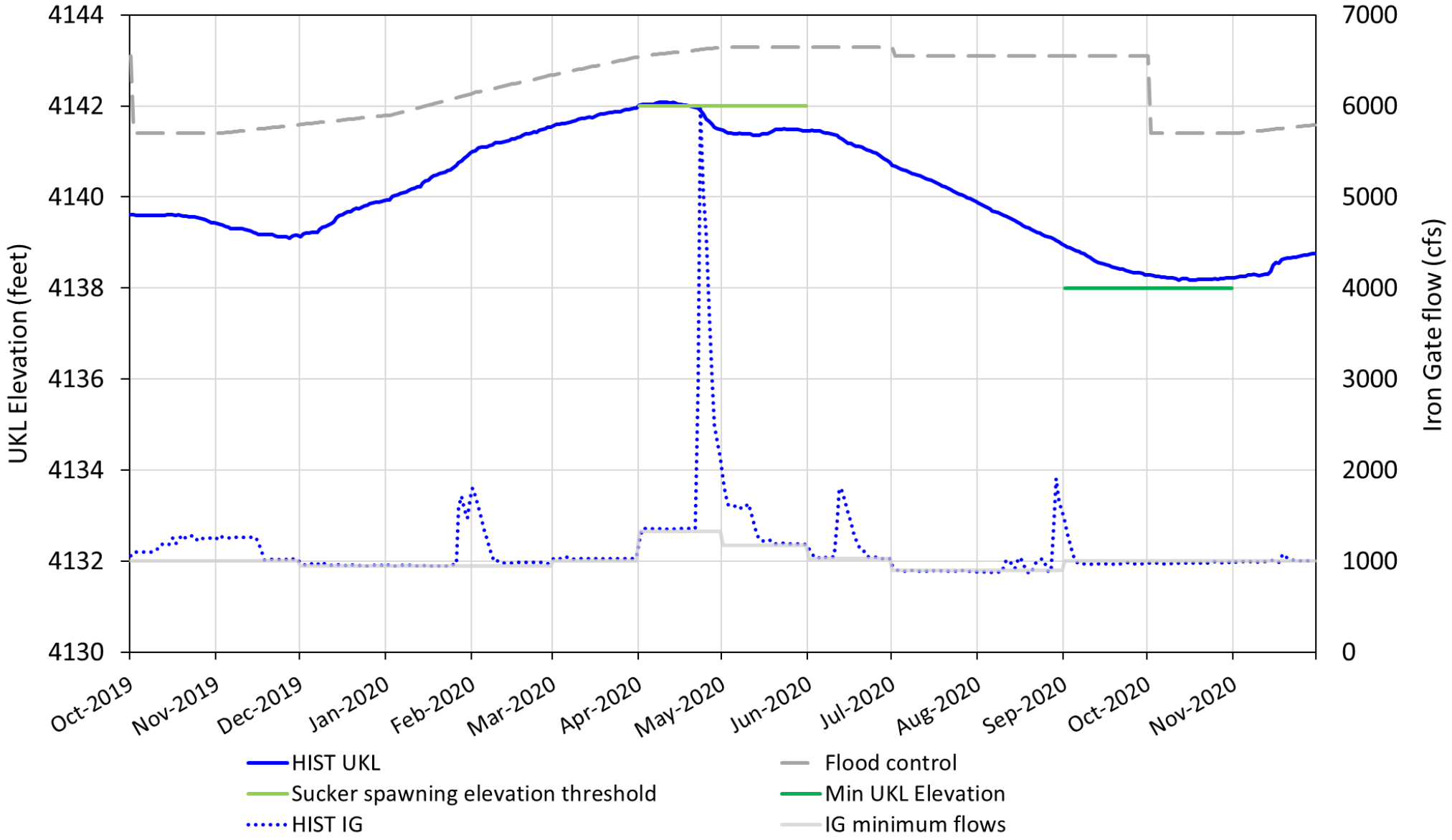

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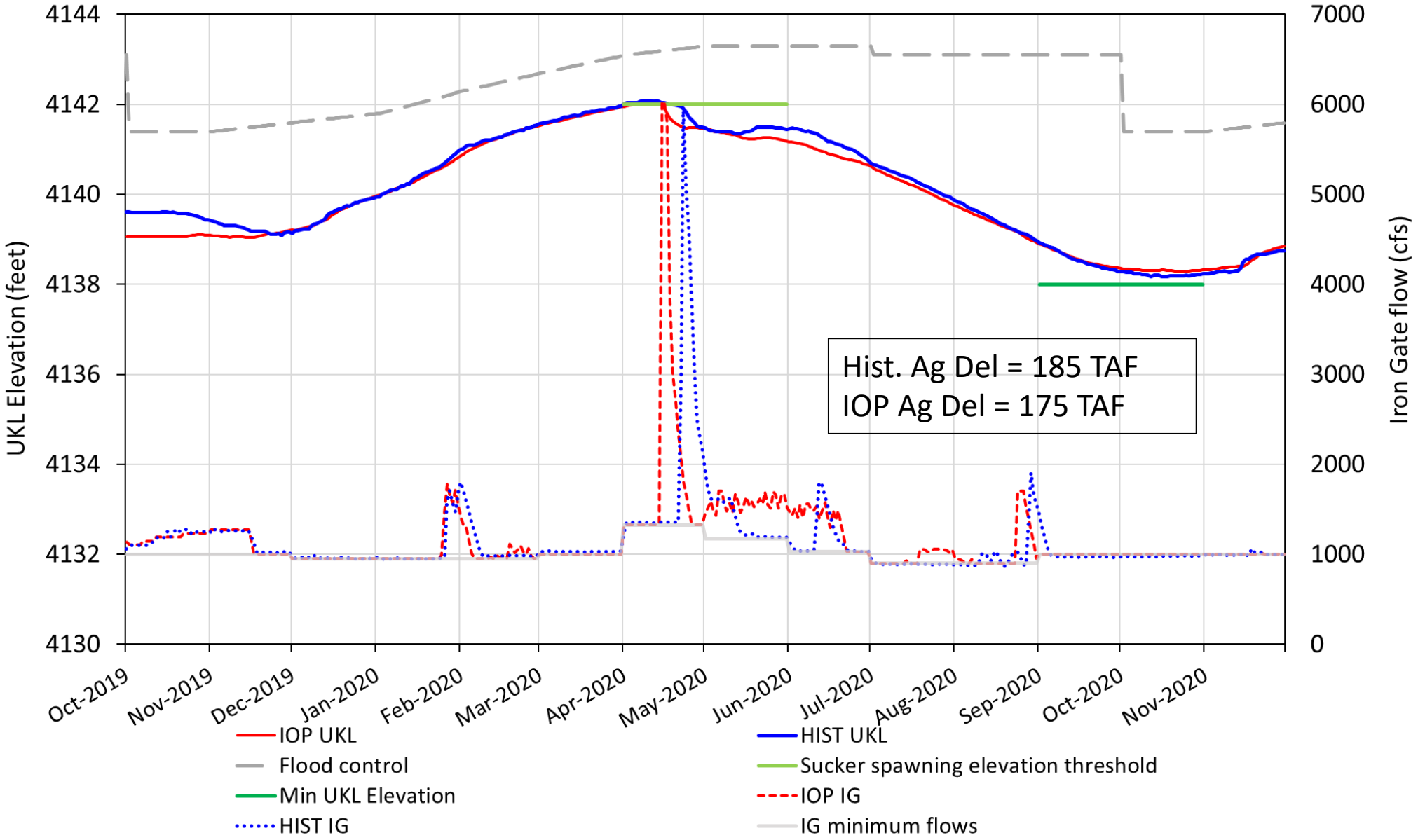
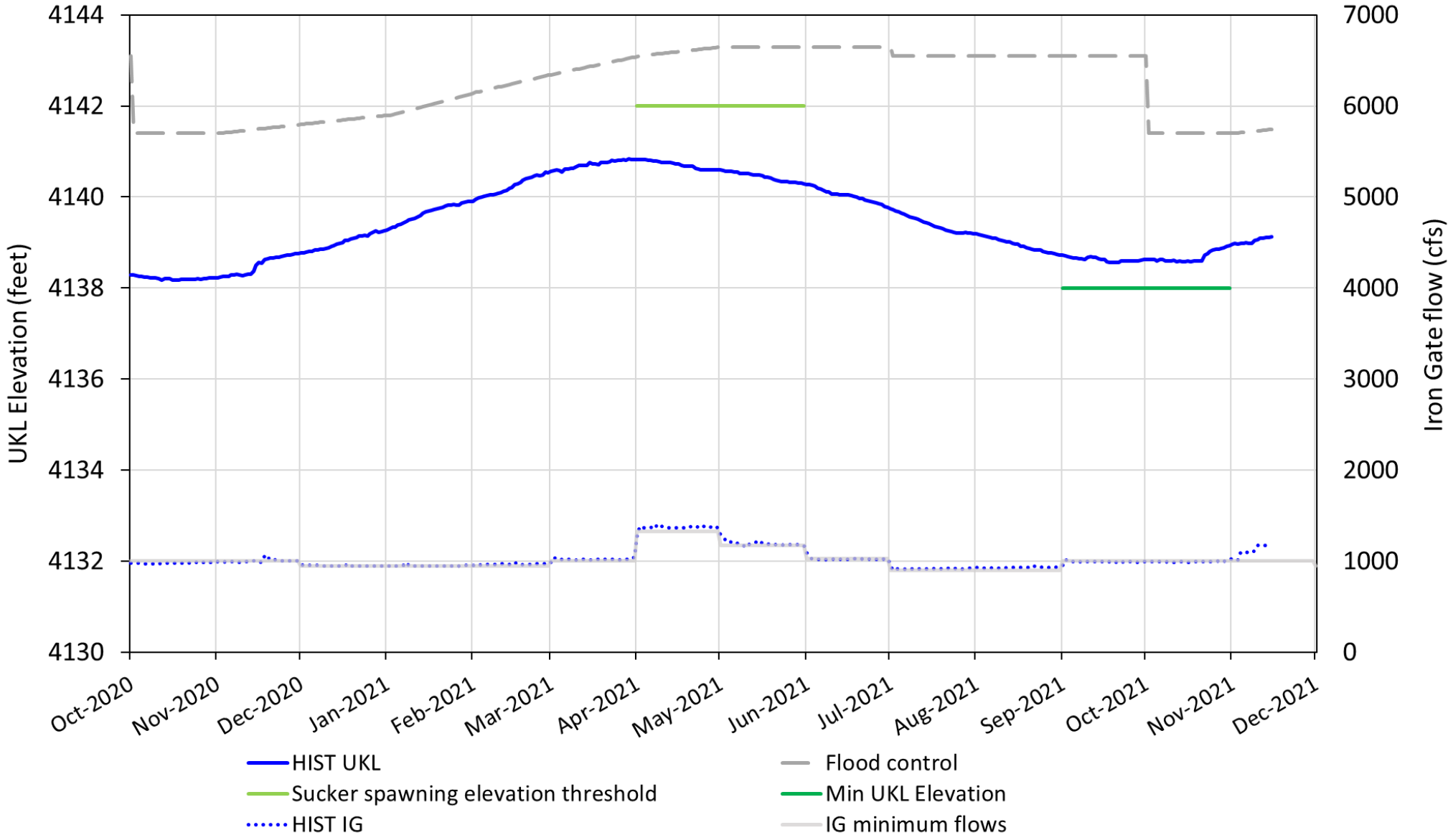


2021 UKL and Iron Gate Operations



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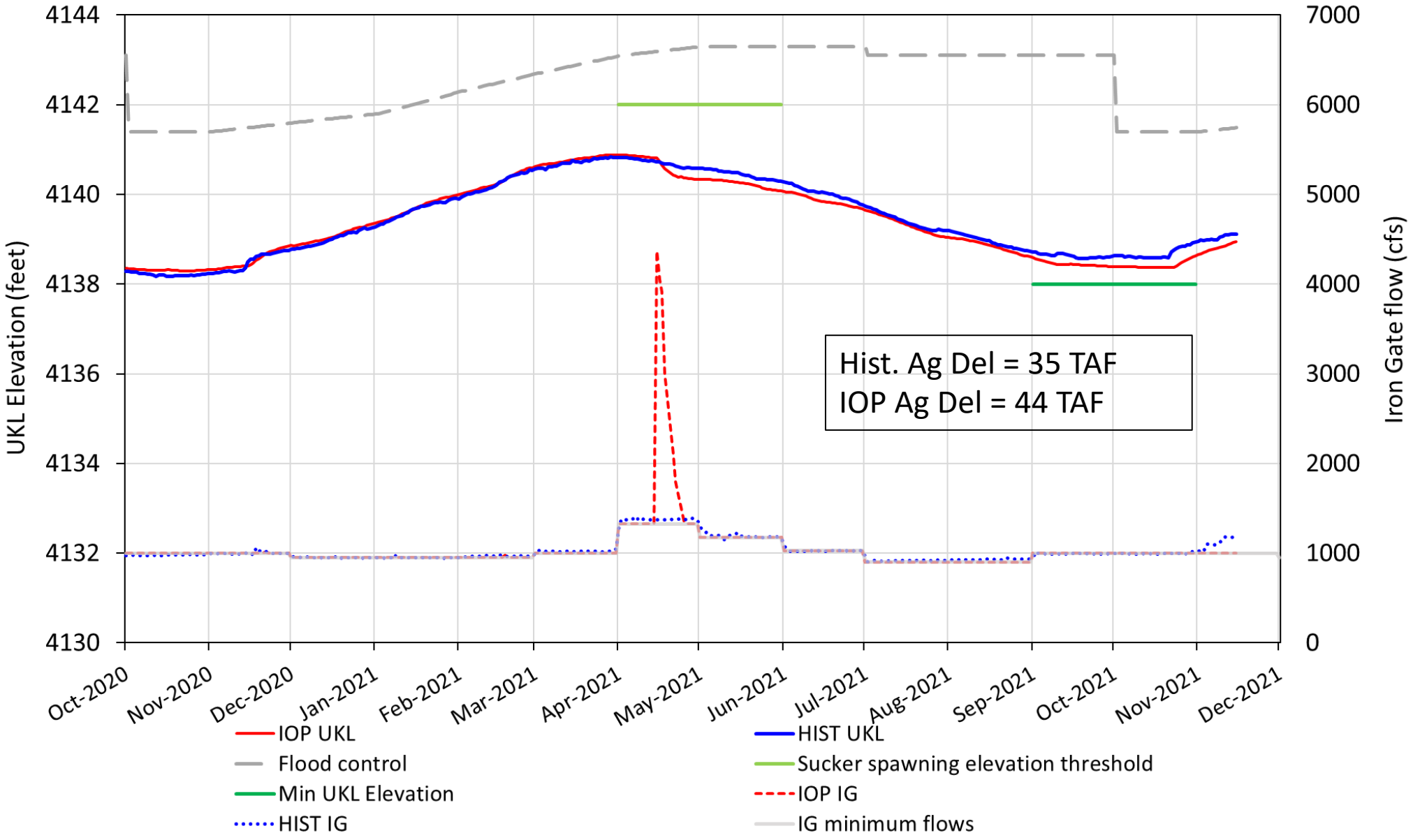
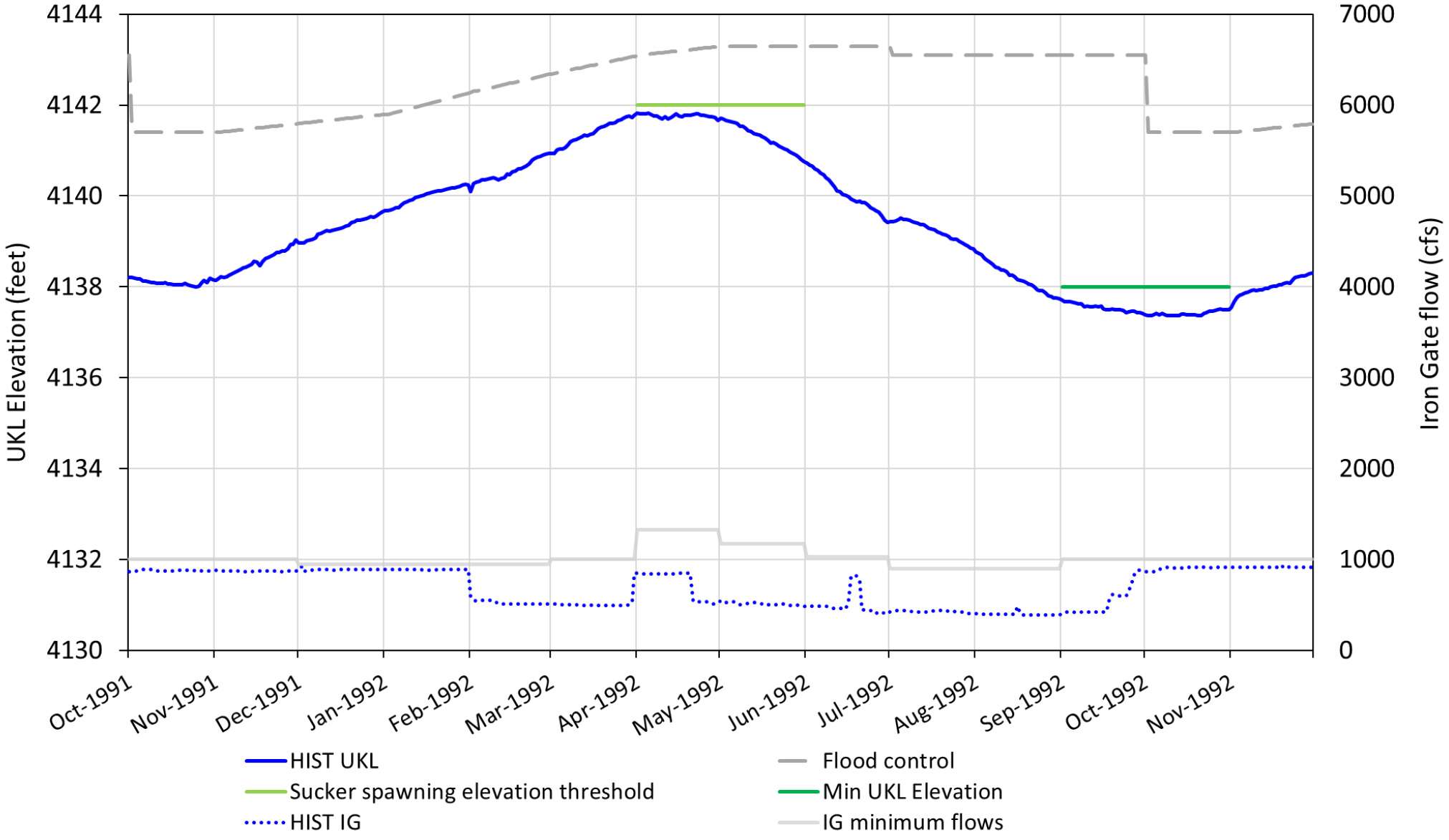
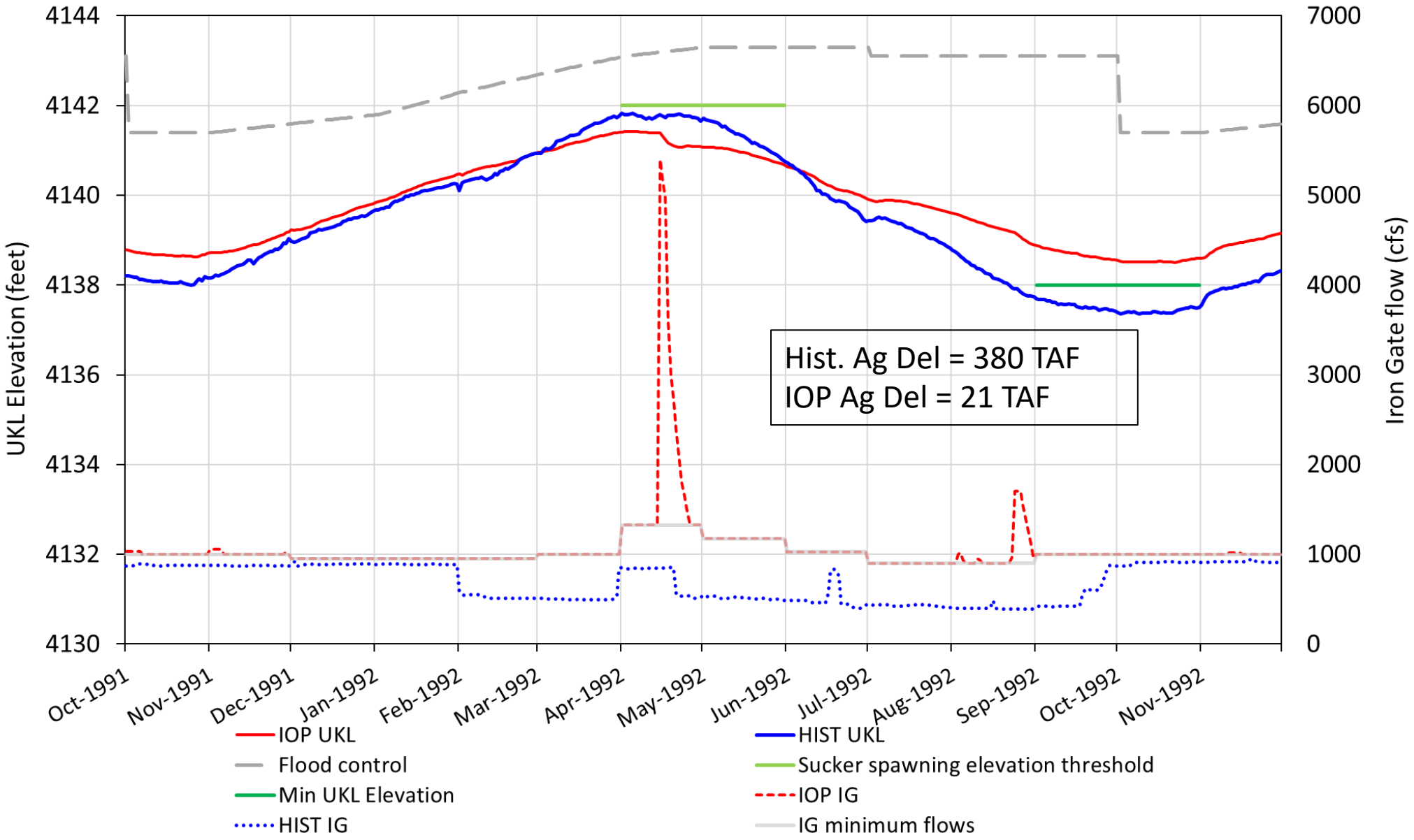


1992 UKL and Iron Gate Operations



1992 UKL and Iron Gate Operations with KBPM IOP Simulation



Key Takeaways

- Surface flushing flow combined with sucker spawning elevation requirements result in unreliable project supply and too frequent project shutdowns.
- Historic hydrology may be insufficient for analyzing the impacts of a proposed action.
- With Pacificorp dams coming out, there is hope.