Cat Creek Energy Status Conference & Update

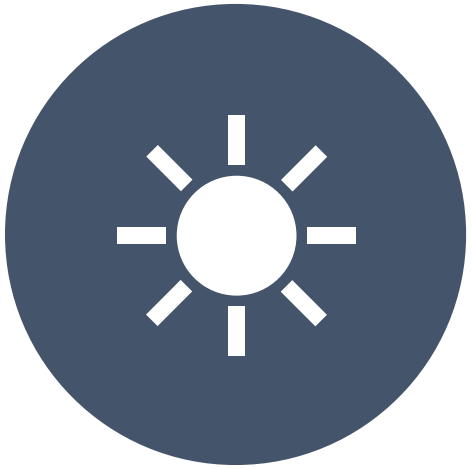
June 13, 2024

Boise, Idaho

AGENDA

- Project overview
- New 2024 Permit overview
- FERC-BOR update
- Project comparison and Path forward

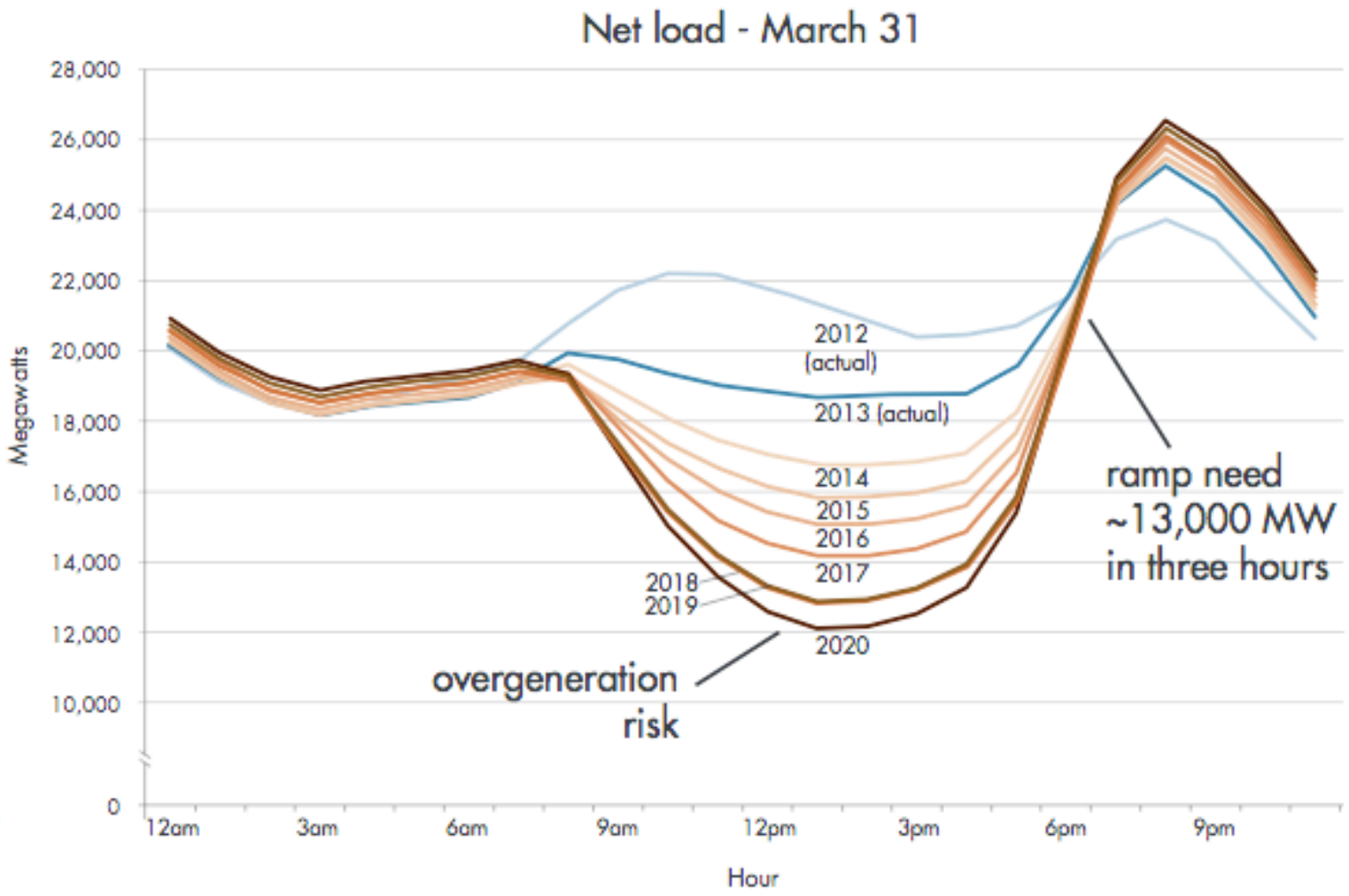
WHY



ENERGY STORAGE

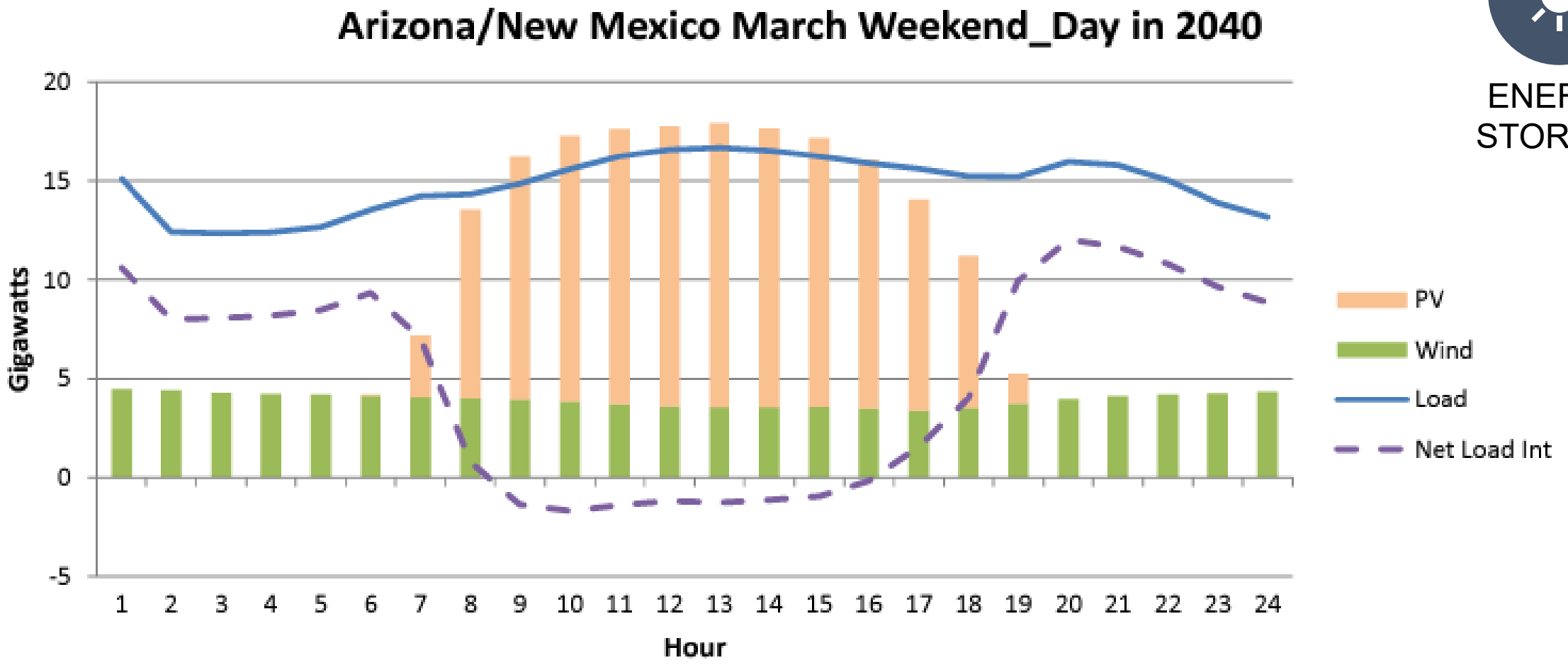
WATER STORAGE

ENERGY STORAGE



Net Load Curves for March 31, from 2012 to 2020, based on analysis by California ISA. Source: California ISO

ENERGY STORAGE



The Consideration of PV Curtailments in NEMS: Addressing the Duck Problem

Presented by Frances Wood OnLocation, Inc. July 11, 2016

ENERGY STORAGE

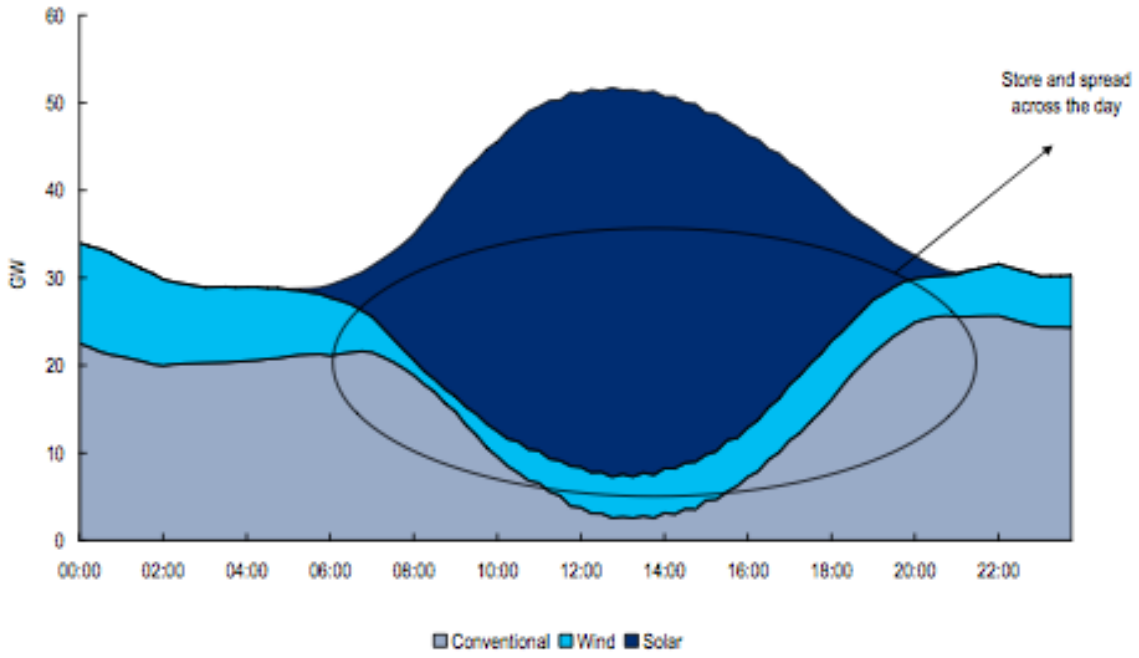
Executive Summary

The 2021 Western Assessment of Resource Adequacy (Western Assessment) concludes that resource adequacy risks to reliability are likely to increase over the next 10 years. WECC recommends entities take immediate action to mitigate near-term risks and prevent long-term risks. Approaches to evaluating and planning for resource adequacy must adapt to changes affecting the system and evolve to ensure future reliability. The world has changed. The West has changed. These changes appear not only destined to continue, but to accelerate. If reliability and resilience are to be maintained, our planning, analyses, and ideas about resource adequacy must also change. Based on current projections, by 2025, each subregion, and the interconnection, will be unable to meet the 99.98%—one-day-in-ten-year—reliability threshold.

Source: Western Energy Coordinating Council, 2021 Assessment of Western Resource Adequacy

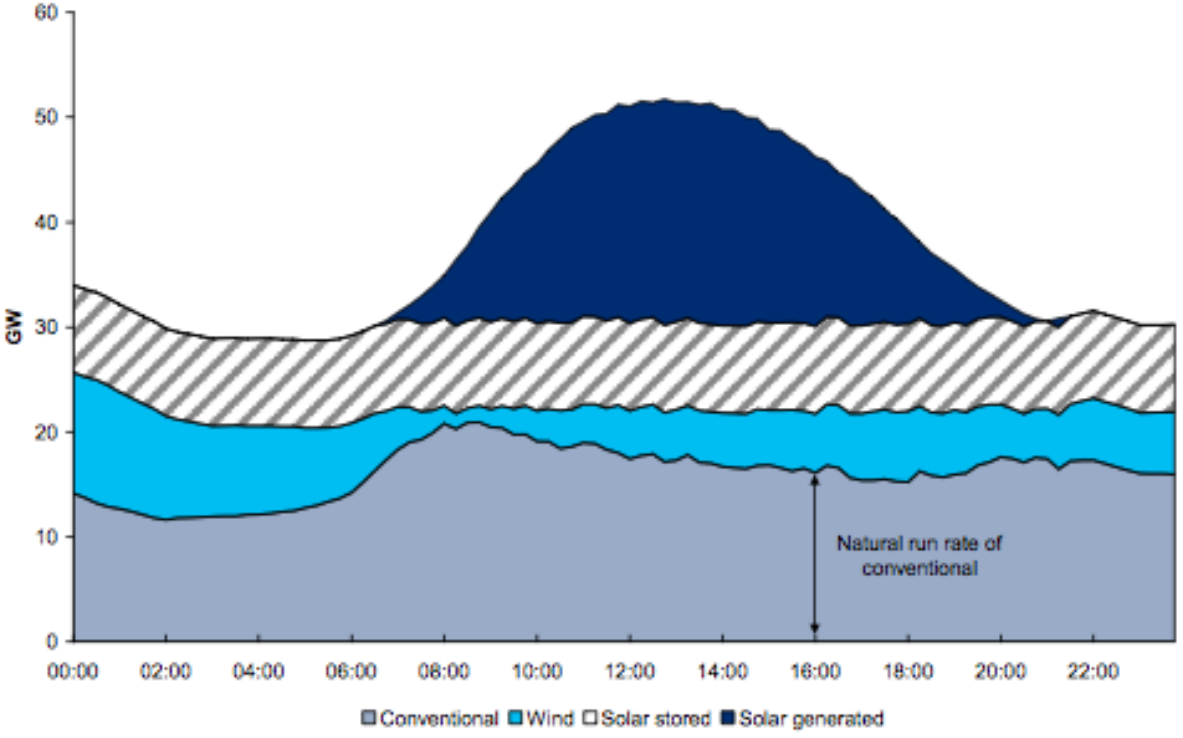
ENERGY STORAGE

Figure 20. Generation profile before storage



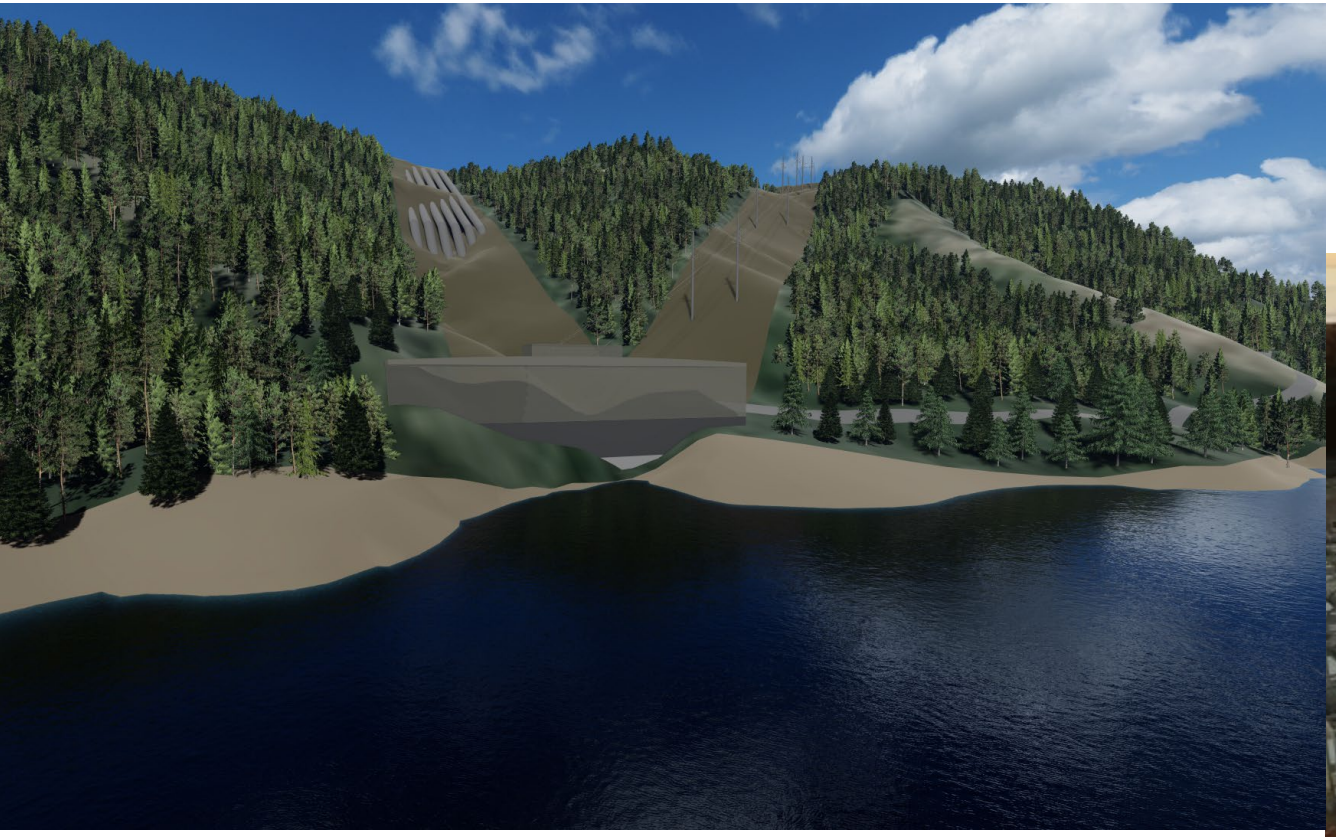
Source: Citi Research, EEX

Figure 21. Generation profile once storage is installed



Source: Citi Research, EEX

PSH vs. Chemical Battery Storage



Cat Creek Energy

72 times larger

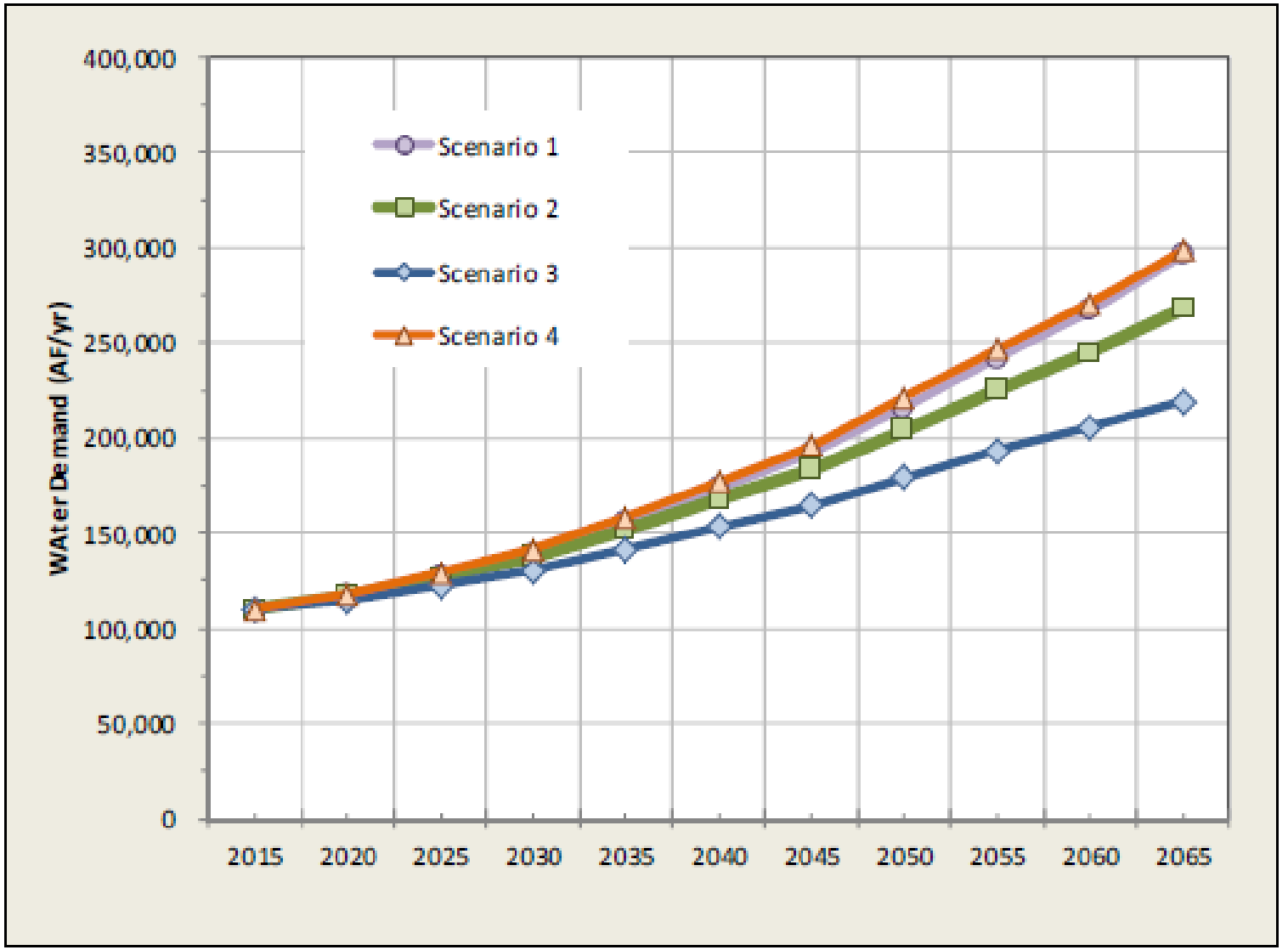
“World’s Largest Battery”

WATER
STORAGE

Water Storage

WATER STORAGE

Treasure Valley DCMI Water Demand Projections (2015-2065)



WATER STORAGE

Treasure Valley DCMI Water Demand Projections (2015-2065)

Water Demand Projections, 2015-2065 (AF/yr)									
Scenario →		1		2		3		4	
		Partial Irrigation,[1] No Conservation		Partial Irrigation,[1] Moderate Conservation		Partial Irrigation,[1] More Aggressive Conservation		Full Irrigation,[2] Moderate Conservation	
	2015[3]	2065	Increase, 2015-2065	2065	Increase, 2015-2065	2065	Increase, 2015-2065	2065	Increase, 2015-2065
Total indoor	55,700	136,500	80,800	120,400	64,600	95,600	39,800	120,400	64,600
Total irrig.[3]	54,500	506,900	452,400	456,200	401,700	354,800	300,300	587,400	532,900
Total	110,200	643,400	533,100	576,500	466,300	450,400	340,100	707,800	597,500
Net DCMI indoor[4]	55,700	136,500	80,800	120,400	64,600	95,600	39,800	120,400	64,600
Net DCMI irrig.[4]	54,500	159,500	105,000	147,500	93,000	123,700	69,100	178,000	123,500
Net DCMI Total[4]	110,200	296,000	185,700	267,900	157,600	219,200	109,000	298,300	188,100

Notes:
1. "Partial irrigation" refers to urban areas in which a portion of the irrigable land is not irrigated or is irrigated with a water volume that is less than that which is required for fully-irrigated turf (see text).
2. "Full irrigation" refers to urban land that is irrigated with an amount needed for fully irrigated turf.
3. The irrigation volume in 2015 does not include surface water delivered by non-DCMI water-delivery entities (e.g., irrigation districts or canal companies). In contrast, the 2065 "total" irrigation volumes *does* include urban land that will be irrigated with surface water provided by non-DCMI entities.
4. The "Net DCMI" volumes do not include future demand that will be supplied by currently-developed supplies (surface water or groundwater). These indoor, irrigation, and total demand volumes therefore represent a better comparison with the total estimated 2015 DCMI demand.

WATER
STORAGE

4E - SNAKE RIVER BASIN NEW STORAGE

Development of new on-stream, off-stream, and aquifer storage is in the public interest; provided, however, applications for large surface storage projects in the Milner to Murphy reach of the Snake River should be required to mitigate for impacts on hydropower generation.

WATER STORAGE

LEGISLATURE OF THE STATE OF IDAHO

Sixty-fifth Legislature First Regular Session - 2019

IN THE HOUSE OF REPRESENTATIVES

HOUSE JOINT MEMORIAL NO. 4

BY RESOURCES AND CONSERVATION COMMITTEE

BE IT FURTHER RESOLVED that the Idaho Legislature urges the IWRB, Corps, Reclamation, water users, and other stakeholders to consider other infrastructure projects to address future water needs, including but not limited to raising of Arrowrock, Lucky Peak, Minidoka, and Island Park dams.

WHEREAS, studies show that additional water supplies will be needed to meet future demands as the state population continues to grow; and

WHEREAS, additional water infrastructure would provide opportunities to meet current and future water demands; and

Boise River Basin Feasibility Study

Needs

The combination of population growth and climate projections is expected to create challenges in meeting existing water contract obligations and increased water supply demand in the Treasure Valley. With these challenges, there is a need to identify, investigate, recommend, and implement a plan for increased storage within the Boise River basin.

WATER STORAGE

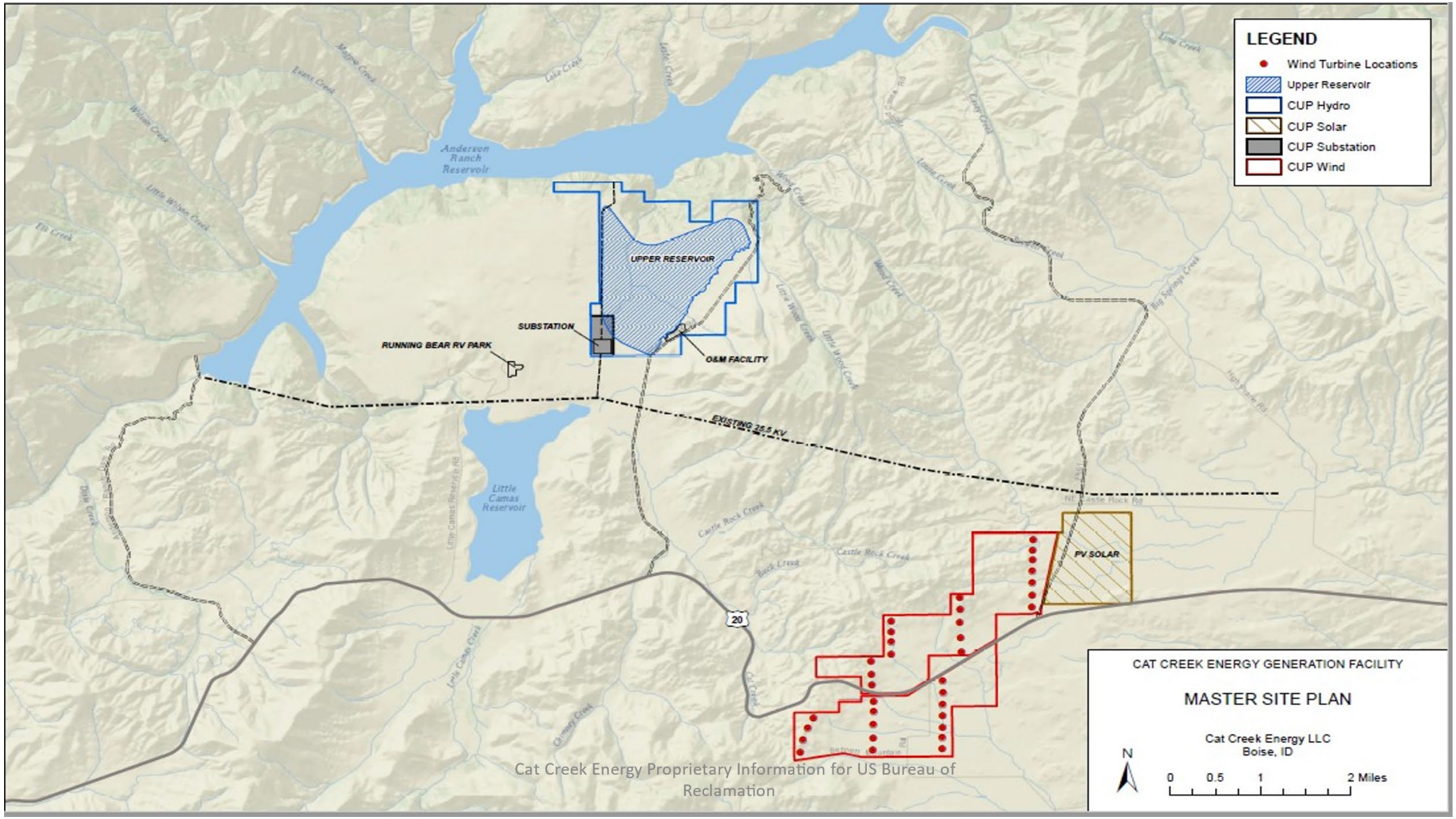
Idaho Statesman

EDITORIALS

Growth + climate change = pending water crisis in Idaho. Let's sound the alarm now

BY THE EDITORIAL BOARD

AUGUST 01, 2021 04:00 AM

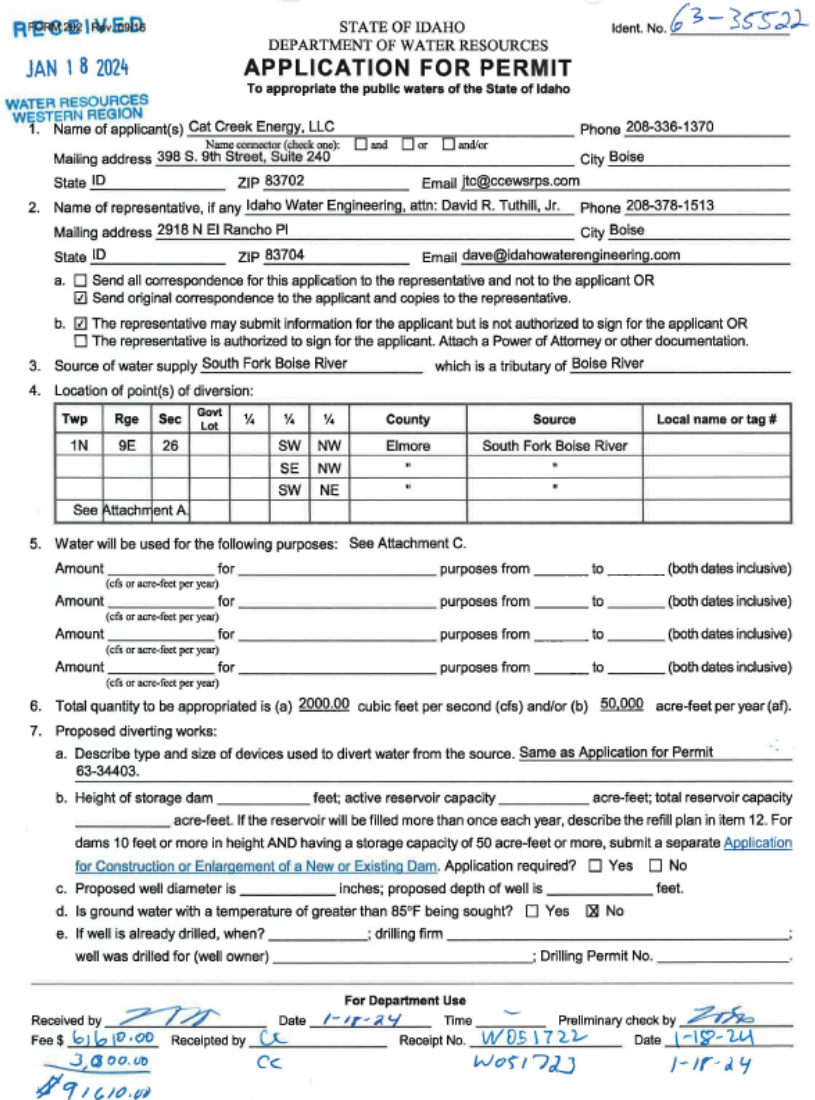



Upper Reservoir
Penstocks
Transmission Line
Emergency Spillway
Powerhouse/
Pumphouse/
Substation
Access Road

Prior Water Right Applications

Water Right #	Beneficial Use	Acre-Feet
63-34403	Hydropower	100,000
63-34652	Irrigation, Municipal, Mitigation	30,000
63-34897	Irrigation, Municipal, Mitigation	31,000
63-34900	Irrigation, Municipal, Mitigation, Recharge, Water Quality, Industrial, Commercial, Fish Habitat, Recreation, Domestic, Wildlife	19,000

New 2024 Water Right Application



RECEIVED
JAN 18 2024
WATER RESOURCES
WESTERN REGION

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
Ident. No. 63-35522

APPLICATION FOR PERMIT
To appropriate the public waters of the State of Idaho

1. Name of applicant(s) Cat Creek Energy, LLC Phone 208-336-1370
   Name connector (check one): ☐ and ☐ or ☐ and/or
   Mailing address 398 S. 9th Street, Suite 240 City Boise
   State ID ZIP 83702 Email jtc@ccewsrps.com
2. Name of representative, if any Idaho Water Engineering, attn: David R. Tuthill, Jr. Phone 208-378-1513
   Mailing address 2918 N El Rancho Pl City Boise
   State ID ZIP 83704 Email dave@idahowaterengineering.com
   a. ☐ Send all correspondence for this application to the representative and not to the applicant OR
      ☑ Send original correspondence to the applicant and copies to the representative.
   b. ☑ The representative may submit information for the applicant but is not authorized to sign for the applicant OR
      ☐ The representative is authorized to sign for the applicant. Attach a Power of Attorney or other documentation.
3. Source of water supply South Fork Boise River which is a tributary of Boise River
4. Location of point(s) of diversion:

Twp	Rge	Sec	Govt Lot	¼	¼	¼	County	Source	Local name or tag #
1N	9E	26			SW	NW	Elmore	South Fork Boise River	
					SE	NW	"	"	
					SW	NE	"	"	
See Attachment A.									

5. Water will be used for the following purposes: See Attachment C.
   Amount _____ (cfs or acre-feet per year) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per year) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per year) for _____ purposes from _____ to _____ (both dates inclusive)
   Amount _____ (cfs or acre-feet per year) for _____ purposes from _____ to _____ (both dates inclusive)
6. Total quantity to be appropriated is (a) 2000.00 cubic feet per second (cfs) and/or (b) 50,000 acre-feet per year (af).
7. Proposed diverting works:
   a. Describe type and size of devices used to divert water from the source. Same as Application for Permit 63-34403.
   b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet. If the reservoir will be filled more than once each year, describe the refill plan in item 12. For dams 10 feet or more in height AND having a storage capacity of 50 acre-feet or more, submit a separate Application for Construction or Enlargement of a New or Existing Dam. Application required? ☐ Yes ☐ No
   c. Proposed well diameter is _____ inches; proposed depth of well is _____ feet.
   d. Is ground water with a temperature of greater than 85°F being sought? ☐ Yes ☒ No
   e. If well is already drilled, when? _____; drilling firm _____; well was drilled for (well owner) _____; Drilling Permit No. _____

For Department Use
Received by [illegible] Date 1-18-24 Time ~ Preliminary check by [illegible]
Fee $ 6,610.00 Receipted by CC Receipt No. W051722 Date 1-18-24
3,000.00
$9,610.00

- Received by IDWR on Jan. 18, 2024
- Application for additional 50,000 ac-ft for hydropower
- Project design recently expanded, increasing upper reservoir storage from 100K ac-ft to 150K ac-ft
- 130K portion of the upper reservoir available for downstream uses
- 71K of upper reservoir assigned to irrigation and municipal water entities under agreements with CCE
- Additional 50K ac-ft of storage available for existing and future needs

FERC Licensing Process

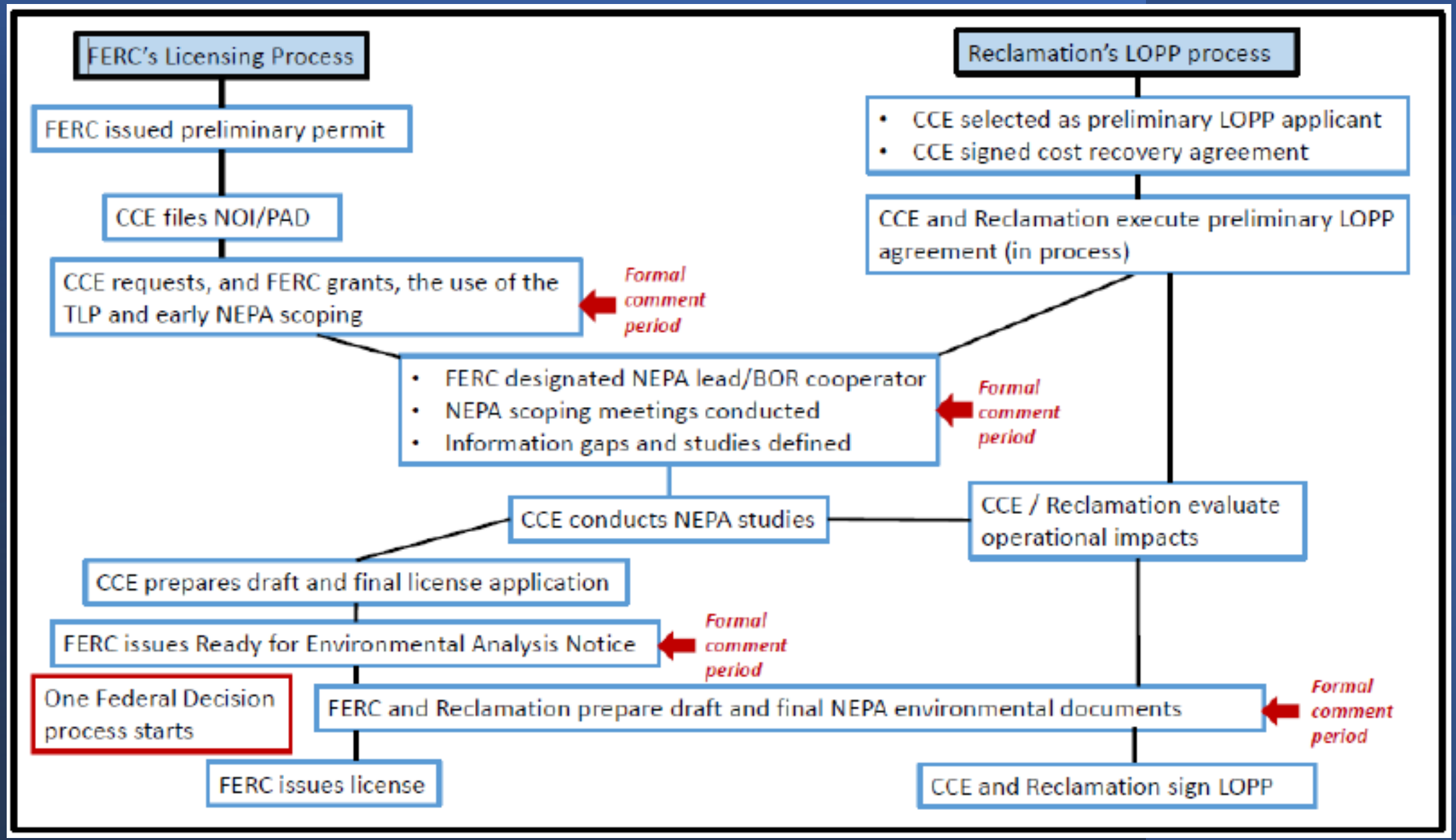
PRE-APPLICATION DOCUMENT

SCOPING PHASE

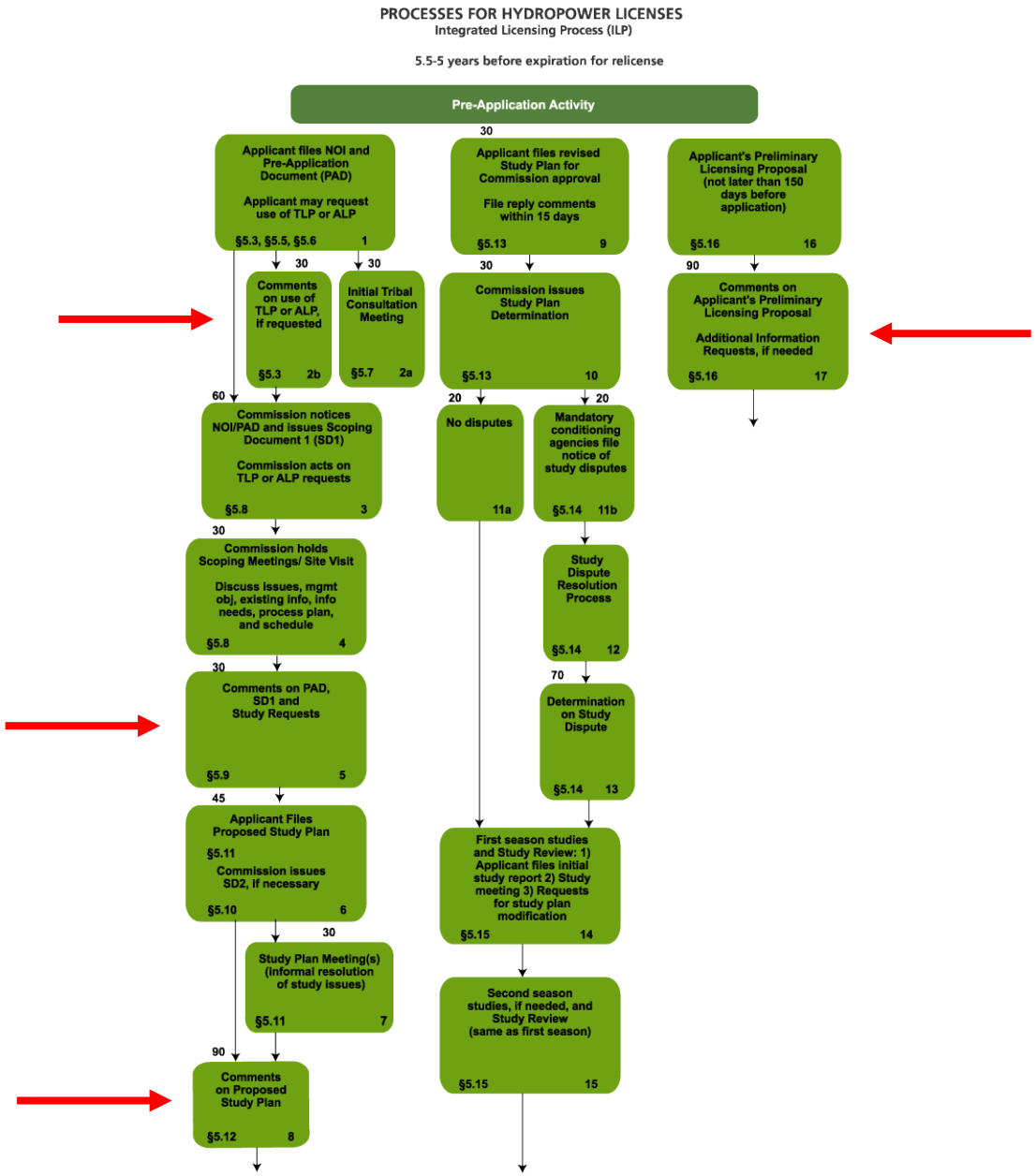
STUDY PLAN

STUDIES PERFORMED

APPLICATION FOR LICENSE


FERC's Licensing Process
FERC issued preliminary permit
CCE files NOI/PAD
CCE requests, and FERC grants, the use of the TLP and early NEPA scoping
Formal comment period
Reclamation's LOPP process
• CCE selected as preliminary LOPP applicant
• CCE signed cost recovery agreement
CCE and Reclamation execute preliminary LOPP agreement (in process)
• FERC designated NEPA lead/BOR cooperator
• NEPA scoping meetings conducted
• Information gaps and studies defined
Formal comment period
CCE conducts NEPA studies
CCE / Reclamation evaluate operational impacts
CCE prepares draft and final license application
FERC issues Ready for Environmental Analysis Notice
Formal comment period
One Federal Decision process starts
FERC and Reclamation prepare draft and final NEPA environmental documents
Formal comment period
FERC issues license
CCE and Reclamation sign LOPP

FERC Licensing Process



FERC requires compliance with:

- Clean Water Act
- Endangered Species Act
- Wild and Scenic Rivers Act
- National Historic Preservation Act
- Recommendations of Federal and State Fish & Wildlife Agencies

Studies

- Imagery-based land cover mapping with field verification to identify and quantify available wildlife habitat that could be affected by the Project
- Baseline floristic survey of the Project area
- Assessment of avian populations subject to migration patterns and encounters with the upper reservoir
- Waterfowl baseline counts
- Amphibian and reptile baseline survey
- Test plots on amphibious plants that grow on Reservoir edges to determine plant root impact on liner
- Test plots on rehabilitation plants for the site
- Inventory survey of the entire project area
- Nested computational modeling system to determine changes on water quality and fisheries
- A full featured coupled 3D hydrodynamic water quality model to simulate future conditions and capture varying aspects of weather, catchment, aquatic biota, and basin planning scenarios

Cat Creek Energy & Water Storage Renewable Power Station Project
Proposed Aquatic Studies

J. Brock

Anderson Ranch Reservoir - Nov 2017

Water Quality and Fish

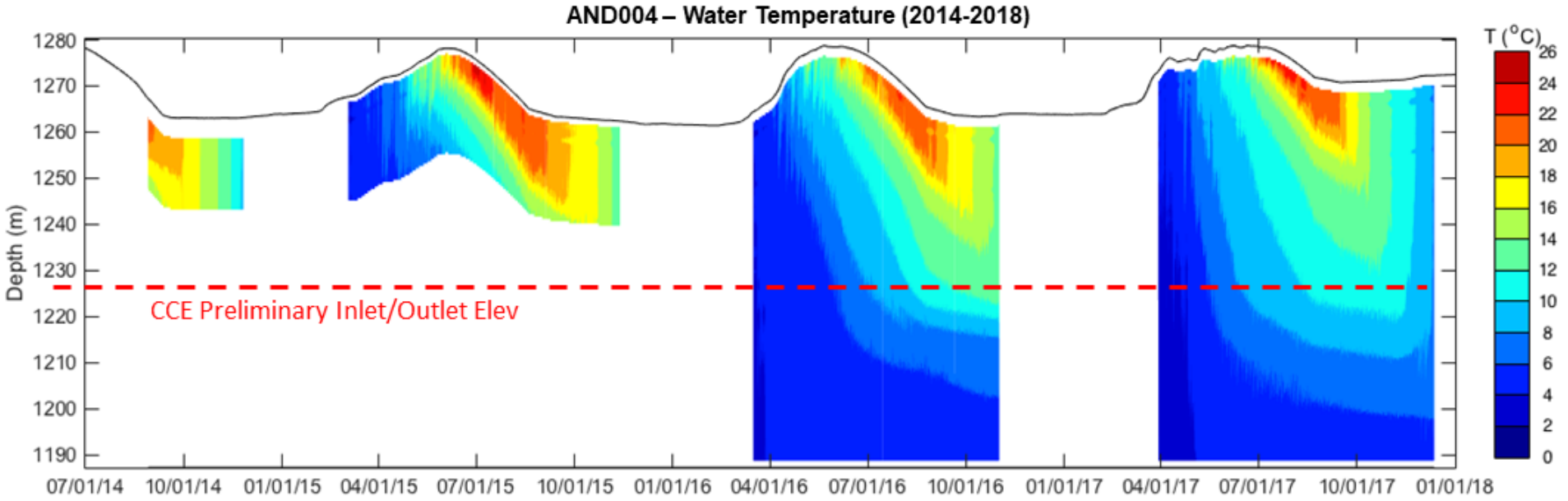
Kokanee

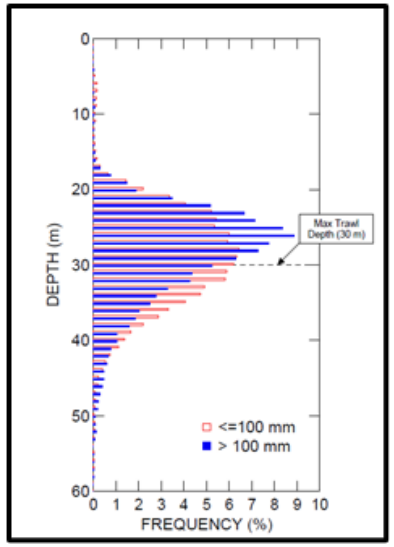
IDFG – June 2008

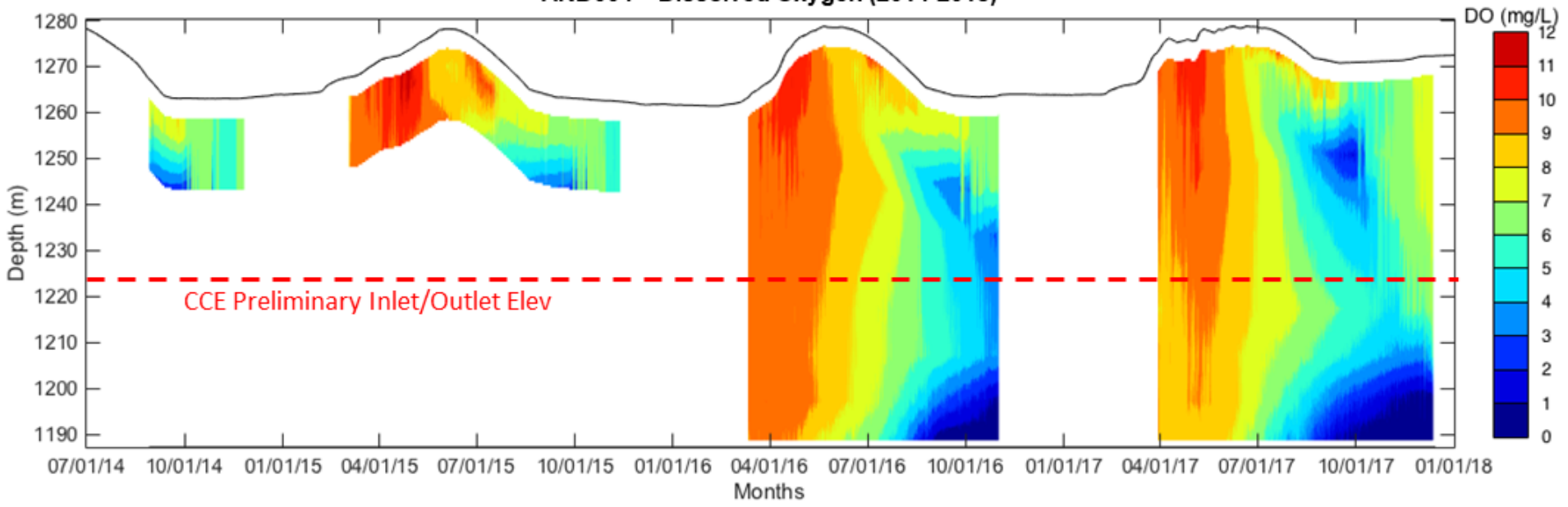
SFBR Tailwater - Trout

IDFG

Bull Trout

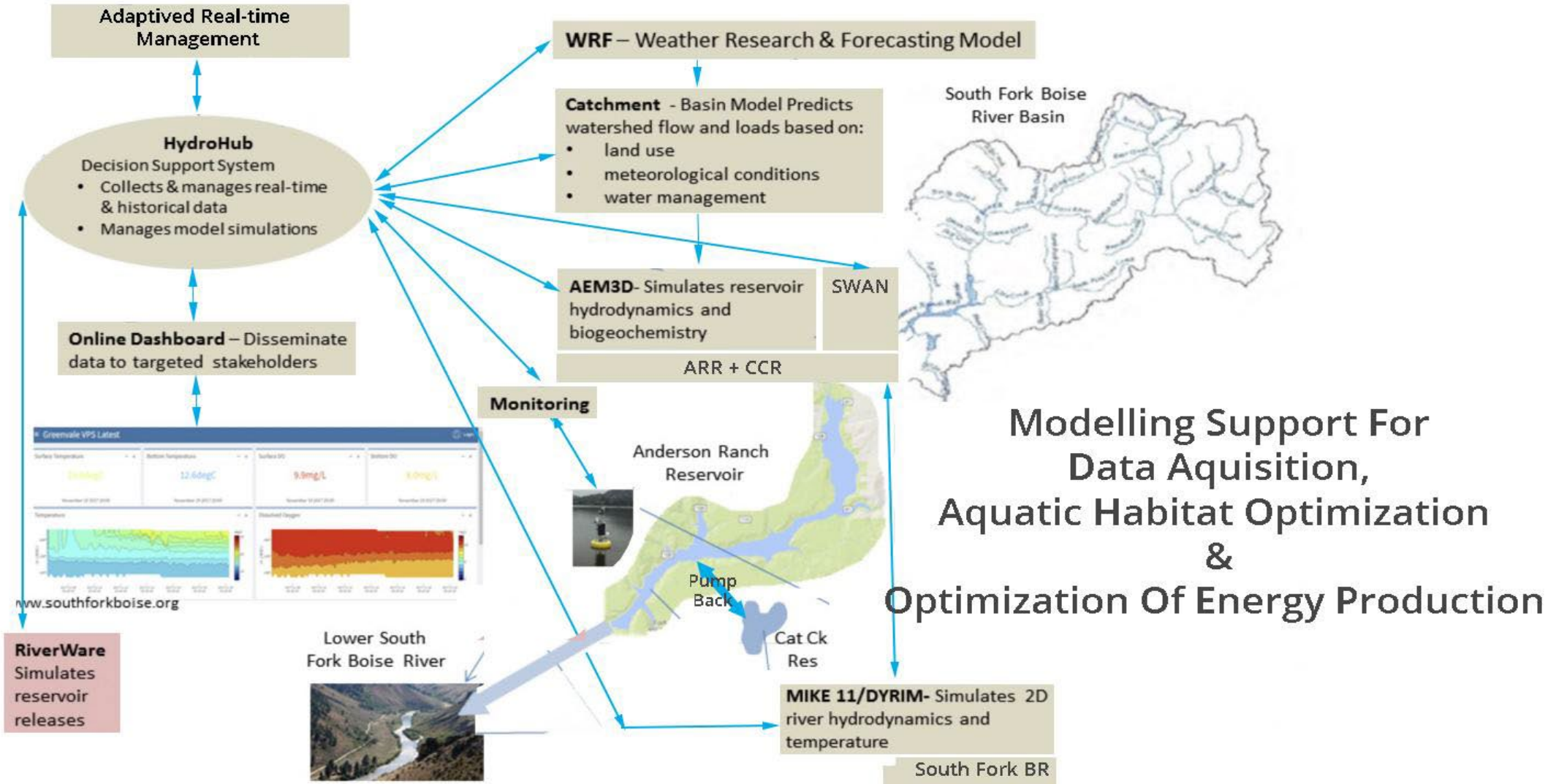






Depth distribution of Kokanee in ARR on July 24, 2000. Figure 2 in Teuscher (2001).

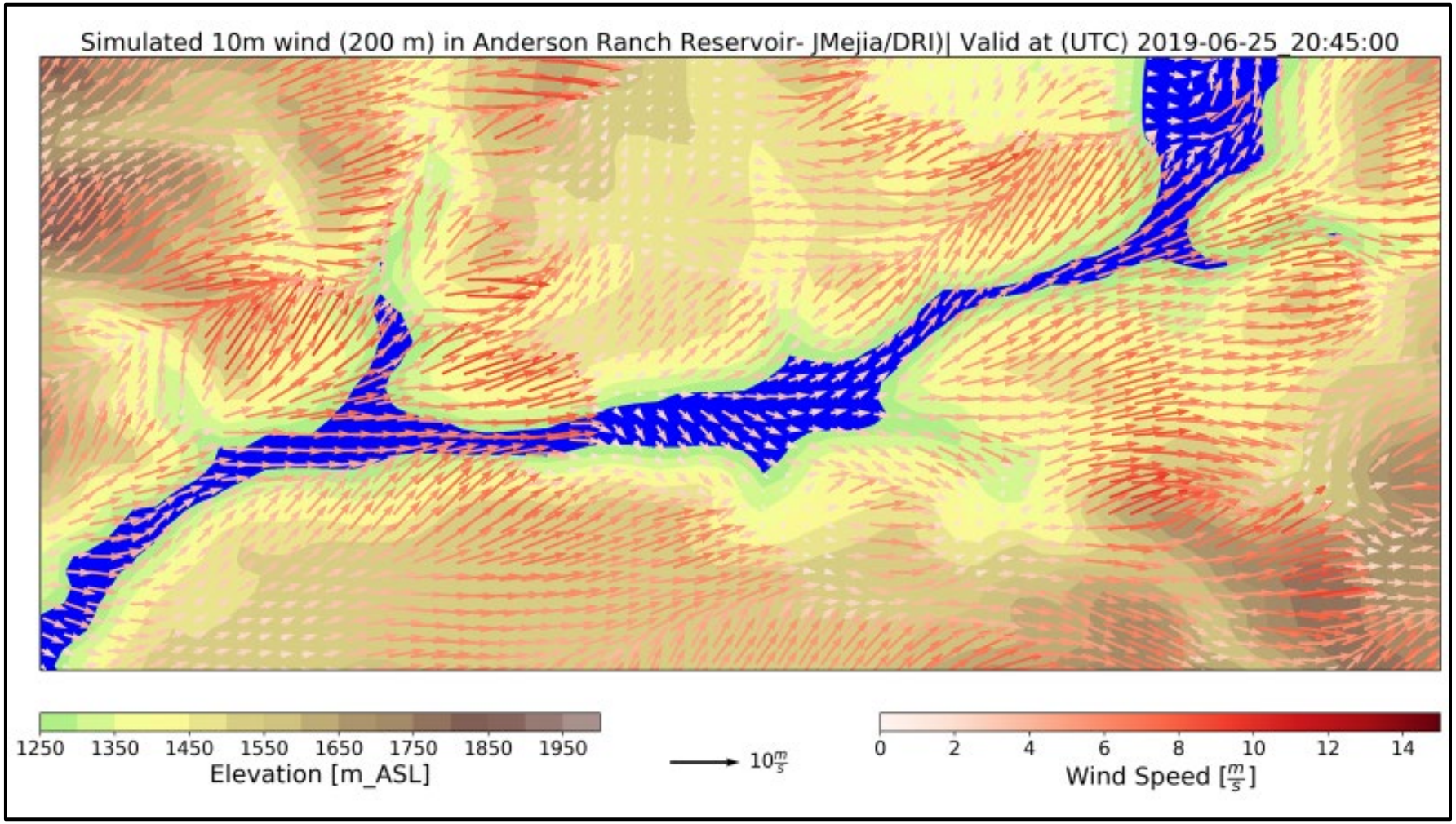
Data Source:
BOR Unpublished


Adaptived Real-time Management
WRF – Weather Research & Forecasting Model
HydroHub
Decision Support System
• Collects & manages real-time & historical data
• Manages model simulations
Catchment - Basin Model Predicts watershed flow and loads based on:
• land use
• meteorological conditions
• water management
South Fork Boise River Basin
AEM3D- Simulates reservoir hydrodynamics and biogeochemistry
SWAN
ARR + CCR
Online Dashboard – Disseminate data to targeted stakeholders
Monitoring
Anderson Ranch Reservoir
Pump Back
Cat Ck Res
www.southforkboise.org
RiverWare Simulates reservoir releases
Lower South Fork Boise River
MIKE 11/DYRIM- Simulates 2D river hydrodynamics and temperature
South Fork BR
Modelling Support For
Data Aquisition,
Aquatic Habitat Optimization
&
Optimization Of Energy Production

	Domain	Model Abbrev	Model Name	Role	Inputs	Physical Domain Descriptors	Outputs	Monitoring	Comments
A	Weather	WRF	Weather Research & Forecasting Model	provide weather conditions throughout basin (1000m x 1000m grid) and over ARR (200m x 200m)	lateral boundary conditions from NARR, NOAA	topography	irradiance, air temp, precipitation, humidity, wind	land and buoy-based met stations	3 second time step, 15 minute output interval DRI/BSU
B	Catchment	TBD	SWAT, WARMF, HSPF, HSP2 (to be determined)	route runoff and streamflow through basin, determine sediment, nutrient, and water temperature inflows to ARR	WRF	topography, land use, soils, channel hydraulic properties, water management, i.e., irrigation withdrawal	flow, temperature, water quality including nutrients, sediment, carbon	flow, water quality sondes, water chemistry, temperature, channel survey	LimnoTech/IWE
C	Reservoirs	AEM3D	Aquatic Ecosystem Model 3D	simulate 3D hydrodynamics and biogeochemistry of reservoirs	WRF, Catchment inflows and WQ data, initial conditions	bathymetry, location of inflows and outflow	hydrodynamics and water quality 3D distribution, water level, fish food & habitat	temperature buoys, profiling, water chemistry, plankton, fish	includes coupled CCR model, wave model coupled to AEM3D, Clelia Marti/HydroNumerics collaborate with BoR
D	AND Dam	BRPM	Boise RiverWare Planning Model	determine releases from AND	inflows		flow Releases to SFBR	flow	in collaboration with BoR
E	Tailwater	MIKE11-MIKE21/ DYRIM	MIKE11-MIKE21/DYRIM	2D river hydrodynamics, temperature and aquatic habitat	WRF, AND releases	topography, bathymetry, channel hydraulic properties	downstream flow & temperature	flow, water temperature	U of I Boise Group/ Clelia Marti
F	Decision Support System	HydroHub	HydroHub	collect and manage historical, real time and future scenario data, manage model simulations, visualise field and model data	WRF, Catchment, AEM3D, Tailwater		Index of Sustainable Functionality (ISF), Model Database	online dashboard	HydroNumerics - ISF may guide optimization of CCE operations consistent with ecological and energy generation constraints

Notes:

NARR = North American Regional Reanalysis; available 1978-Present
ARR = Anderson Ranch Reservoir
AND = Anderson Ranch Dam
CCR = Cat Creek Reservoir


Simulated 10m wind (200 m) in Anderson Ranch Reservoir- JMejia/DRI)| Valid at (UTC) 2019-06-25_20:45:00
1250 1350 1450 1550 1650 1750 1850 1950
Elevation [m_ASL]
$10\frac{m}{s}$
0 2 4 6 8 10 12 14
Wind Speed [$\frac{m}{s}$]

Monitoring to Include:

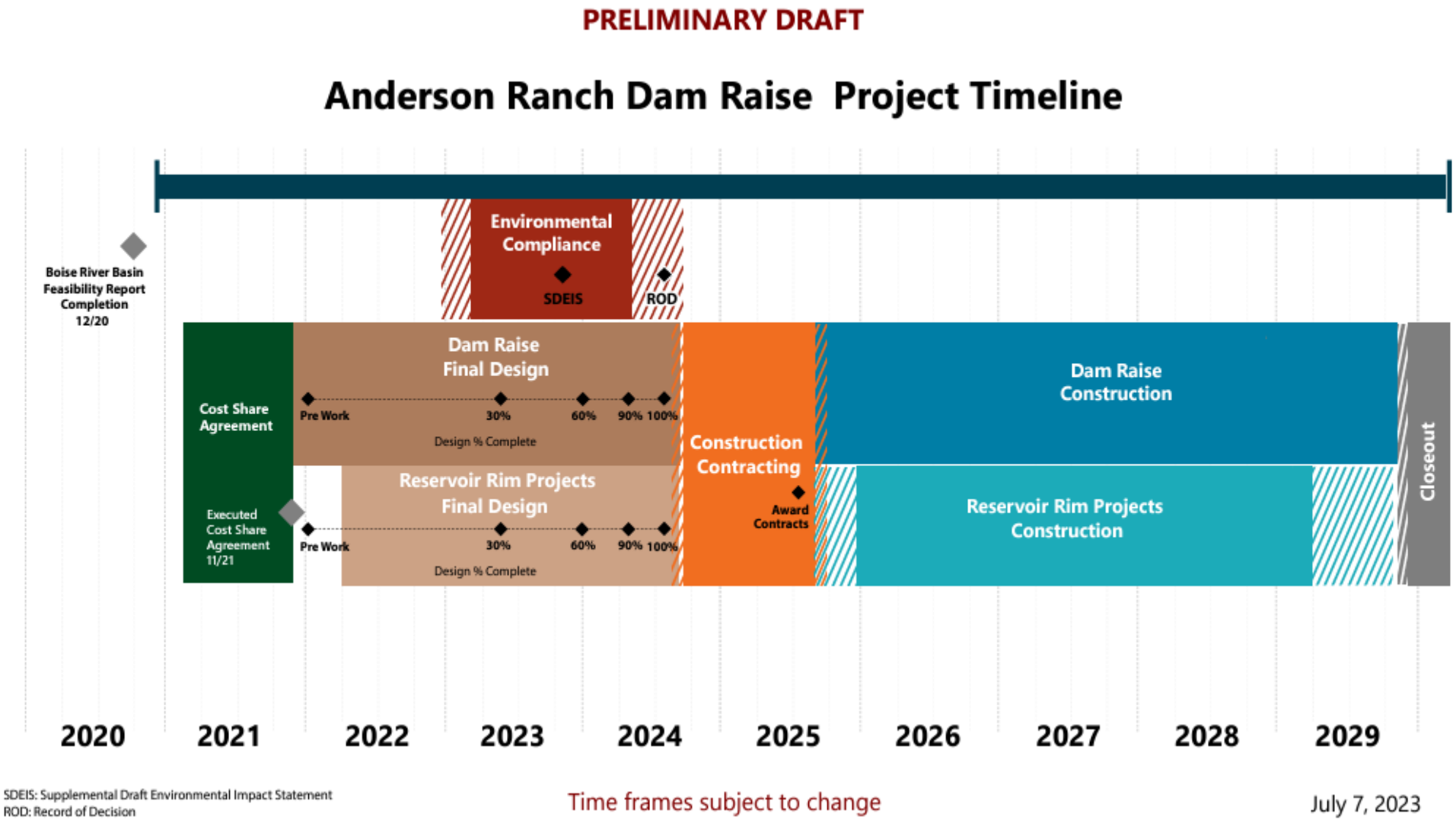
Weather	AT,RH,SWR,LWR,WS,WD,Precip - Multiple Locations
In/Outflows & Catchment	Discharge
	Water Temperature
	Water Chemistry
Reservoir	Pool Elevation
	Water Chemistry
	Comprehensive Profiling
	Data Buoys - Continuous Monitoring
	Plankton - Plant Pigments, Zooplankton
	Fish - HydroAcoustics, Coordinate with IDFG, BOR
	Ice Cover

Reclamation Update

- Held Continuing Learning Education event with BOR at Sun Valley with IDWR in 2023
- Discussions with BOR at Governor Little's one-day water conference in summer 2023 in Boise
- Updates provided to BOR in May 2023, January 2024, May 2024, and June 2024
- New stakeholder additions to the Project are in progress and will impact BOR discussions re LOPP (Lease of Power Privilege) and FERC study plan

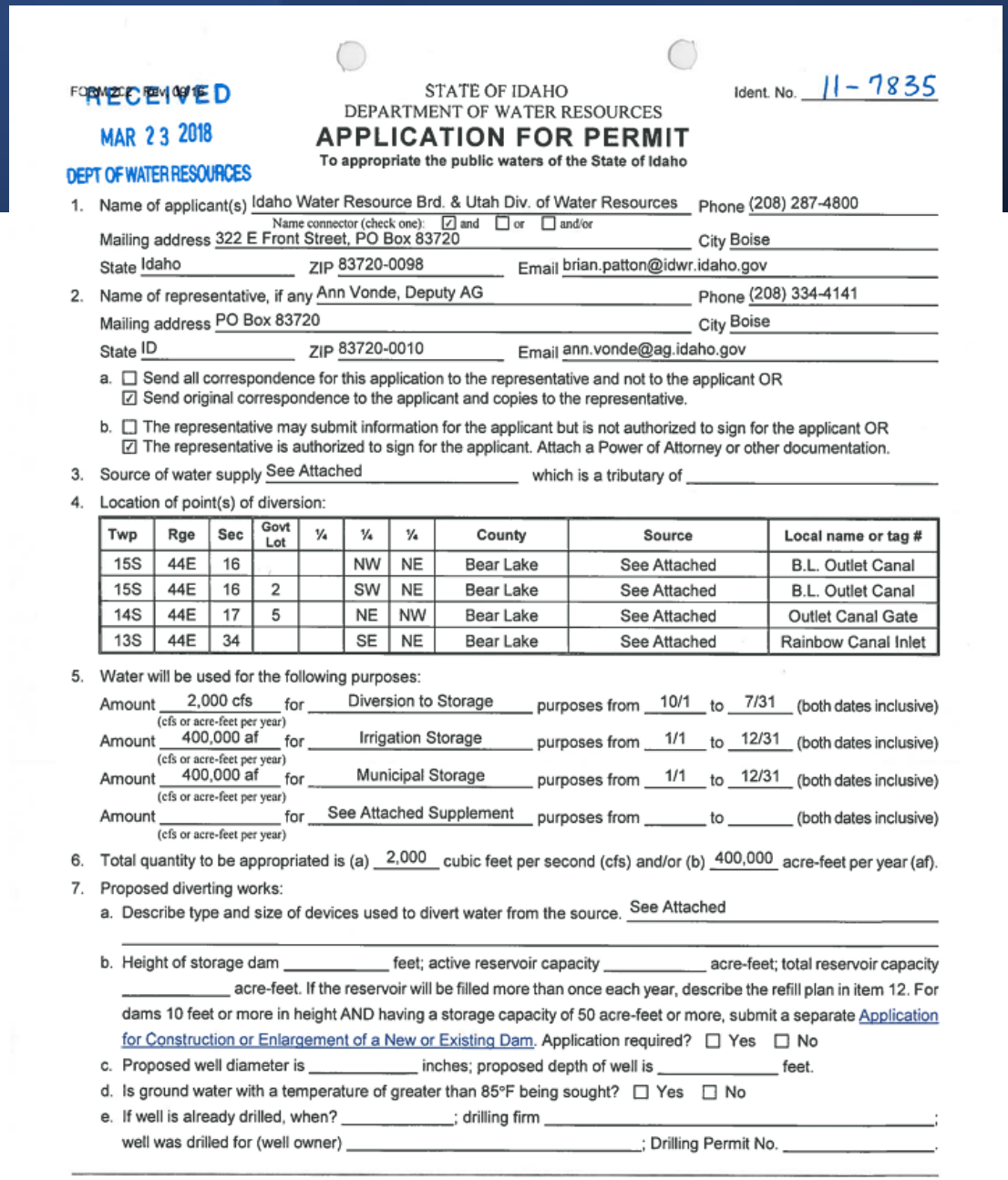
Comparable Projects

- IWRB submitted Application for Permit of 30,000 ac-ft in June 2019 for additional storage water created by the proposed dam raise on Anderson Ranch Dam.
- Dam raise competition predicted for 2029/2030



Comparable Projects

- IWRB and Utah filed Application for Permit in March 2018 for 400,000 ac-ft related to Bear River project to retain “flood control releases” to supply existing and future water uses in Bear River basin.
- Protests filed in Utah on the Application
- Procter & Gamble Paper Products Company filed request for IDWR to publish notice on the application to allow protest, but no publication yet filed
- Project not yet identified or listed on IWRB website



RECEIVED
MAR 23 2018
DEPT OF WATER RESOURCES

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
Ident. No. 11-7835

APPLICATION FOR PERMIT
To appropriate the public waters of the State of Idaho

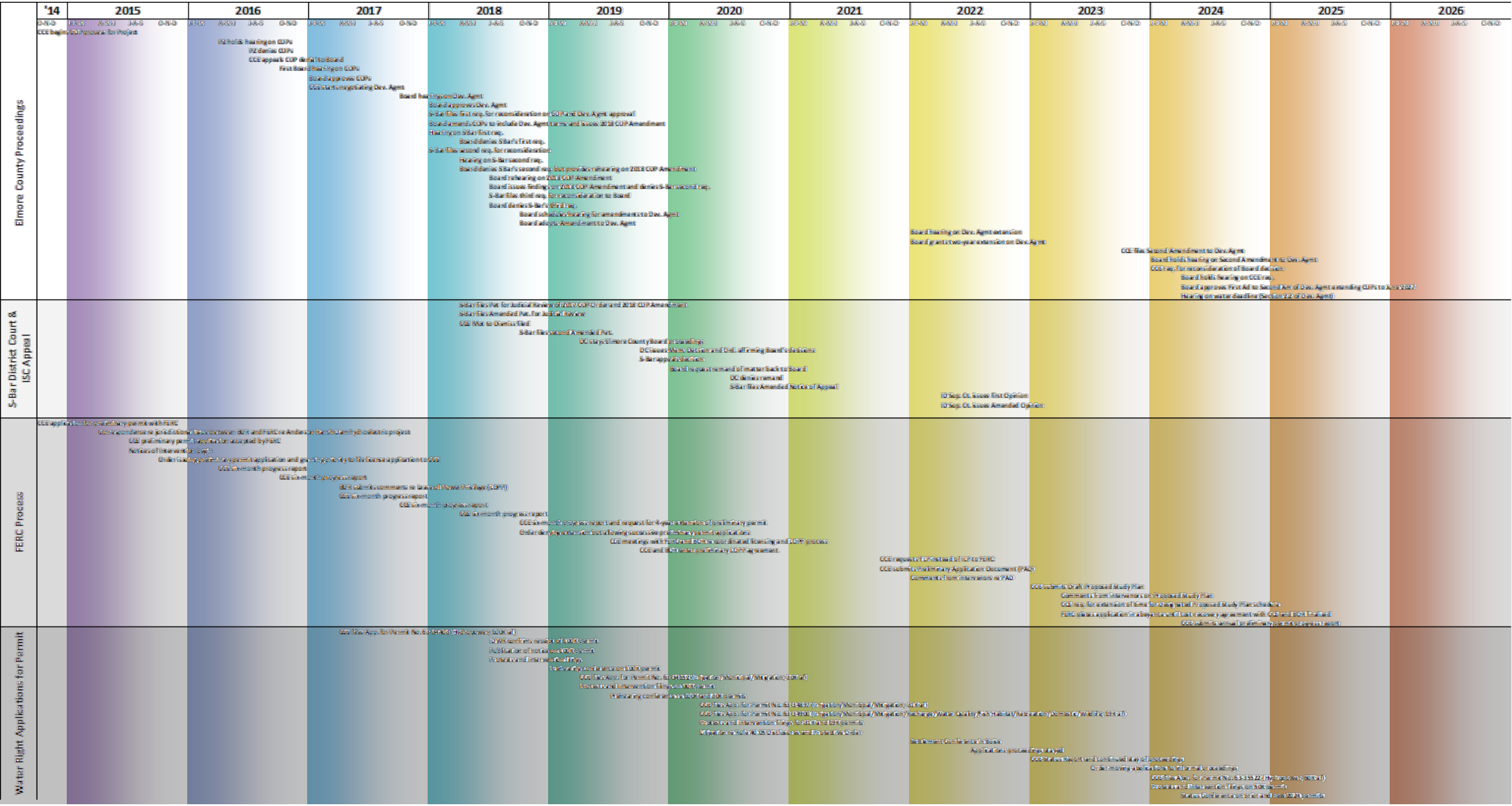
1. Name of applicant(s) Idaho Water Resource Brd. & Utah Div. of Water Resources Phone (208) 287-4800
   Name connector (check one): ☑ and ☐ or ☐ and/or
   Mailing address 322 E Front Street, PO Box 83720 City Boise
   State Idaho ZIP 83720-0098 Email brian.patton@idwr.idaho.gov
2. Name of representative, if any Ann Vonde, Deputy AG Phone (208) 334-4141
   Mailing address PO Box 83720 City Boise
   State ID ZIP 83720-0010 Email ann.vonde@ag.idaho.gov
   a. ☐ Send all correspondence for this application to the representative and not to the applicant OR
      ☑ Send original correspondence to the applicant and copies to the representative.
   b. ☐ The representative may submit information for the applicant but is not authorized to sign for the applicant OR
      ☑ The representative is authorized to sign for the applicant. Attach a Power of Attorney or other documentation.
3. Source of water supply See Attached which is a tributary of
4. Location of point(s) of diversion:

Twp	Rge	Sec	Govt Lot	¼	¼	¼	County	Source	Local name or tag #
15S	44E	16			NW	NE	Bear Lake	See Attached	B.L. Outlet Canal
15S	44E	16	2		SW	NE	Bear Lake	See Attached	B.L. Outlet Canal
14S	44E	17	5		NE	NW	Bear Lake	See Attached	Outlet Canal Gate
13S	44E	34			SE	NE	Bear Lake	See Attached	Rainbow Canal Inlet

5. Water will be used for the following purposes:
   Amount 2,000 cfs (cfs or acre-feet per year) for Diversion to Storage purposes from 10/1 to 7/31 (both dates inclusive)
   Amount 400,000 af (cfs or acre-feet per year) for Irrigation Storage purposes from 1/1 to 12/31 (both dates inclusive)
   Amount 400,000 af (cfs or acre-feet per year) for Municipal Storage purposes from 1/1 to 12/31 (both dates inclusive)
   Amount _____ (cfs or acre-feet per year) for See Attached Supplement purposes from _____ to _____ (both dates inclusive)
6. Total quantity to be appropriated is (a) 2,000 cubic feet per second (cfs) and/or (b) 400,000 acre-feet per year (af).
7. Proposed diverting works:
   a. Describe type and size of devices used to divert water from the source. See Attached
   b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet. If the reservoir will be filled more than once each year, describe the refill plan in item 12. For dams 10 feet or more in height AND having a storage capacity of 50 acre-feet or more, submit a separate Application for Construction or Enlargement of a New or Existing Dam. Application required? ☐ Yes ☐ No
   c. Proposed well diameter is _____ inches; proposed depth of well is _____ feet.
   d. Is ground water with a temperature of greater than 85°F being sought? ☐ Yes ☐ No
   e. If well is already drilled, when? _____; drilling firm _____; well was drilled for (well owner) _____; Drilling Permit No. _____.

Summary of CCE Project Events to Date

- Project comprised of five components
  - Reservoir with hydroelectric turbines
  - Solar panels
  - Wind turbines
  - Electrical transmission lines
  - Onsite power station
- Requires coordination with Elmore County Commissioners for conditional use permits, FERC, Reclamation, IDWR and Project investors/customers
- Lots of moving parts and studies which impact one another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2025
2026
Elmore County Proceedings
5-Bar District Court & ISC Appeal
FERC Process
Water Right Applications for Permit

Go Forward Plan

- Continue to coordinate with BOR and stakeholders on LOPP and study plan
- After LOPP finalized FERC will take application out of abeyance and process will continue
- Finalize study plan and conduct FERC-NEPA (National Environmental Policy Act) studies
- Work to cooperatively resolve IDWR Permit Application protests after study results
- If necessary, reinitiate IDWR formal proceedings and resolve remaining protests

Other Issues?