NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

For Immediate Release:
May 1, 2024
Release No. 24-011

Contact: Scott Lawrence
Public Affairs Office
(206) 764-6896

Albeni Falls Dam spill operations remain restricted

SEATTLE – Spill operations remain restricted at Albeni Falls Dam in Oldtown, Idaho, while U.S. Army Corps of Engineers' officials respond to the discovery of base metal flaws and defects identified on a spillway gate undergoing rehabilitation. The flaws were discovered in April 2024 as part of a major gate rehabilitation contract initiated in June 2023.

The Albeni Falls spillway gates are original to the dam, constructed in 1955. Since the gates were fabricated at the same time using the same type of steel, USACE is developing a schedule to evaluate all gates and determine if similar, recently discovered defects exist.

Current hydrologic modeling indicates maintaining current Lake Pend Oreille elevation until late May might be necessary. Officials are monitoring real-time weather, streamflow trends and updating modeling predictions daily. Once lakeshore flood risk passes, USACE will operate to meet normal summer pool elevations as quickly as possible.

"We need to keep storage space available to guard against the potential for rain or snow events that can lead to sudden spring high inflows," said Albeni Falls Dam Operating Project Manager Amanda Smith. "The basin is extremely large so there is a lot to consider when monitoring the conditions. These rain events can happen in any year, so we are being cautious during refill operations."

This weekend's temperatures are forecast to be the season's warmest. This significant warming should provide more clarity on snowpack runoff and the Corps expects to issue an update on refill operations next week.

To sustain current lake elevations, USACE may need to remove one gate next week when inflows are predicted to exceed full powerhouse capacity of approximately 30,000 cubic feet per second.

"The Corps continues to closely monitor upstream storage projects, streamflow, snowpack and weather forecasts," said Smith. "We are adjusting our operations in real-time as conditions allow."

To receive email notifications for Albeni Falls Dam outflow changes and near-term lake elevation projections, email uppercolumbiawm@usace.army.mil and request to be added.

###

Albeni Falls Flow Update - 15 May 2024

1 message

Varner, David C CIV USARMY CENWS (USA) <David.C.Varner@usace.army.mil>
To: UpperColumbiaWM <UpperColumbiaWM@usace.army.mil>

Wed, May 15, 2024 at 9:39 AM

Good morning,

Current Conditions:

Lake Pend Oreille Elevation at Hope: 2,055.32 feet

Albeni Falls Dam Outflow: 31,000 cubic feet per second (cfs)

Changes and Highlights:

- Albeni Falls Dam outflow will increase from 31.0 kcfs to 36.0 kcfs at 10:00 PDT, then increase to 40.0 kcfs at 11:00 PDT today, May 15th.
- We are currently operating with spill gate restrictions. The currently planned operation is to maintain current lake elevations and maximize existing storage space. To accomplish this, one spill gate was removed on May 14th.
- Even with very low snowpack being recorded in the basin, there still is significant uncertainty in the inflow forecasts both in terms of total volume and timing (how fast the snow melts). We are monitoring real-time weather, streamflow trends, and updating modeling predictions daily. Once lakeshore flood risk passes, USACE will operate to meet normal summer pool elevations as quickly as possible.

Short-term modeling forecasts are provided by the Northwest River Forecast Center. Their projections for Albeni Falls Dam inflow, outflow, and Lake Pend Oreille elevation at the Hope gage can be found here:

http://www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?lid=ALFW1

The range of monthly inflow volume forecasts are provided by the Northwest River Forecast Center.

ESP Monthly Water Supply Volumes: PEND OREILLE - ALBENI FALLS DAM (noaa.gov)

Press releases for Albeni Falls Dam can be found here:

Seattle District News Releases (army.mil)

David Varner, P.E.

Hydrology Section

Seattle District Corps of Engineers

206-316-3155

Gmail Molly McCahon <lakescommission@gmail.com>

Form Letter Lake Level Issue

2 messages

Alison Murphy <alisonmurphyidaho@gmail.com> Thu, May 16, 2024 at 12:27 PM
To: lakescommission@gmail.com

Hi,

Do you have a sample type form letter I can modify or work from in regard to the lake level issue? I received an email from Waterfront Property Management with all the contact information (Governor, Senators, IDL, corps, etc). I'm just curious is there's a letter I can work from that has a more in-depth scope of the issues at play.

From my end, my lakefront clients are losing their collective minds, but it will also damage the ability of several of my clients to sell. I can speak to this. I know there's a lot more I'm less informed on, so I'm hoping this is where you can help?

Any help you could provide would be most appreciated.

Thanks! Alison

Molly McCahon <lakescommission@gmail.com> Thu, May 16, 2024 at 12:39 PM
To: Alison Murphy <alisonmurphyidaho@gmail.com>

Hi Alison,
Yes, "losing their collective minds" is the theme of my life right now! LOL

I am still working on a letter myself....this is challenging with so little information. I will send you a template letter ASAP.

I think pictures will be helpful. As you know, every site is different depending on whether there is a fixed dock, floating dock, long launch, shallow or deep bay, size of boat, type of boating, etc....

I will be back in touch soon.

Molly McCahon
Lakes Commission
Executive Director
phone: (208)265-4568
work cell: (208)255-8825
email: lakescommission@gmail.com
website: lakescommission.org

Lake Pend Oreille

1 message

BJ Holinka <dbholinka1@aol.com> Tue, May 14, 2024 at 9:24 AM
To: "lakescommission@gmail.com" <lakescommission@gmail.com>

RE: Lake Pend Oreille Water Level

This letter is to let you know my concern how the fluctuating lake levels and the delay to fill the Lake this Spring effect me as a property owner on the Lake on Bottle Bay. The Holinka family has owned property since 1962. The family has enjoyed the summers on the lake and have extended family and friends come from all over United States to enjoy their time on the water and at our home. I fear that will not be a possibility this summer.

If there are indeed repairs needed to Albeni Falls Dam, let's get them done. My concern is that we don't seem to be getting a lot of information about the problem(s).

I have specific questions:
Why was the dam inspection conducted in the Spring just prior to spring/summer recreation expectations?
Why was the dam not routinely inspected in the fall so any needed repairs could have been made (or at least initiated) during the winter when the users of the Lake are at a minimum?
Are the people in charge, i.e. the Army Corps of Engineers working 24/7 to get this problem fixed?
It would seem to me this problem is that important!!!

Please do what you can to get this problem solved. We Lake Users would like more information. We Lake Users would like to have the “State Laws on the Books” followed so all the involved parties have a say in Lake Pend Oreille issues.

I want to preserve Lake Pend Oreille beauty and use for future generations and protect the rights of the
people who have an invested interest in the Lake.

Thank you for your attention in this matter.

BJ Holinka
571 East Bottle Bay Rd
Sagle, Idaho 83860
208-659-6545

Bonner County Tax Payer Concerns

2 messages

Brad Epker <bepker@gmail.com> Fri, May 17, 2024 at 8:47 AM
To: Molly McCahon <lakescommission@gmail.com>

(Molly, will you do me a favor and please review and feel free to edit any items that are inaccurate, or add any facts you think need to be emphasized. From there I will send this to the county commissioners and the Mayor)

County Commissioners,

As a long time Bonner County Tax Payer with multiple properties throughout Bonner County, including 2 lake front properties I have some significant concerns that I feel need to be addressed by our local government.

My concerns start with the level of the lake not just this year, but every year. Clearly this year's situation is well known by all of us, but the annual lake level has been a concern for many years. It is my understanding through my research that when the Albeni Falls Dam was constructed nearly 70 years ago, the Law required the Army Corps of Engineers (ACE) to maintain the lake level to full summer pool for a minimum of 6 months a year. With recreation being the number one priority as written in the law. Since that time, ACE has only complied with this law one year, and the local businesses and residents are suffering significant financial damage because of this. Every year ACE has some reasoning for the lack of compliance, however most of these can be debunked with just the slightest bit of logic. (i am more than willing to discuss each at length)

As a waterfront taxpayer, I would like to know what our Elected Officials are doing to resolve this situation for this year and future years. Until we have a successful remedy from our Local and State Government, the Federal Government will continue to take advantage of all or the residents of Bonner County and beyond!

If nothing is done to resolve this matter I feel the only solutions will be to prorated our Property Tax bills based on actual time that the lake it at full pool. As an example, if ACE continues to break the Law and only delivers 3 months of the 6 months of full summer pool, I recognize that as 50% of the commitment to the Law, and therefore believe all waterfront tax payers, should prorate their tax bill accordingly. This should continue until you our elected officials help your citizens resolve this issue that is costing us millions of dollars in lost tourism revenue.

I would be glad to discuss this issue further, and anticipate a timely response to the email.

Regards,

Brad Epker
1123 West Oden Bay Road
Sandpoint, ID

1069 West Oden Bay Road
57 Lower Wyvern Way
10000 Schweitzer Mountain Road

Molly McCahon <lakescommission@gmail.com> Fri, May 17, 2024 at 9:16 AM
To: Brad Epker <bepker@gmail.com>

Good Morning,

I think your letter is spot on. Below is an excerpt from Senate Doc #9 which is the legal document establishing summer pool guidelines. The quote below is actually from the Corps last years. I have attached the document as well. I would include both in your email. I would also attach pictures of your property.

"Senate document number 9, on page 21, Chapter 3, paragraph 59, states the multipurpose nature of the project, including recreation. The paragraph also states the following:"

1. *"The proposed method of reservoir operation will provide simultaneously the maximum in system power benefits and the maximum in flood-control benefits."*
2. *"Flood above normal pool elevation 2,062.5 will be passed through the reservoir as rapidly as possible and surplus waters will be impounded and held at normal pool level until fall, thereby stabilizing Pend Oreille Lake levels through the spring and summer recreational period of about 6 months, in contrast with the rapid recession of lake levels now experienced from June to September."*

Molly McCahon
Lakes Commission
Executive Director
phone: (208)265-4568
work cell: (208)255-8825
email: lakescommission@gmail.com
website: lakescommission.org

[Quoted text hidden]

Senate_Doc_9.pdf
6079K

Lake Fill

2 messages

Brant Hinze <branthinze@yahoo.com> Fri, May 17, 2024 at 5:58 AM
To: Molly McCahon <lakescommission@gmail.com>

Molly

Any update from the ACOE on lake fill forecast?

Regards

Brant Hinze

Sent from my iPad

Molly McCahon <lakescommission@gmail.com> Fri, May 17, 2024 at 7:45 AM
To: Brant Hinze <branthinze@yahoo.com>

Hi Brant,
We don't have any new information. But it appears they will definitely hold this level until end of May. I really hope they realize the low flow conditions are not a flood risk and refill quickly beginning in June. So many people are upset and can't access their slips or conduct business that they normally could this time of year. Please do keep writing and blowing up the phone to the Congressional delegation and county commissioners.

luke.omodt@bonnercountyid.gov
steven.bradshaw@bonnercountyid.gov
asia.williams@bonnercountyid.gov

I plan to send an "update"out today.
[Quoted text hidden]

Lake Pend Orielle

1 message

Craig Roberts <robertsc246@gmail.com> Mon, May 13, 2024 at 8:51 AM
To: "lakescommission@gmail.com" <lakescommission@gmail.com>

To whom it may concern:

I recently heard the US Corps of Engineers will delay the filling of Lake Pend Oreille due to May “repairs to the Albeni Falls Dam”. I also discovered the Corps has decided to hold an extra 2 feet of water in Flathead Lake, which drains into Lake Pend Oreille. This is not acceptable if it lasts past the boating season.

I own a fixed dock, the proposed delay will affect my ability to use our boat. This will have negative effects on the local economy, tourism, fishing and activity on our lake guaranteed by Senate Document #9.

Additionally, I have pressing concerns regarding Regional General Permit Number 27 (RGP-27) for Lake Pend Oreille and proposed rule changes by the Idaho Department of Lands (IDL). These developments have the potential to impact my rights and the preservation of Lake Pend Oreille's native fish species, scenic beauty, and recreational opportunities.

This proposed rule changes by the IDL present a an overreach and conflict with existing statutes, including the Lake Protection Act and the state constitution.

I am very concerned with:

•Changes in the legal “ordinary water mark”, which affect all lakeshore property owners and their property rights

•Changes regarding native fish species, recreational opportunities and scenic beauty

My concern involves the Army Corps of Engineers introducing a new Regional General Permit specifically for Lake Pend Oreille. This permit requires a biological opinion only for this lake, while other lakes in Idaho do not have the same requirement. This inconsistency raises concerns about the fairness and effectiveness of the permitting process.

I believe existing water rights and permits should be safeguarded and not be diminished by these proposed changes. The Idaho Code explicitly protects these rights and emphasizes the state's commitment to fair and just water resource management.

Lastly, our family has been in this area for the last 25 years, I think the officials of Idaho making these decisions have to think about the potential lawsuits from ALL owners who could potentially lose millions of dollars in property values,

not to mention the loss in taxes that we have been accessed up to this point. I have a fixed dock as well, so there would also be the compensation for the expenses that were paid out to build the fixed dock, plus the expense of building a new floating dock. I would hope that the possible changes propose will be shut down and keep Lake Pend Oreille the lake it is now!!

I would like to know your position on this matter.

Craig Roberts

Sagle ID 83860

Gmail Molly McCahon <lakescommission@gmail.com>

FW: Urgent Action Needed For Lake Pend Oreille

1 message

Jamie Brunner <Jamie.Brunner@deq.idaho.gov> Mon, May 13, 2024 at 4:11 PM
To: "lakescommission@gmail.com" <lakescommission@gmail.com>

Hi Molly,

Are you familiar with this?

Jamie

From: Lake Pend Oreille Alliance <info@savependoreille.net>
Sent: Friday, May 10, 2024 1:07 PM
To: Jamie Brunner <Jamie.Brunner@deq.idaho.gov>
Subject: Urgent Action Needed For Lake Pend Oreille

View this email in your browser

LAKE PEND OREILLE
ALLIANCE

Urgent Action Needed For Lake Pend Oreille

Recently the US Corps of Engineers announced they will delay the filling of Lake Pend Oreille due to May “repairs to the Albeni Falls Dam”. However, our Alliance has also discovered the Corps has decided to hold an extra 2 feet of water in Flathead Lake, which drains into Lake Pend Oreille.

If you boat on Lake Pend Oreille, or own a fixed dock, the proposed delay will affect your ability to use your boat. This will have negative effects on the local economy, tourism, fishing and activity on our lake guaranteed by Senate Document #9.

Additionally, we have pressing concerns regarding Regional General Permit Number 27 (RGP-27) for Lake Pend Oreille and proposed rule changes by the Idaho Department of Lands (IDL). These developments have the potential to impact your rights and the preservation of Lake Pend Oreille's native fish species, scenic beauty, and recreational opportunities.

The proposed rule changes by the IDL present a potential overreach and conflict with existing statutes, including the Lake Protection Act and the state constitution.

The Lake Pend Oreille Alliance is very concerned with:

•Changes in the legal “ordinary water mark”, which affect all lakeshore property owners and their property rights

•Changes regarding native fish species, recreational opportunities and scenic beauty

Another concern involves the Army Corps of Engineers introducing a new Regional General Permit specifically for Lake Pend Oreille. However, this permit requires a biological opinion only for this lake, while other lakes in Idaho do not have the same requirement. This inconsistency raises concerns about the fairness and effectiveness of the permitting process.

We believe existing water rights and permits should be safeguarded and not be diminished by these proposed changes. The Idaho Code explicitly protects these rights and emphasizes the state's commitment to fair and just water resource management.

In light of these concerns, we urge you to take immediate action.

Contact your local representatives, the Idaho Department of Lands, and the Army Corps of Engineers to express your concerns and advocate for the protection of your rights and the preservation of Lake Pend Oreille. Your voice matters. Their contact information is below.

By adding your voice, we can ensure that these developments align with state law and prioritize the well-being of the lake and its inhabitants.

Let’s stand together to safeguard our rights and preserve the beauty of Lake Pend Oreille for future generations.

Governor Little

Email: https://gov.idaho.gov/contact/contact-us/

Telephone: 208-334-2100

U.S. Senator Mike Crapo

Email: https://www.crapo.senate.gov/contact/email-me

Telephone: 208-664-5493

U.S. Senator James Risch

Email: https://www.risch.senate.gov/public/index.cfm/email

Telephone: 208-667-6130

Congressman Russ Flucher

Email: https://fulcher.house.gov/email-me

Rep Sage Dixon

Email: SDixon@house.idaho.gov

Telephone: 208-610-4800

Rep Heather Scott

Email: HScott@house.idaho.gov

Telephone: 208-332-1190

Idaho Department of Lands:

Marde Mensinger

MMensinger@idl.idaho.gov

Army Corps of Engineers

Scott Lawrence

aaron.s.lawrence@usace.army.mil

Telephone: (208) 667-0127

Congressman Mike Simpson

Email: https://simpson.house.gov/contact/

Telephone: 208-334-1953

Senator Scott Herndon

Email: SHerndon@senate.idaho.gov

SHerndon@senate.idaho.gov

Telephone: 208-610-2680

Rep Mark Sauter

Email: MSauter@house.idaho.gov

Telephone: 208-332-1035

Lake Commission:

Ford Elsaesser & Molly McCahon

Email: lakescommission@gmail.com

Telephone: 208-265-4568

City of Dover:

Mayor Eskridge

cityclerk@cityofdoveridaho.org

Phone: (208) 265-8339

City Of Sandpoint:

Mayor Grimm

Email: https://www.sandpointidaho.gov/your-government/contact-us/e-mail-the-mayor

Telephone: 208-265-1481

To Donate to our 501(C)3 Organization, visit savependoreille.org

LAKE PEND OREILLE
ALLIANCE

Our mailing address is:
Lake Pend Oreille Alliance 120 E Lake St Ste 101 Sandpoint, ID 83864-1366 USA

I have serious concerns regarding the current modifications to the level of Lake Pend Oreille. Not only does it appear that the US Corp of Engineers suddenly identify necessary repairs for the Albeni Falls Dam just before the Spring run off and fill period for Lake Pend Oreille; I have also been informed that there are changes in water level in Flat Head Lake, Regional General Permit No. 27 and proposed rule changes by Idaho Department of Lands, proposed changes to “ordinary water mark”, and other proposed changes by the Army Corps of Engineers. All of which have a negative impact on the use, recreational opportunities, and access to the property owners and tourists that use and enjoy Lake Pend Oreille.

I implore you to take action to protect the rights of the citizens and visitors that use and enjoy Lake Pend Oreille.

Respectfully,
Donald Morris
108 Indian Meadows Rd
Sandpoint, ID 83864
208-290-1528

Senator Crapo,

Thanks for your letter of May 16th .

The Army Corp letter is dated May 1st. It came 2 days after Senator Tester's letter dated April 29th to the COE that states that there is a defect in the manufacturing of the steel in the 70 year old gate. (See Attached) Am I to understand from your letter that a defect actually exists?

The COE did not have a letter from a structural engineer stating that there was a defect with a high probability of failure in its 71st year.

Is the COE saying that the manufacturer and contractor did not meet the standard at the time of installation? Or is it a new specification?

My request is for you and your team to get involved the way that Senator Tester did.

A. Is there a defect?
B. Is there a report?
C. Why wasn't the maintenance done in October after the lake drawdown?
D. Is the "routine" Inspection that you note routinely done the week before refilling the Lake?
E. Do you have any idea of the economic impact that results directly from this?

#1- I request a copy of the policies and procedures of maintenance for the gates with the critical path timing for the inspection and rehabilitation of the spillway gates.

#2- I request a copy of the inspection report that says this affects life safety. I also request a copy of the credentials of the individuals submitting the report that say there are defects that affect life safety.

#3- I request the economic impact study and the EIS for the change in operations.

#4- I request the engineering document that states probability of failure on a gate that has lasted 70 years to fail on the 71st year.

> Senator Tester wrote on April 29th :
> Flathead Lake is extremely important to Montana's residents and economy. All of us in Montana want to see Flathead Lake at or near full pool during the summer months. In the coming weeks and months, I stand ready to work with the TMT, state, local and tribal governments and the Department of Interior to help ensure the region is in the best position to mitigate drought conditions. Montanans have an opportunity here to work together to achieve the best possible results.

Are they playing the Safety Card- Or is this a political decision?

Senator Tester was able to affect change for Montanans and Lake Pend Oreille is of the utmost importance to Idahoans-With all due respect Sir, we request your help in determining the answer to these questions.

Thank you for your consideration in this matter.

Jenny Hixson

From: Senator Mike Crapo <correspondence_reply@crapo.senate.gov>
Sent: Thursday, May 16, 2024 6:57 AM
To: Jenny Hixson <jenny@sandpointwaterfront.com>
Subject: Correspondence from Senator Crapo

May 16, 2024

Jenny Hixson
10654 N Boyer Rd
Sandpoint, ID 83864-8857

Dear Jenny:

Thank you for contacting me regarding the operations of the Albeni Falls Dam. I appreciate hearing from you and welcome the opportunity to respond.

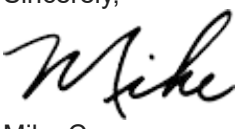
The Albeni Falls Dam is a hydroelectric power plant managed by the U.S. Army Corps of Engineers (USACE). In April, the USACE had to modify the spillway operations due to metal defects that were recently discovered on a single dam gate. These defects were found during a routine inspection and rehabilitation. As you noted in your correspondence, these defects have modified water flow and delayed changes in water level. According to the USACE, the current Lake Pend Orielle water elevation will have to stay the same until late May. USACE will operate to meet normal summer pool elevations as quickly as possible. To sustain current lake elevations, USACE may need to remove one gate when inflows are predicted to exceed full powerhouse capacity of approximately 30,000 cubic feet per second. If you would like information regarding the status of the Albeni Falls Dam, I have attached a helpful resource below:

https://www.nws.usace.army.mil/Missions/Civil-Works/Locks-and-Dams/Albeni-Falls-Dam/

While I understand your frustrations regarding the speed and timing of these repairs, the safety concerns surrounding the structural stability of Albeni Falls Dam's gates remain paramount. I will continue to monitor the repair progress of the Albeni Falls Dam. I appreciate you taking the time to share your views about this important issue.

Again, thank you for contacting me. I appreciate you taking the time to share your thoughtful observations with me as it is essential for me to know of the concerns of all Idahoans. Please feel free to contact me in the future on matters of interest to you. You can also find more information about what is going on in the U.S. Senate as well as news releases, photos and other items at my Senate website, https://www.crapo.senate.gov .

Sincerely,



Mike Crapo
United States Senator

MDC:BE

Jennifer Ekstrom Mon, May 13, 9:12 AM (4 days ago)

to me

Thanks Molly.. Hope you had a great weekend! Friday night was such a brilliant light show-WOW!
If you learn any insider scoop from the Corps about what is actually happening with the damages to the gate or gates and how they are planning to fix those, and if you are able to share that info I'd be grateful.
Cheers,

Jennifer Ekstrom
North Idaho Director
208.318.5812

Idaho Conservation League
P.O. Box 2308
Sandpoint, ID 83864

https://www.idahoconservation.org/
Twitter / Facebook / Instagram

Brad Epker Sat, May 11, 6:20 AM (6 days ago)

to me

Really! Flood risks! Seems to me more excuses to sell electricity and deny recreational access!

Fix It

2 messages

Jeff Penna <jpenna03@icloud.com> Fri, May 10, 2024 at 9:33 PM
To: lakescommission@gmail.com

The proposed rule changes by the IDL present a potential overreach and conflict with existing statutes, including the Lake Protection Act and the state constitution.

The Lake Pend Oreille Alliance is very concerned with:
•Changes in the legal "ordinary water mark", which affect all lakeshore property owners and their property rights
•Changes regarding native fish species, recreational opportunities and scenic beauty

Another concern involves the Army Corps of Engineers introducing a new Regional General Permit specifically for Lake Pend Oreille. However, this permit requires a biological opinion only for this lake, while other lakes in Idaho do not have the same requirement. This inconsistency raises concerns about the fairness and effectiveness of the permitting process.

We believe existing water rights and permits should be safeguarded and not be diminished by these proposed changes. The Idaho Code explicitly protects these rights and emphasizes the state's commitment to fair and just water resource management.
In light of these concerns, we urge you to take immediate action.
Jeff Penna
(509) 954-9718
jpenna03@icloud.com

Molly McCahon <lakescommission@gmail.com> Tue, May 14, 2024 at 4:11 PM
To: Jeff Penna <jpenna03@icloud.com>

Thank you for your email, Jeff.
We share your concerns and are looking into this issue.

If you would like to be added to our email list, I will send you updates as we learn more on this issue.

Best,

Molly McCahon
Lakes Commission
Executive Director
phone: (208)265-4568
work cell: (208)255-8825
email: lakescommission@gmail.com
website: lakescommission.org

[Quoted text hidden]

Gmail Molly McCahon <lakescommission@gmail.com>

FW: Economic Impact Study -----LPA economic study sample

1 message

Ralph Sletager <Ralph@sandpointwaterfront.com> Mon, May 13, 2024 at 1:42 PM
To: Molly McCahon <lakescommission@gmail.com>

Hi Molly,

Attached is a copy of an Economic Impact Study on Lake Koshkonong Drawdown: A Debate on the Value of 2 Inches of Water.

Thanks rs

06_02_kashian.pdf
124K

Lake Pend Oreille

1 message

Ned Wendle <nedp64@gmail.com> Sat, May 11, 2024 at 7:07 AM
To: Molly McCahon <lakescommission@gmail.com>

We have been mooring our boat in Sandpoint Marina for 25 years and have a family that has over a 100 year history on or around Lake Pend Oreille. While we appreciate the Corp. for being diligent in fixing potential issues on the Albeni Falls Dam and understand the importance of public safety, we are concerned about the impact on our boating season, local economy, etc. which is already very short (May 19th - October 1st).
We were wondering why the Corp. isn't conducting these types of inspections during the winter months when the water is already down.

Therefore, we kindly ask that you conduct the inspections quickly and start to refill the lake so that we don't lose any of our short season.
We are also very concerned about the army corps willingness to break contracted rules as it pertains to RGP 27 and senate document #9.

Respectfully,

Ned P. Wendle

Gmail

Molly McCahon <lakescommission@gmail.com>

Lake Level

2 messages

Kelly Prior <kprior@litehouseinc.com> Mon, May 13, 2024 at 8:41 AM
To: "lakescommission@gmail.com" <lakescommission@gmail.com>

Allegedly there are issues at the Albani Falls dam that is impeding the refill of Lake Pend Oreille this year. Enough is enough, between the tribe and the utility district, there is not adherence to the full pool for six months. Dam maintenance should be routine and through the winter when the lake level was down, so to have this crop up during the filling of the lake is rather suspicious, especially during a year where the runoff is light and the ability for the dam to generate as much electricity is low.

This lake was built for recreation and the utility benefit is only an additional perk. It is time we took the lake back to ensure its proper contribution to the Sandpoint, Hope, Dover, and Bayview communities. It has been another tough winter for tourism and the businesses and residents need this lake at full pool to make it through another year. We cannot accept further delays in filling the lake and/or continued ignorance around the requirement to keep it full.

It is time our legislators supported our communities and put their foot down to fight for the lake level. Are they prepared to lower our taxes for not having lake front for 10 months out of the year? We can't have it both ways.

Fill this lake!

Thank you.

Kelly Prior

Concerned Citizen

President/CEO Litehouse, Inc.

Kelly Prior // President & CEO // Employee Owner
Front Desk 208-920-2000
www.litehousefoods.com

Molly McCahon <lakescommission@gmail.com> Tue, May 14, 2024 at 4:21 PM
To: Kelly Prior <kprior@litehouseinc.com>

Hello Kelly,
Thank you for the email. We share your concerns! We are still unclear on what the actual situation is with the spillway gates and we are asking the Corp to let us know asap.
We will update you as we learn more.

Best,

Molly McCahon
Lakes Commission
Executive Director
phone: (208)265-4568
work cell: (208)255-8825
email: lakescommission@gmail.com
website: lakescommission.org

[Quoted text hidden]

Gmail Molly McCahon <lakescommission@gmail.com>

Lake Pend Oreille

1 message

Lea Cody <leacody@gmail.com> Mon, May 13, 2024 at 4:21 PM
To: lakescommission@gmail.com

To whom it may concern,

Can you enlighten me on the changes being considered for the lake? It appears our rights and values will be affected by these changes and our tourism will be deeply affected. I am very concerned about the issue. The lake will not be full this year until July 1 - one full month later than normal and 1/3 of our summer season. I cannot put my boat at my dock because there is nothing there but dirt. This is unacceptable and I need to know what is being done to protect our property values and water rights!

Thank you!

--

Lea Cody

Gmail

Molly McCahon <lakescommission@gmail.com>

Lake Pend Oreille

2 messages

Rich Sugden <rsugdenmd@gmail.com> Sat, May 11, 2024 at 1:16 PM
To: SDixon@house.idaho.gov
Cc: HScott@house.idaho.gov, MMensinger@idl.idaho.gov, aaron.s.lawrence@usace.army.mil, Mader Erin <lakescommission@gmail.com>, SHerndon@senate.idaho.gov, cityclerk@cityofdoveridaho.org, MSauter@house.idaho.gov

Dear Rep. Dixon, Rep Scott, Marde Mensinger, Scott Lawrence, Ford Elsaesser, Senator Scott Herndon, Mayor Eskridge, Rep. Sauter, and Mayor Grimm,

My wife and are are in our 80's, and have a Summer home on Lake Pend Oreille that we have been enjoying for the past 30 years, especially since I have slowed down my family medicine practice, and have more time to be on the lake.

I share the concerns expressed below by the Lane Pend Oreille Alliance, and am getting concerned about the decisions made about the lake level, and who is making them, and why.

I hope you are also concerned, and are looking into the reasoning behind the decisions, and are ensuring those decisions are based on common sense, and fact … and not based on political one-ups-man-ship between agencies and departments.

Thank you for all you are doing for our country, state and town … and keep up the good work. And, thank you for your attention to my concerns!!

Rich and Sue Sugden
Lot 3, Warren Is.land
Hope, Id

PS - I hope that you had a chance to see the Aurora Borealis last evening … this photo shot from the Hope Marina!

From: Lawrence, Aaron S CIV USARMY CENWS (USA) <Aaron.S.Lawrence@usace.army.mil>
Sent: Friday, May 10, 2024 12:07 PM
Subject: News Release: Spill operations at Albeni Falls Dam remain restricted

Spill operations at Albeni Falls Dam remain restricted

SEATTLE – Spill operations remain restricted at Albeni Falls Dam in Oldtown, Idaho, while U.S. Army Corps of Engineers' officials respond to the discovery of base metal flaws and defects identified on a spillway gate undergoing rehabilitation. The flaws were discovered in April 2024 as part of a major gate rehabilitation contract initiated in June 2023.

The Albeni Falls spillway gates are original to the dam, constructed in 1955. Since the gates were fabricated at the same time using the same type of steel, USACE is developing a schedule to evaluate all gates and determine if similar, recently discovered defects exist.

Current hydrologic modeling indicates maintaining current Lake Pend Oreille elevation until late May might be necessary.

Officials are monitoring real-time weather, streamflow trends and updating modeling predictions daily. Once lakeshore flood risk passes, USACE will operate to meet normal summer pool elevations as quickly as possible.

"We need to keep storage space available to guard against the potential for rain or snow events that can lead to sudden spring high inflows," said Albeni Falls Dam Operating Project Manager Amanda Smith. "The basin is extremely large so there is a lot to consider when monitoring the conditions. These rain events can happen in any year, so we are being cautious during refill operations."

This weekend's temperatures are forecast to be the season's warmest. This significant warming should provide more clarity on snowpack runoff and the Corps expects to issue an update on refill operations next week.

To sustain current lake elevations, USACE may need to remove one gate next week when inflows are predicted to exceed full powerhouse capacity of approximately 30,000 cubic feet per second.

"The Corps continues to closely monitor upstream storage projects, streamflow, snowpack and weather forecasts," said Smith. "We are adjusting our operations in real-time as conditions allow."

To receive email notifications for Albeni Falls Dam outflow changes and near-term lake elevation projections, email uppercolumbiawm@usace.army.mil and request to be added.

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

For Immediate Release:
May 15, 2024
Release No. 24-011

Contact: Scott Lawrence
Public Affairs Office
(206) 764-6896

Albeni Falls Dam spill gate removed to mitigate flood risk

SEATTLE – To sustain current Lake Pend Oreille elevations and mitigate lakeshore flood risk, U.S. Army Corps of Engineers' officials removed a spill gate on May 14, and reduced powerhouse flows to achieve the desired total outflow.

During this operation, powerhouse flows were reduced to regulate the total flow increase to 5,000 cubic feet per second and the gate was removed without incident.

Spill operations remain restricted at Albeni Falls Dam in Oldtown, Idaho, while USACE officials respond to the discovery of base metal flaws and defects identified on a spillway gate undergoing rehabilitation. The flaws were discovered in April 2024 as part of a major gate rehabilitation contract initiated in June 2023.

USACE officials are minimizing spill gate movements, so rather than moving multiple gates to regulate lake elevation, a single gate was fully removed.

Current hydrologic modeling indicates maintaining current Lake Pend Oreille elevation until late May might be necessary. Officials are monitoring real-time weather, streamflow trends and updating modeling predictions daily.

Once lakeshore flood risk passes, USACE will operate to meet normal summer pool elevations as quickly as possible.

Even with lower-than-normal snowpack recorded in the basin, there still is significant uncertainty in the inflow forecasts both in terms of total volume and snowpack runoff timing.

The Corps is closely monitoring upstream storage projects, streamflow, snowpack and weather forecasts, and officials are adjusting operations in real-time as conditions allow.

"We need to keep storage space available to guard against the potential for rain or snow events that can lead to sudden spring high inflows," said Albeni Falls Dam Operating Project Manager Amanda Smith. "The basin is extremely large so there is a lot to consider when monitoring the conditions. These rain events can happen in any year, so we are being cautious during refill operations."

To receive email notifications for Albeni Falls Dam outflow changes and near-term lake elevation projections, email uppercolumbiawm@usace.army.mil and request to be added.

###

Concern of Lake Pend Oreille

1 message

Paula Oswald <ejjposwald@yahoo.com> Tue, May 14, 2024 at 11:27 AM
To: "MSauter@house.idaho.gov" <msauter@house.idaho.gov>, "SDixon@house.idaho.gov" <sdixon@house.idaho.gov>, "HScott@house.idaho.gov" <hscott@house.idaho.gov>, "MMensinger@idl.idaho.gov" <mmensinger@idl.idaho.gov>, "aaron.s.lawrence@usace.army.mil" <aaron.s.lawrence@usace.army.mil>, "SHerdon@senate.idaho.gov" <sherdon@senate.idaho.gov>, "lakescommission@gmail.com" <lakescommission@gmail.com>, "cityclerk@cityofdoveridaho.org" <cityclerk@cityofdoveridaho.org>

May 14, 2024

To: Idaho State and Federal Officials

My parents bought their 100feet of frontage property on Bottle Bay, Pend Oreille Lake in 1958-59 on which they built their cabin. Summers on the lake with five children was a treasure trove of family memories. Fishing, swimming, water skiing were some of those great activities, Watching for eagles, deer, geese and other birds enhanced the beauty of wildlife and the relationship with humans. Two of my siblings still own that property. My wife and I have bought our own 50 foot frontage lot for our children and grandchildren on Bottle Bay.

If the existing rules and regulations are change so drastically that water levels are not raised to allow land owners, guests, and visitors the privilege to use their existing fixed docks, it would be a huge disservice to local business, marinas, dock repair and others around the lake. It is always a family activity to boat to Sandpoint for shopping, dinner and ice cream.

Pend Oreille Lake should be at max level, ordinary water mark, by Memorial weekend. It provides the perfect opportunity for local business to strengthen their economy, provide opportunity for guests and locals to take advantage of lake and mountain activities plus enjoy food, drink, concerts and relaxation.

The Lake Protection Act and the State Constitution were set in place many years ago to protect the lake, land owners and guests and for future generations. Existing water rights and permits should be fair to all in Idaho. Any changes should include ALL lakes in Idaho not just Pend Oreille. Any changes should be researched to protect and safe guard the beauty of the Lake Pend Oreille area for now and the future.

We appreciate that the Albeni Falls Dam regulates the spring run-off. This dam protects our property from flooding. We also know dropping the lake level in September helps with lack of spring floods.

At this point, we cannot get our boat onto the lift attached to the fixed dock. We hope that this dilemma regarding RGP27 and Senate Document #9 are protecting Lake Pend Oreille with the very best of interest.

Respectfully submitted

Jeff and Paula Oswald

ejjposwald@yahoo.com
509 455 6756

Gmail

Molly McCahon <lakescommission@gmail.com>

Lake Pend Oreille

3 messages

Rich Sugden <rsugdenmd@gmail.com> Sat, May 11, 2024 at 1:16 PM
To: SDixon@house.idaho.gov
Cc: HScott@house.idaho.gov, MMensinger@idl.idaho.gov, aaron.s.lawrence@usace.army.mil, Mader Erin <lakescommission@gmail.com>, SHerndon@senate.idaho.gov, cityclerk@cityofdoveridaho.org, MSauter@house.idaho.gov

Dear Rep. Dixon, Rep Scott, Marde Mensinger, Scott Lawrence, Ford Elsaesser, Senator Scott Herndon, Mayor Eskridge, Rep. Sauter, and Mayor Grimm,

My wife and are are in our 80's, and have a Summer home on Lake Pend Oreille that we have been enjoying for the past 30 years, especially since I have slowed down my family medicine practice, and have more time to be on the lake.

I share the concerns expressed below by the Lane Pend Oreille Alliance, and am getting concerned about the decisions made about the lake level, and who is making them, and why.

I hope you are also concerned, and are looking into the reasoning behind the decisions, and are ensuring those decisions are based on common sense, and fact … and not based on political one-ups-man-ship between agencies and departments.

Thank you for all you are doing for our country, state and town … and keep up the good work. And, thank you for your attention to my concerns!!

Rich and Sue Sugden
Lot 3, Warren Is.land
Hope, Id

PS - I hope that you had a chance to see the Aurora Borealis last evening … this photo shot from the Hope Marina!

==========

LAKE PEND OREILLE
ALLIANCE

Urgent Action Needed For Lake Pend Oreille

Recently the US Corps of Engineers announced they will delay the filling of Lake Pend Oreille due to May “repairs to the Albeni Falls Dam”. However, our Alliance has also discovered the Corps has decided to hold an extra 2 feet of water in Flathead Lake, which drains into Lake Pend Oreille.

If you boat on Lake Pend Oreille, or own a fixed dock, the proposed delay will affect your ability to use your boat. This will have negative effects on the local economy, tourism, fishing and activity on our lake guaranteed by Senate Document #9.

Additionally, we have pressing concerns regarding Regional General Permit Number 27 (RGP-27) for Lake Pend Oreille and proposed rule changes by the Idaho Department of Lands (IDL). These developments have the potential to impact your rights and the preservation of Lake Pend Oreille's native fish species, scenic beauty, and recreational opportunities.

The proposed rule changes by the IDL present a potential overreach and conflict with existing statutes, including the Lake Protection Act and the state constitution.

The Lake Pend Oreille Alliance is very concerned with:

•Changes in the legal “ordinary water mark”, which affect all lakeshore property owners and their property rights

•Changes regarding native fish species, recreational opportunities and scenic beauty

Another concern involves the Army Corps of Engineers introducing a new Regional General Permit specifically for Lake Pend Oreille. However, this permit requires a biological opinion only for this lake, while other lakes in Idaho do not have the same requirement. This inconsistency raises concerns about the fairness and effectiveness of the permitting process.

We believe existing water rights and permits should be safeguarded and not be diminished by these proposed changes. The Idaho Code explicitly protects these rights and emphasizes the state's commitment to fair and just water resource management.

Lake Pend Oreille Alliance

Molly McCahon <lakescommission@gmail.com> Tue, May 14, 2024 at 4:19 PM
To: Rich Sugden <rsugdenmd@gmail.com>

Hello Rich,
Thank you for the email. We share your concerns! We are still unclear on what the actual situation with the spillway gates is and we are asking the Corp to let us know asap.
We will update you as we learn more.

Best,

Molly McCahon
Lakes Commission
Executive Director
phone: (208)265-4568
work cell: (208)255-8825
email: lakescommission@gmail.com
website: lakescommission.org

[Quoted text hidden]

Rich Sugden <rsugdenmd@gmail.com> Tue, May 14, 2024 at 5:11 PM
To: Mader Erin <lakescommission@gmail.com>

Thanks Molly … a beautiful few days at the lake!!

Rich - from Warren Is.
[Quoted text hidden]

Rich Sugden M.D.
rsugdenmd@gmail.com

81ST CONGRESS, 1st Session | SENATE | DOCUMENT No. 9

IMPROVEMENT AT ALBENI FALLS ON PEND OREILLE RIVER, IDAHO

LETTER

FROM THE

SECRETARY OF WAR

TRANSMITTING TO THE

CHAIRMAN OF THE COMMITTEE ON PUBLIC WORKS UNITED STATES SENATE

PURSUANT TO A

RESOLUTION OF THE COMMITTEE ON COMMERCE OF APRIL 6, 1937, A REVIEW OF REPORTS ON THE COLUMBIA RIVER AND TRIBUTARIES, CONCERNING IMPROVEMENT AT ALBENI FALLS ON PEND OREILLE RIVER, IDAHO

PRESENTED BY MR. CHAVEZ

FEBRUARY 7, 1949.—Referred to the Committee on Public Works and ordered to be printed with illustrations

UNITED STATES
GOVERNMENT PRINTING OFFICE
86003 WASHINGTON : 1949

CONTENTS

TABLES

PLATES

(Only pls. 2 and 4 printed)

APPENDIXES

(One volume—not printed)

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY,
Washington, D. C., January 28, 1949.

Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate, Washington, D. C.

DEAR SENATOR CHAVEZ: I am transmitting herewith a report dated November 29, 1948, from the Chief of Engineers, United States Army, together with accompanying papers and illustrations, on a review of reports on the Columbia River and tributaries, concerning improvement at Albeni Falls on Pend Oreille River, Idaho. This investigation was requested by resolutions of the Committee on Commerce, United States Senate, adopted on April 6, 1937, and September 24, 1943.

In accordance with section 1 of Public Law 534, Seventy-eighth Congress, and Public Law 732, Seventy-ninth Congress, the proposed report of the Chief of Engineers was furnished the Governors of the States of Oregon, Washington, Idaho, and Montana, and to the Secretary of the Interior. Copies of the report were also furnished the International Joint Commission, the Chairman, Federal Power Commission, and the Department of Agriculture for comment. The views of the International Joint Commission, the States of Oregon, Idaho, and Washington, and the Federal agencies are set forth in the enclosed communications. The State of Montana acknowledged receipt of the report on May 19, 1948, and to date has furnished no written views or recommendations with respect thereto.

This interim report on the Albeni Falls project was prepared by the Chief of Engineers in response to congressional resolutions, in advance of completion of a report on a comprehensive plan of improvement for the Columbia River Basin. The latter report has now been completed and the Albeni Falls project, as set forth in the interim report herewith, has also been included as a unit of the comprehensive plan of improvement. The cost of the Albeni Falls project as given in the comprehensive report has been increased by about $4,000,000 over that given in the interim report, due to availability of more detailed field data and use of current (1948) price levels. The benefits of the project have also been increased substantially. As a net result the Albeni Falls project included as a unit of the comprehensive plan of improvement shows a much higher degree of economic justification than is established in the interim report. Consequently, the more recent studies confirm the interim findings of the Chief of Engineers as to the economic soundness of this project.

This interim report is being submitted at this time for consideration in advance of the report of the comprehensive plan for the Columbia River Basin because the Albeni Falls project will be a significant factor

in relieving acute power shortages which now prevail in the Pacific Northwest, and is therefore urgently needed to meet the ordinary power demands of that region as well as power requirements for security and defense purposes.

The comments of the Bureau of the Budget are herewith and that agency advises that there is no objection to the submission of the report to Congress.

Sincerely yours,

KENNETH C. ROYALL,
Secretary of the Army.

COMMENTS OF THE BUREAU OF THE BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington 25, D. C., January 7, 1949.

The honorable the SECRETARY OF THE ARMY,

(Through the budget officer for the Department of the Army).

MY DEAR MR. SECRETARY: Receipt is acknowledged of your letter of December 9, 1948, submitting a proposed interim report of the Chief of Engineers on a review of reports on the Columbia River and tributaries on improvement of Albeni Falls on Pend Oreille River, Idaho, requested by resolutions of the Committee on Commerce, United States Senate, adopted April 6, 1937, and September 24, 1943.

The Chief of Engineers recommends authorization, as a part of the comprehensive plan for improvements in the Columbia River Basin, of construction of Albeni Falls Dam and powerhouse on the Pend Oreille River, Idaho. In the comments received from the affected States, as required by section 1 of the 1944 Flood Control Act, the State of Washington approves the project, Oregon finds no objection, and Idaho, where the project will be located, indicates approval of the report but urges that a thorough study be made of certain matters, particularly with regard to more liberal allowances for severance damages on lands within the reservoir to be withdrawn from production, to the need for reservoir clearing in the 5-foot freeboard strip around the lake and provisions for recreational use of the facilities, to water rights and to operating levels, and that serious effort be made to include these features in the development. The Secretary of Agriculture endorses the project but points out the impact on local agriculture of use of certain lands for the reservoir as well as the need for restoration of certain facilities on national forest land that would be affected by the project. The Acting Secretary of the Interior points out that the project would not adversely affect the interests of any of the agencies of that Department but that ultimate development for irrigation upstream from the reservoir may result in a depletion of about 550,000 acre-feet in the flow of the Pend Oreille River rather than the 325,000 acre-feet estimated in the district engineer's report. He urges early authorization and construction of the project. The Federal Power Commission finds that the Albeni Falls project would be particularly desirable in helping to meet the existing power deficiency in the Pacific Northwest and believes that the project authorization should include provision for installation of power generating facilities. They suggest, however, that the question of whether such a power installation should actually be made should be reexamined at the time construction plans are prepared. The American section of the International Joint Commission, United States and Canada, states that neither the construction nor the operation of the proposed project works would adversely affect any Canadian interests and, in fact, would ultimately be of benefit to them.

86003—49——2

The report of the Chief of Engineers indicates the total estimated construction cost of the project to be $26,995,000, based on 1947 prices. On this basis the annual costs were estimated at $2,352,000 and annual evaluated benefits at $2,600,000, or an over-all benefit-cost ratio of about 1.11. Your proposed letter to the Speaker of the House of Representatives states that the cost of the Albeni Falls project has been increased by about $4,000,000 over that given in the interim report due to availability of more detailed field data and the use of current (1948) price levels. The letter states that the benefits of the project have also been increased substantially but does not indicate from which source those benefits would be obtained. Since substantially all of the benefits must accrue from power operations, it is not clear how they would be increased substantially without increases in power rates. Furthermore, there are evidently some factors involving costs which have not been included in the estimates such as those referred to by the Governor of the State of Idaho which would tend to increase the total construction cost of the project. On this basis it appears that the project may have a benefit-cost ratio approaching unity. However, since, as stated in your proposed letter to the Speaker of the House of Representatives, the report is being submitted at this time in advance of the report of the comprehensive plan for the Columbia River Basin because the Albeni Falls project would be a significant factor in relieving the acute power shortages which now prevail in the Pacific Northwest, and since the proposed work appears to be an integral unit of any sound plan for the ultimate development of the water resources of the Columbia River Basin, I am authorized by the Director of the Bureau of the Budget to advise you that there would be no objection to the submission of the report to Congress. As suggested by the Federal Power Commission, however, it is proposed, if the project is authorized by the Congress, to reexamine the question of the need for the power installation at the time requests for funds for initiation of construction are received at this office.

Sincerely yours,

L. C. MARTIN,
Assistant Director, Estimates.

COMMENTS OF THE INTERNATIONAL JOINT COMMISSION

INTERNATIONAL JOINT COMMISSION,
Washington, D. C., September 29, 1948.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, Department of the Army,
Washington 25, D. C.

DEAR GENERAL WHEELER: Reference is made to your letter of May 7, 1948, transmitting a copy of your proposed report concerning the Albeni Falls Reservoir project on the Pend Oreille River, Idaho, together with the report of the Board of Engineers for Rivers and Harbors and those of the district and division engineers, thus affording this office an opportunity to submit comments thereon.

The proposed Albeni Falls Reservoir development is entirely within the United States, and neither the construction nor the operation of the project works would adversely affect any Canadian interests. On the contrary, the additional storage would be conducive to a better regulated flow in the river below the dam, and in consequence thereof Canadian interests would ultimately be benefited. In view of such anticipated benefits on the Canadian side of the international boundary, the storage to be provided by the Albeni Falls project should be given consideration by the International Joint Commission in its over-all recommendations to the Governments of the United States and Canada under the Columbia River reference dated March 9, 1944. We know of no reason, however, for delaying the submission of your report to the Congress.

You will observe that several months elapsed between the date of your letter and the date of this reply. In this connection I desire to explain that your letter and the report went astray in the mails and for that reason did not come to my attention promptly. I trust the delay, which I regret, has caused you no inconvenience.

Sincerely yours,

A. O. STANLEY, *Chairman.*

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

DEPARTMENT OF THE INTERIOR,
Washington 25, D. C., June 11, 1948.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, Department of the Army.

MY DEAR GENERAL WHEELER: By letter dated May 7, 1948 (file ENGWF), you transmitted for the information and comments of the Secretary of the Interior, copies of your proposed report on a review of the Columbia River and tributaries, concerning improvement of Albeni Falls on Pend Oreille River, Idaho, together with the reports of the Board of Engineers for Rivers and Harbors and of the district and division engineers.

The Albeni Falls project as proposed in the report would provide usable storage of 1,140,000 acre-feet with an installed capacity at the site of 42,600 kilowatts. The water stored at Albeni Falls would be used to provide additional prime energy at Albeni Falls and at downstream plants. The project, if constructed as proposed, would be an important element in the integrated Columbia River power system. It would not adversely affect the interests of any of the agencies of the Interior Department. On the contrary, benefits would accrue to the fishery resources and its early construction would assist the Department as power marketing agent in meeting the pressing power requirements of the Pacific Northwest.

Your studies indicate that through the construction of the Albeni Falls project additional prime power totaling 112,000 kilowatts would be made available at the existing Grand Coulee and Bonneville Dams on the Columbia River. In addition, storage at Albeni Falls would provide 17,000 kilowatts of prime energy at the McNary Dam, now under construction, and 38,000 kilowatts at the authorized Foster Creek Dam.[1] The prime power to be developed at the Albeni Falls power plant would be 27,000 kilowatts. Additional prime energy will be furnished to the Columbia River system by the water storage at the Albeni Falls project when other downstream sites now under consideration are developed.

The Albeni Falls development could be completed prior to 1952, and it would aid materially in meeting the growing power demands of the Pacific Northwest. Availability of storage from Albeni Falls during the winter season 1951–52 would provide 112,000 kilowatts additional to the Northwest by use at Grand Coulee and Bonneville. Prior to 1952, the only increase in Federal generation to be provided in the Pacific Northwest will be through the installation of the remaining nine generators at the Grand Coulee Dam. Maximum generation at Grand Coulee Dam can be realized only when there is large upstream storage at projects such as Hungry Horse, now under construction on the South Fork Flathead River in Montana, and at the proposed Albeni Falls project. Storage at the Hungry Horse project is now scheduled to become available in 1952, and it, together with the Albeni

[1] Now Chief Joseph.

Falls storage, will contribute considerably to the energy that can be produced at Grand Coulee.

The Albeni Falls project is well located with respect to the provision of additional power supply in the northern Idaho area, which now is about 100 miles from the nearest Federal river development in the Pacific Northwest. Additional power generation at Albeni Falls would contribute materially in supplying power to the rapidly growing local load areas in northern Idaho and northeastern Washington. It will increase the reliability of power supply on the Bonneville Power Administration's 115-kilovolt network lines which have been authorized to be constructed and to which the Albeni Falls plant would, in all probability, be connected.

Computations made by the Bonneville Power Administration indicate that the project, which is primarily power in character, but which will also have nonpower benefits for fish, recreation, flood control, and navigation is economically feasible. The Bonneville Power Administration concurs in the conclusions reached in your report that power benefits will exceed power costs. These conclusions are based on computations by the Bonneville Power Administration which differ in some details from those contained in your report.

I wish to emphasize especially the importance of the early construction of the Albeni Falls project as essential to meet the growing power demands of the Pacific Northwest. Despite the announced plans of the public and private utilities to install substantial additional power capacity, the greater part of the increased demands must fall on the Federal system because of the region's dependence on hydroelectric power. Studies by the Bonneville Power Administration indicate that even the most rapid possible construction of new Federal plants on the Columbia River will not be adequate to meet the growing needs prior to 1954, at the earliest. The most critical situation is expected to occur between 1950 and 1953, particularly if river flows are less than normal. The largest shortage is predicted for 1951–52. In that year a shortage of 600,000 average kilowatts may be expected under minimum water conditions, which amounts to 16 percent of the estimated total regional energy requirements. The major public and private power systems in the Northwest are agreed upon the load estimates upon which these predictions are based.

The estimated potential power requirements for 1951–52 in the Pacific Northwest under minimum water conditions are 3,721,000 average kilowatts. The capability of scheduled plants is estimated at 3,119,000 average kilowatts. If the Albeni Falls project were in operation at that time, the total average capability would be increased by 139,000 kilowatts. This would decrease the estimated regional deficit under low-water conditions from 602,000 to 463,000 kilowatts, or by about 23 percent. Under average water conditions, the region's estimated deficit would be completely eliminated. The desirability for early construction is very evident.

Your interim report includes the preliminary evaluation report of the Fish and Wildlife Service which indicates that the relatively small loss of wildlife habitat which would be occasioned by construction of the proposed project would be overshadowed by the value of the benefit which would result to the fishery. The net value of the anticipated effect of the project on fish and wildlife resources has been incorporated in the computation of the benefits of the project.

The project does not affect adversely the interests of either the National Park Service or the Bureau of Indian Affairs. It is included in the Department's report on the Columbia River Basin under the name of the Pend Oreille project. It was not, however, recommended for immediate authorization. As the project would not affect irrigation development to any material extent, and since it would achieve essentially the same desired ends as the project proposed in the Department's report sponsored by the Bureau of Reclamation, the Bureau raises no objection. However, the Bureau wishes to point out that the ultimate development for irrigation upstream from the project may result in a depletion of about 550,000 acre-feet in the flow of Pend Oreille River rather than the 325,000 acre-feet as estimated on page 37 of the district engineer's report.

The Geological Survey in its review of the report calls attention to certain geologic conditions which might conceivably affect the operation of the project. These comments have heretofore been called to the attention of your engineering staff since they may be pertinent to studies in connection with developing further details of the project.

Opportunity to review the report is appreciated, and it is my hope that nothing will prevent its early authorization and construction since, as more fully outlined herein, it will not adversely affect any interests of concern to the Department; will be a very important element in the integrated Columbia River power system; and will assist the Department greatly as a power-marketing agent to meet the pressing power demands in the Pacific Northwest.

Sincerely yours,

WILLIAM E. WARNE,
Acting Secretary of the Interior.

COMMENTS OF THE FEDERAL POWER COMMISSION

FEDERAL POWER COMMISSION,
Washington 25, June 23, 1948.

Subject: Columbia River and tributaries, Albeni Falls project, Pend Oreille River, Idaho.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, Department of the Army,
Washington 25, D. C.

DEAR GENERAL WHEELER: In response to your request, the Commission makes the following comments on your proposed report on a review of the Columbia River and tributaries concerning improvement at Albeni Falls on Pend Oreille River, Idaho, which was transmitted with your letter of May 7, 1948, together with the reports of the Board of Engineers for Rivers and Harbors and of the district and division engineers.

The report of your Department presents a plan for stabilization of the level of Pend Oreille Lake and reduction of its stages during flood periods, production of hydroelectric power at Albeni Falls, and improvement of low flows in the Columbia River. This increase of low flows will be usable for power production at the existing or future dams on the Columbia River and, in addition, will afford increased depths for navigation.

If constructed in accordance with the district engineer's interim report of October 1, 1947, the Albeni Falls project would consist of a concrete gravity dam and hydroelectric power plant at Albeni Falls with maximum controlled pool at elevation 2,062.5. Active storage capacity below that elevation would amount to 1,140,000 acre-feet. As power loads are greatest during the winter, this storage would be drawn upon to increase flows during that period extending to the spring snow-melt season, when refilling of the lake would take place. The power plant at Albeni Falls would have an installed generating capacity of 42,600 kilowatts. No major relocations of improvements are involved. The district engineer estimates the cost of the Albeni Falls project, on the basis of August 1947 price levels, to $26,995,000.

The district engineer's report shows that the Albeni Falls project would add 168,000 kilowatts of nominal prime power, or 251,000 kilowatts of firm capability (at 67 percent annual load factor), to the system of Federal projects consisting of Grand Coulee, Bonneville, Hungry Horse, McNary, Foster Creek,[1] and Albeni Falls. This increase of regional power would require the installation of one additional generating unit at McNary, two at Foster Creek,[1] and three 14,200-kilowatt units at the Albeni Falls plant. Of these additional amounts of power, the district engineer estimates the Albeni Falls plant to contribute 27,000 kilowatts of nominal prime power and 41,000 kilowatts of firm capability. The Commission staff is in substantial agreement with these estimates of the additional power in this system of projects that is attributable to the Albeni Falls project.

[1] Now Chief Joseph.

The power load in the Pacific Northwest is continuing to grow at a rate which necessitates that immediate steps be taken to provide for the installation of new generating capacity in addition to that presently scheduled. The construction of the Albeni Falls project would be particularly desirable in assisting to meet the prospective deficiency in power by permitting the more efficient use of the projects named above in the generation of power.

The Commission staff reports, therefore, that the Albeni Falls project is a desirable unit in the comprehensive development of the Columbia River Basin on the basis, primarily, of its value in regulating stream flow for the benefit of other power plants, and that the project has its greatest value and is highly economical when constructed and operated for this purpose. While the staff believes that the project authorization should include the installation of power-generating facilities, it is the opinion of the staff that the question of whether power should be installed at Albeni Falls should be reexamined at the time that construction plans are being prepared.

Based on its consideration of the report of your Department and studies by its own staff, the Commission concludes that the Albeni Falls project is a desirable project which would contribute substantially, by the regulation of stream flow, to the regional supply of hydroelectric power. In view of the urgent need for additional power in the Pacific Northwest, the Commission believes that the Albeni Falls project should be authorized for construction, with such modifications of the plans as in the discretion of the Secretary of the Army and the Chief of Engineers may be advisable.

Sincerely yours,

NELSON LEE SMITH, *Chairman.*

COMMENTS OF THE SECRETARY OF AGRICULTURE

DEPARTMENT OF AGRICULTURE,
Washington, July 1, 1948.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, War Department,
Washington 25, D. C.

DEAR GENERAL WHEELER: Reference is made to your request of May 7, 1948, for the views of this Department relative to the report of the Chief of Engineers concerning proposed improvement at Albeni Falls on Pend Oreille River, Idaho.

We note that the proposed Albeni Falls project is primarily for the development of hydroelectric power. In time the project will expand the recreational facilities of the locality, although in the process, there are one or two such facilities on the national forests that will be destroyed. Construction of the project will have some adverse effect on existing facilities for the protection and administration of the Kaniksu National Forest. Last January an exchange of letters took place between Regional Forester P. D. Hanson of this Department and Col. W. S. Moore of the Corps of Engineers concerning this matter. It is our interpretation of Colonel Moore's letter of January 16 that the Corps of Engineers will give favorable consideration to the restoration and adjustment, at the expense of project funds, that may be needed with regard to such facilities that will be affected by project construction.

It is estimated in the report that 6,293 acres of land will be permanently inundated by a normal pool elevation of 2,062.5 feet at the proposed dam. The inundation of this land will result in a loss of income to the farmers directly affected and of much needed feed produced on this land for adjacent ranch operations.

It is our understanding that local interests immediately affected are raising objection to the project. While the total agricultural area involved is small, it is nevertheless very important locally. We assume that whatever can be done, within the limits of flexibility dictated by optimum project benefits, will be done by the Corps of Engineers to minimize the impact of project construction on local agriculture.

In consideration of the showing of need for the project and the over-all benefits to accrue to it, this Department endorses it.

Sincerely,

CHARLES F. BRANNAN, *Secretary.*

86003—49——3

COMMENTS OF THE STATE OF IDAHO

STATE OF IDAHO,
OFFICE OF THE GOVERNOR,
Boise, August 9, 1948.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, War Department,
Washington 25, D. C.

DEAR GENERAL WHEELER: With reference to your proposed report concerning specifically improvement at Albeni Falls on Pend Oreille River in Idaho, permit me to make the following observations:

First. That any procedure of this kind calling for the use of waters within the State should be initiated and completed by following Idaho statutory provisions as to filing and certification on water rights. This is, as you are aware, now done under the Federal Reclamation Act, in all Idaho cases.

Second. That in the light of the experiences of the 1948 flood of the Clark Fork River, Lake Pend Oreille and the Pend Oreille River certain adjustments may be made necessary in the planning with especial reference to protection of the municipalities of Clark Fork and Sandpoint.

Third. That recognition be given to the inescapable fact that certain lands therein designated will be withdrawn from production and the further fact that the economic impact of such withdrawal cannot be measured solely by the appraised value of the land itself but rather with respect to its potential future return to its present users and to the continuing loss in tax return to county and State. Therefore, it appears to me that allowances for severance damages should be reappraised and more liberally set up.

Fourth. That cost estimates on reservoir clearing appear to be calculated below elevation 2,062.5 only. What about the 5-foot free board? Scenically this lake region is a great asset to Idaho and anything less than prevention of unsightly condition on its shores would be tragic.

Continuing observations along this line paragraph 7 of the engineers board report to you comments thus: That the district engineer's report recognizes "that future provision of related recreational facilities will be required for full utilization of the potentialities of the stabilized lake for that purpose but does not include such facilities in his present plan."

Fifth. That further efforts to minimize flood potentials by added up-stream storage remain essential.

Sixth. That the Idaho Department of Fish and Game through its director, Mr. T. B. Murray, and its fish culturist, Mr. James C. Simpson, has stated its position thus: "Our reaction has been that this project would benefit the present fishery in Pend Oreille Lake by stabilizing and enlarging the lake level during the summer months

and by reducing the flow in the river below the dam. It is our understanding that the lake will be drawn down during the late fall and winter months when the fish are found in the deeper water. It is also our understanding that the draw-down of the lake will not be greater than the present fluctuation of the lake."

Seventh. That as heretofore determined and agreed upon the level of 2,062.5 remains the point of maximum regulation to which the State of Idaho can agree.

Eighth. That further attention be given to channel improvements at or near the dam site to enhance flood run-off.

Enlarging upon the statement in point 2, the matter of the effect of the heightening by a stabilized lake level of the presently known underground water movements in and about Clark Fork, upon streets, sewers, and basements in that community should be definitely determined.

The care of the sewage-disposal problem at Sandpoint where the period of the nonoperating months of that system may be increased needs careful study, as does the care of the Sand Creek slough area to prevent an unsightly mud flat at draw-down period.

Believing that the benefits to Idaho will be greater than the damages if the above-mentioned matters are thoroughly studied but urging serious effort to comply with them the report is approved.

Sincerely,

C. A. ROBINS, *Governor.*

COMMENTS OF THE STATE OF WASHINGTON

STATE OF WASHINGTON,
EXECUTIVE DEPARTMENT,
Olympia, June 7, 1948.

Col. L. H. HEWITT,
District Engineer, Seattle District, Corps of Engineers,
Seattle, Wash.

DEAR COLONEL HEWITT: Your preliminary report recommending my approval of the Albeni Falls project, located about 2½ miles east of the Washington State border in Idaho, has been received.

I understand this project is to be presented to Congress for approval at the earliest possible date, and your authorization for seeking this approval is received by a directive of Congress to review the original report on the Columbia River and its Minor Tributaries made by the engineers in 1932.

We, in the State of Washington, are very much interested in upstream storage. I understand this project will provide about 1,440,000 acre-feet of storage and the project itself will provide only 42,600 kilowatts of hydroelectric power, but the benefits to existing projects such as Grand Coulee and other downstream programs would add another 168,000 kilowatts generating capacity.

I understand that in the hearings, that have been held on this project in Idaho, the project has been quite favorably received by the citizens of Idaho.

The cost of the project in comparison to the benefits certainly seems to be very favorable. The fact that the Pacific Northwest faces the most acute power shortage in the history of the region certainly warrants my approval of this project at this time. However, I would like to suggest that the Congress definitely be advised this is not a major project in the orderly development of the Columbia River Basin, as far as generating capacity is concerned, and would by no means supply the needed generating capacity required by the users of hydroelectric power in the Pacific Northwest at the present time.

We in Washington definitely are of the opinion this project would be helpful, but we need the immediate construction of McNary and Foster Creek [1] Dams in order that our generating capacity might meet the needs of the Pacific Northwest.

The fact that this project may be built in a short period of time will also be helpful, especially for the year 1951, which will be our most critical year in the event McNary and Foster Creek [1] construction is started immediately and carried forward as rapidly as possible.

My approval for the Albeni Falls project in Idaho is hereby granted. I would appreciate sincere consideration by the Corps of Engineers and the Congress in regard to McNary and Foster Creek [1] projects.

Sincerely yours,

MON C. WALLGREN, *Governor.*

[1] Now Chief Joseph.

COMMENTS OF THE STATE OF OREGON

STATE OF OREGON,
EXECUTIVE DEPARTMENT,
Salem, June 1, 1948.

Lt. Gen. R. A. WHEELER,
Chief of Engineers, Washington 25, D. C.

DEAR GENERAL WHEELER: Referring further to your letter of May 7, 1948, relating to the proposed report on a review of the Columbia River and tributaries, concerning improvement of Albeni Falls on Pend Oreille River, Idaho, I am enclosing reports from the State level on the project.

One of the attached reports is provided by Mr. Charles E. Stricklin, State engineer, and the other is supplied by Mr. Arnie J. Suomela, master fish warden. Both reports indicate that the State of Oregon has no objection to file in connection with the proposed improvement.

Very truly yours,

JOHN H. HALL, *Governor.*

STATE OF OREGON,
OFFICE OF THE STATE ENGINEER,
WATER RESOURCES DEPARTMENT,
Salem, May 25, 1948.

Hon. JOHN H. HALL,
Governor of Oregon, Capitol Building.

MY DEAR GOVERNOR HALL: Pursuant to your request I have reviewed the report of the Corps of Engineers, United States Army, on the Albeni Falls project and following is a brief summary of the data set forth therein:

The report has been prepared pursuant to resolutions of the Committee on Commerce of the United States Senate adopted April 6, 1937, and September 24, 1943. It recommends authorization by the Congress of the construction of a multiple-purpose project at Albeni Falls on the Pend Oreille River, Idaho, at an estimated first cost to the United States of $27,000,000 and $100,000 annually for operation and maintenance. Both estimates are based on 1947 prices.

The Albeni Falls project, as recommended in the report, consists of a dam, reservoir and powerhouse as shown on the attached drawings. The reservoir would have a normal water-surface elevation of 2,062.5 feet and would provide 1,140,000 acre-feet of useful storage. Installed capacity of power facilities would be 42,600 kilowatts.

The report states that the Albeni Falls project will provide desirable regulation of Lake Pend Oreille together with local flood control, conservational, and recreational benefits. The storage provided by the project will afford increased channel depths at low water in the navigable reaches of the Columbia River and increase materially the capacity of existing and authorized hydroelectric plants on the Columbia River. Altogether, 251,000 kilowatts of urgently needed firm capability would be made available to the region by construction of the project.

It is stated in the report that the project will not affect adversely salmon runs in the Columbia River. The valuable recreational potentialities of Lake Pend Oreille will not be damaged, but on the

other hand will be materially enhanced by the lake regulation to be provided.

The reporting officers consider construction of the Albeni Falls project essential at this time to meet urgent present and immediately prospective needs of the Pacific Northwest for hydroelectric power, and believe that such action would be in accordance with the wishes of the people most directly affected, as expressed at public hearings held at Kalispell, Mont., at Sandpoint, Idaho, and at Metaline Falls, Wash.

It is noted in R. A. Wheeler (lieutenant general, Chief of Engineers) letter to you transmitting his report that he expressed a desire to have the views of the State agency responsible for fish and wildlife on this proposed development and the report. I have been advised by Miss Phillips that this report has been made direct to you by the State fish commission, therefore, not having a copy of this report I am assuming that the fish commission's report contains the information which General Wheeler desires.

It is my opinion that the proposed development would not adversely affect Oregon interest but the water to be stored would result in some benefits to navigation and increase the power output at the Bonneville Dam and the McNary project now under construction.

Attached hereto are two maps, one containing the map of the area and the other as to the general details of the development.

Respectfully yours,

CHAS. E. STRICKLIN,
State Engineer.

FISH COMMISSION OF OREGON,
Portland 4, Oreg., May 19, 1948.

Hon. JOHN H. HALL,
Governor, State of Oregon, Salem, Oreg.

MY DEAR GOVERNOR: In answer to your inquiry regarding the effect of the Corps of Engineers' project at Albeni Falls, Pend Oreille River, Idaho, I should like to inform you that we have given the review report on this project careful study. In addition, I personally attended a public hearing in February wherein all aspects of this project were carefully reviewed by the United States engineers.

In view of the fact that this project blocks the river above two barriers on the Columbia River, the Grand Coulee Dam and Z Canyon, both of which are impassable barriers to salmon and other anadromous fish, we consider that this project will not have any detrimental effects on the fish runs.

After careful study of this project, it appears to us that the storage benefit from this dam will increase the power production at other lower projects by increasing the low water flows of the Columbia River, and, in addition, will help to alleviate the power shortage. Thus, with the construction and operation of this dam, there should be less agitation for the lower, main-stem Columbia River dams, which dangerously and drastically affect the fisheries resources of the Columbia River.

I sincerely hope that this answers your inquiry. If there are any further aspects to this project which I might be able to clarify, I would be only too pleased to do so.

Very truly yours,

ARNIE J. SUOMELA,
Master Fish Warden.

IMPROVEMENT AT ALBENI FALLS ON PEND OREILLE RIVER, IDAHO

FOREWORD TO REPORT

The Albeni Falls project is reported herein as a single addition to the existing and authorized Federal system of Columbia River developments. A subsequent, comprehensive, review report on the Columbia River and tributaries, as yet unpublished, considers Albeni Falls Dam as one of a larger group of projects to be added to the existing and authorized Federal system. Certain changes in basic data also have occurred: notably the great flood of May and June 1948; an increase in the designed usable capacity of Hungry Horse Reservoir from 2,860,000 to 2,980,000 acre-feet; and a continuation of upward price trends.

Under these circumstances, the identical physical project is found to contribute somewhat differing increments to the economies of the two systems with which it is associated, as described in the respective reports. In the larger system contemplated by the review report, Albeni Falls storage would be effective through more developed head downstream and its economic advantage becomes even more apparent than reflected herein.

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, November 29, 1948.

Subject: Columbia River and tributaries, concerning improvement at Albeni Falls on Pend Oreille River, Idaho.

To: The Secretary of the Army.

1. I submit herewith for transmission to Congress the report of the Board of Engineers for Rivers and Harbors in response to resolutions of the Committee on Commerce of the United States Senate, adopted April 6, 1937, and September 24, 1943, requesting the Board to review the report on Columbia River and minor tributaries, submitted in House Document No. 103, Seventy-third Congress, first session, with a view to determining the advisability at this time of improving Clark Fork of Columbia River, including the stabilization of the level of Lake Pend Oreille, Idaho; and the reports on the Columbia River and tributaries submitted under the provisions of House Document No. 308, Sixty-ninth Congress, first session, as authorized by the River and Harbor Act of January 21, 1927, with a view to determining whether any modification of existing projects or recommended comprehensive plans of improvement should be made at this time. It concerns improvements in the Columbia River Basin at Albeni Falls on Pend Oreille River, Idaho, below Pend Oreille Lake which receives most of its inflow from Clark Fork. A final report on Columbia River and its tributaries will be submitted at a later date.

2. After full consideration of the reports secured from the district and division engineers, the Board recommends authorization, as a part of the comprehensive plan for improvements in the Columbia River Basin, of construction of Albeni Falls Dam and powerhouse on Pend Oreille River, Idaho, in accordance with the plans in the report of the district engineer with such modifications thereof as in the discretion of the Secretary of the Army and the Chief of Engineers may be advisable, at an estimated cost of $26,995,000 to United States for construction and $100,000 annually for maintenance and operation.

3. After due consideration of these reports, I concur in the views and recommendations of the Board.

R. A. WHEELER,
Lieutenant General,
Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

DEPARTMENT OF THE ARMY,
THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, April 20, 1948.

Subject: Columbia River and tributaries, concerning improvement at Albeni Falls on Pend Oreille River, Idaho.

To: The Chief of Engineers, United States Army.

1. This interim report is in response to the following resolutions adopted April 6, 1937, and September 24, 1943, respectively:

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on Columbia River and minor tributaries, submitted in House Document No. 103, Seventy-third Congress, first session, with a view to determining the advisability at this time of improving Clark Fork of Columbia River, including the stabilization of the level of Lake Pend Oreille, Idaho.

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on the Columbia River and tributaries submitted under the provisions of House Document No. 308, Sixty-ninth Congress, first session, as authorized by the River and Harbor Act of January 21, 1927, with a view to determining whether any modification of existing projects or recommended comprehensive plans of improvement should be made at this time.

It concerns improvements in the Columbia River Basin at Albeni Falls on Pend Oreille River, Idaho, below Pend Oreille Lake, which receives most of its inflow from Clark Fork. A final report on Columbia River and its tributaries will be submitted at a later date.

2. Clark Fork rises near Butte, Mont., and flows northwesterly about 350 miles to Pend Oreille Lake in northern Idaho. The lake has an area of about 83,500 acres and is the source of Pend Oreille River which leaves the lake approximately 25 miles west of the mouth of Clark Fork and 5 miles below Sandpoint, Idaho. From the lake Pend Oreille River flows west 25 miles, with a flat gradient, to Albeni Falls where the low water drop is about 7 feet. About 2 miles below the falls the stream enters the State of Washington in which its course is northwesterly for 72 miles to the Canadian border. In Canada, Pend Oreille River flows westerly for 16 miles and joins the Columbia River. Just below this junction, Columbia River enters the United States where it flows generally southward across Washington and west along the Washington-Oregon line to the Pacific Ocean, a total distance of about 745 miles. Pend Oreille River at Albeni Falls drains a mountainous area of 24,200 square miles.

3. The discharge at Albeni Falls averages 24,600 cubic feet per second and is materially regulated by many natural lakes and several reservoirs in the upstream basin. Low flows occur in the winter, the minimum observed being 2,200 cubic feet per second in December 1919. The flood flows of Pend Oreille River, which result principally from melting snow, reach their peaks in May or June. From 1903 to 1947, inclusive, 14 floods with peak discharges in excess of 100,000 cubic feet per second at Albeni Falls have occurred, the maximum peak flow for the period being 136,000 cubic feet per second in June 1913. The largest known flood occurred in 1894 with peak discharge

estimated at 217,000 cubic feet per second. During the flood of 1913, Pend Oreille Lake reached a stage of 2,069.1 feet above mean sea level or about 20 feet above its stage during low flow periods. The area flooded in 1933 between Albeni Falls and the delta of Clark Fork, inclusive, comprises 7,811 acres of agricultural land, 5,251 acres of wooded and waste area, and 255 acres of municipal and other lands. Based on present developments and 1947 prices, the district engineer estimates the average annual flood damages from Albeni Falls to the Clark Fork delta, inclusive, at $132,500.

4. The Department of the Army has no authorized projects in the Clark Fork-Pend Oreille Basin. Hungry Horse Reservoir, with facilities for development of hydroelectric power and large storage for multiple purposes, is under construction in the Clark Fork Basin by the Department of the Interior. The Montana Power Co. has hydroelectric plants with installation of 56,000 and 30,000 kilowatts in the upper basin. Other power plants in the watershed are small. Several small reservoirs supply irrigation water. Existing Federal dams with hydroelectric power plants on Columbia River below Pend Oreille River are Grand Coulee Dam, mile 595, and Bonneville Dam, 144 miles above the river mouth. The River and Harbor Acts of March 2, 1945, and July 24, 1946, authorized McNary and Foster Creek [1] Dams, with hydroelectric power plants, on Columbia River at miles 290 and 545, respectively. Power produced by the Grand Coulee and Bonneville plants is marketed by the Bonneville Power Administration which has an extensive transmission network. In accordance with law the power produced at Hungry Horse, McNary, and Foster Creek [1] Dams, when completed, will also be marketed by that agency. The district engineer refers to these five plants as constituting the initial system of regional Federal power plants in the Columbia River Basin. He reports that power demands in the Pacific Northwest during the winter of 1946–47 were substantially greater than all previous peaks and estimates that the 1960 load requirements can not be met unless additional power plants are authorized.

5. The Clark Fork-Pend Oreille Basin had a population of 187,727 in 1940 of which 15,667 were in Bonner County, Idaho, which contains Albeni Falls and Pend Oreille Lake. Principal communities between Albeni Falls and the delta of Clark Fork are Sandpoint, Priest River, and Clark Fork, Idaho, with populations of 4,356, 1,056, and 430, respectively. Spokane, Wash., with population of 122,000 in 1940, located 55 miles southwest of Albeni Falls, is the nearest large industrial center. Forests cover about 80 percent of the Clark Fork-Pend Oreille Basin. Mining, farming, and lumbering are the principal occupations. Only about 5 percent of the land is arable. Irrigated land produces about two-thirds of the agricultural income. Pend Oreille Lake is a popular recreational center for boating, sports fishing, and hunting. However, its recreational possibilities are adversely affected by rapid recession of the lake levels during July and August. Navigation on Pend Oreille River and Lake is limited to the floating and rafting of logs, recreational boating, and a small amount of commercial fishing.

6. Local interests, including State authorities, desire stabilization of Pend Oreille Lake and favor limitation of storage in the lake to a

[1] Now Chief Joseph.

maximum elevation of 2,062.5 feet above mean sea level. In view of the effects on riparian properties certain local interests object to a higher elevation. The Governors of Idaho, Oregon, Montana, Washington, and Wyoming have formed the Northwest States Development Association which is concerned with planning the development of land and water resources within the Columbia Basin States. An advisory committee of that association has proposed that a dam for power development and storage be constructed at Albeni Falls.

7. The district engineer presents a plan for stabilization of the level of Pend Oreille Lake and reduction of its stages during flood periods, production of hydroelectric power at Albeni Falls, and improvement of low flows in the Columbia River. This increase in low flows will be usable for power production at the dams on Columbia River and will afford increase depths for navigation. The plan provides for construction of a concrete gravity dam and hydroelectric power plant at Albeni Falls with maximum controlled pool at elevation 2,062.5. Included is improvement of flow conditions at the site so that flood stages at Pend Oreille Lake will be reduced by amounts ranging up to 1.5 feet for discharges up to that of 1894 magnitude. The reservoir will be about 67 miles long including Pend Oreille Lake and at elevation 2,062.5 will have an area of 94,600 acres of which only 6,300 acres are above the meander lines of the river and lake. A levee to protect Sandpoint is included in the work. Usable storage in the reservoir below elevation 2,062.5 amounts to 1,140,000 acre-feet. As power loads are greatest during the winter, this storage would be drawn upon to increase flows during that period extending to the spring snow-melt season, when refilling of the lake would take place. Lake stages would be sustained during the summer and fall recreational season so that storage would be available for power purposes the following winter. The power plant at Albeni Falls would have a normal gross head of 22 feet and an installation of three units each with rated capacity of 14,200 kilowatts, a total of 42,600 kilowatts. The estimated future power demand for the region indicates that provision should be made for producing the system firm power at 67 percent load factor. For the initial system of regional Federal power plants in the Columbia River Basin, as defined in paragraph 4 above, with the addition of the facilities at Albeni Falls, this would require two more units of plant installation at Foster Creek [1] Dam and one more unit at McNary Dam than previously contemplated. Assuming that these additional units are provided, the district engineer finds that construction of the facilities at Albeni Falls as proposed would increase the nominal firm capability of the system of Federal power plants in the basin, for operation at the designated load factor, by 251,000 kilowatts. He points out that the proposed improvements are suitable for incorporation in a general comprehensive plan for the Columbia River Basin and will return larger power benefits as additional downstream power plants are provided. He recognizes that future provision of related recreational facilities will be required for full utilization of the potentialities of the stabilized lake for that purpose but does not include such facilities in his present plan.

8. Based on 1947 prices, the district engineer estimates the first cost for the proposed improvements at Albeni Falls at $26,995,000 and the annual costs at $1,280,000 including $100,000 for operation and maintenance. Estimated annual costs for comparison with the

[1] Now Chief Joseph.

annual benefits include an additional $1,072,000 for the three units of power-plant installation required at the authorized Foster Creek [1] and McNary Dams, to provide for the designated system-load-factor operation, making the total $2,352,000. The district engineer evaluates the annual benefits, exclusive of power values, at $94,000 for navigation, $22,000 for flood control, and $12,000 for the effects on wildlife and fish, a total of $128,000. Deducting this amount from the estimated total annual costs leaves $2,224,000 as the estimated annual power costs. Based upon the existing predominant Federal power rate in the Pacific Northwest and making allowance for transmission costs, the district engineer evaluates the power at the dam sites at $9.85 per kilowatt of firm capability, a total for the 251,000 kilowatts of increased firm capability of $2,472,000. The benefit-cost ratio for power computed by this method slightly exceeds 1.11. Comparison of all the evaluated annual benefits, $2,600,000, with the total estimated annual cost, $2,352,000, indicates an over-all benefit-cost ratio of about 1.11. The district engineer recommends adoption of a project for Albeni Falls as described and that provisions be made for future recreation, conservation, and public-health facilities as may be determined by the Secretary of the Army to be desirable and economically justifiable. The division engineer concurs, subject to such modifications of cost estimates and general design as may result from more detailed investigations.

9. Local interests were advised of the nature of the reports of the district and division engineers and invited to present additional information to the Board. Careful consideration has been given to the communications received.

VIEWS AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

10. The Board of Engineers for Rivers and Harbors concurs generally in the views of the reporting officers. The proposed Albeni Falls project will serve multiple purposes. Most important of these from the standpoint of the evaluated benefits is the regulation of flow for use in the development of power at dams on the Columbia River. In view of the large water area of Pend Oreille Lake, the improvement will make available a large amount of controlled usable storage without inundating a large area of land. The plan provides for stabilization of lake levels during the season when its recreational potentialities are great and use of the storage during the winter when power demands are a maximum. Authorization of the improvement at this time is considered advisable in order that detailed designs may be prepared and construction undertaken at an appropriate time, in relation to other authorized projects and the availability of funds, to meet the regional demands for hydroelectric power. The Flood Control Act approved July 24, 1946, authorizes the Chief of Engineers, under supervision of the Secretary of the Army, to provide public park and recreational facilities in reservoir areas under control of the Department of the Army, and to permit such facilities to be provided by others.

11. The Board recommends authorization, as a part of the comprehensive plan for improvements in the Columbia River Basin, of construction of Albeni Falls Dam and powerhouse on Pend Oreille River,

[1] Now Chief Joseph.

Idaho, in accordance with the plans in the report of the district engineer with such modifications thereof as in the discretion of the Secretary of the Army and the Chief of Engineers may be advisable, at an estimated cost of $26,995,000 to United States for construction and $100,000 annually for maintenance and operation.

For the Board:

R. C. CRAWFORD,
Major General,
Senior Member.

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

The district engineer finds that construction of a dam at Albeni Falls for the regulation of Pend Oreille Lake and associated purposes of flood control, navigation, conservation, recreation, and power generation is a practicable and economically justified step in the planned development of Columbia River water resources.

He confirms the need for additional electrical generating capacity in the region and ascertains that the project will add system power more economically than would the available alternatives.

He submits a plan for a concrete gravity dam, with normal pool at elevation 2,062.5 feet, consisting of overflow spillway section and powerhouse section with three generating units of 42,600 kilowatts total capacity.

He believes the proposed development to be the maximum presently practicable in this reach of river, consistent with preservation of other valuable resources and the public interest.

He recommends adoption of the project, with appropriate provision for the addition of justified recreation, conservation, and health facilities.

Pertinent data on Albeni Falls Dam site

1. Location of dam site, Bonner County, Idaho, secs. 19, 20, 29, and 30, T. 56 N., R. 5 W., Boise meridian:	
Above mouth of Columbia River—river miles	838
Above mouth of Pend Oreille River—do	90
Below mouth of Priest River—do	5
Below Pend Oreille Lake (at outlet near Sandpoint, Idaho)—river miles	25
Below origin of Clark Fork—do	400
From Spokane, Wash. (principal city southwest, population, 122,000)—road miles	55
From Newport, Wash. (nearest railroad and post office, population, 1,200)—road miles	2.5
2. Stream flow (period of record, 1904 to 1945, inclusive):	
Drainage area above dam site—square miles	24,200
Run-off, mean annual—acre-feet	17,800,000
Run-off, mean annual—inches	13.73
Discharge, mean monthly:	
Minimum of record—cubic feet per second	3,871
Average minimum (February)—do	10,800
Average maximum (June)—do	72,900
Annual—do	24,600
Regulated, 7 months critical flow period—do	18,400
Regulated, 8 months critical power period—do	17,200
Maximum known flood, June 1894, U. S. Geological Survey estimate—cubic feet per second	217,000
Spillway design flood—do	350,000
Slope, average low-water, Pend Oreille Lake-dam site—feet per mile	0.53
Slope, average low-water, dam site-Metaline Falls—do	0.84

Pertinent data on Albeni Falls Dam site—Continued

3. Hydraulics:		
Reservoir contents, usable storage	acre-feet	1, 140, 000
Maximum regulated pool elevation	feet mean sea level	2, 062. 5
Maximum regulated lake elevation	do	2, 062. 5
Minimum regulated pool elevation	do	2, 038. 0
Minimum regulated lake elevation	do	2, 049. 7
Pool elevation for 1894 flood	do	2, 070. 0
Lake elevation for 1894 flood (unchanged)	do	2, 076. 1
Pool elevation for design flood	do	2, 088. 0
Lake elevation for design flood	do	2, 091. 7
Tail-water elevation at 18,000 cubic feet per second (approximate critical)	feet mean sea level	2, 033. 2
Tail-water elevation at 1894 flood	do	2, 066. 4
Tail-water elevation at design flood	do	2, 085. 0
4. Dam, concrete gravity, submerged spillway type:		
Spillway section:		
Length, net opening of gated section	feet	360
Crest elevation	feet mean sea level	2, 031
Tops of gates, elevation	do	2, 063
Top of roadway	do	2, 097
Fixed-wheel gates (9) dimensions	feet	40 x 32
Auxiliary spillway, length net opening (3)	do	120
Auxiliary spillway crest elevation	feet mean sea level	2, 062. 5
Spillway, total capacity (design flood)	cubic feet per second	350, 000
Nonoverflow sections:		
Length right (north) side	feet	50
Length left (south) side	do	50
Top elevation	feet mean sea level	2, 097
Freeboard	do	9
5. Intake and powerhouse:		
Intake structure length	feet	350
Installation:		
Main generators	units	3
Main generators, rated capacity each	kilowatts	14, 200
Main generators, spacing	feet	82
Main turbines, Kaplan, rating each	horsepower	19, 600
Plant installed capacity	kilowatts	42, 600
Transformers, 1 bank of 3, rating of bank	kilovolt-amperes	51, 000
Power characteristics, critical period:		
Prime power at site (nominal)	kilowatts	27, 000
Prime power added to system	do	168, 000
Firm capability, 67 percent load factor at site	do	41, 000
Annual firm energy added to system	Million kilowatt-hours	1, 472
Hydraulic characteristics:		
Plant discharge, full gate, rated head	cubic feet per second	29, 100
Head, maximum gross	feet	37. 5
Head, minimum gross	do	4. 9
Head, normal gross	do	22
6. Land and relocations:		
Reservoir:		
Length of reservoir	miles	67
Area within meanders	acres	88, 307
Area above meanders, Government-owned	do	71
Area above meanders, non-Government	do	6, 222
Area over-all	do	94, 600
Raise, roads	miles	1. 3
Railroad, riprap	do	11. 5
Relocate telephone and transmission lines	do	51
Access and construction:		
Areas, construction zone	acres	100
Railroad, construction (including sidings)	feet	1, 100
Highway, construction	do	1, 000

Pertinent data on Albeni Falls Dam site—Continued

7. Cost estimates:	1947 prices
Construction cost	$26, 995, 000
Interest during construction	1, 485, 000
Total project investment	28, 480, 000
Annual costs:	
Interest on investment, 3 percent	854, 000
Amortization, 50 years	253, 000
Interim replacements	70, 000
Operation and maintenance	100, 000
Payments for loss of taxes [1]	3, 000
Total	1, 280, 000

[1] Assumed but not authorized by law.

WAR DEPARTMENT,
CORPS OF ENGINEERS,
OFFICE OF THE DISTRICT ENGINEER,
SEATTLE DISTRICT,
Seattle 4, Wash., October 1, 1947.

Subject: Interim report, Columbia River and Tributaries Review Report, Albeni Falls project, Pend Oreille River, Idaho
To: Division Engineer, North Pacific Division, Corps of Engineers, Portland 5, Oreg.

CHAPTER I. INTRODUCTION

1. *Authority.*—This report is authorized by congressional resolutions adopted April 6, 1937, and September 24, 1943, which read respectively as follows:

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby, requested to review the report on Columbia River and minor tributaries, submitted in House Document No. 103, Seventy-third Congress, first session, with a view to determining the advisability at this time of improving Clark Fork of Columbia River, including the stabilization of the level of Lake Pend Oreille, Idaho.

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby, requested to review the reports on Columbia River and tributaries submitted under the provisions of House Document No. 308, Sixty-ninth Congress, first session, as authorized by the River and Harbor Act of January 21, 1927, with a view to determining whether any modification of existing projects or recommended comprehensive plans of improvement should be made at this time.

The submission of this report is in compliance with instructions of the Chief of Engineers contained in letter dated August 8, 1947.

2. *Report under review.*—The report under review (H. Doc. 103, 73d Cong., 1st sess.) is the most comprehensive of the reports that have been submitted on Columbia River and tributaries under the provisions of House Document No. 308, referred to in the second resolution, and is the first published report that includes consideration of the portion of the Columbia River system to be covered herein. As defined in House Document No. 308 and in the River and Harbor Act of

March 3, 1925, the primary purpose of House Document No. 103 was "the formulation of general plans for the most effective improvement of the river for the purpose of navigation, and the prosecution of such improvement in combination with the most efficient development of the potential water power, the control of floods, and the needs of irrigation."

3. The report under review outlined a general plan for 10 dams on the main stream at the following sites between the international boundary and tidewater: Grand Coulee, Foster Creek,[1] Chelan, Rocky Reach, Rock Island Rapids, and Priest Rapids in Washington; Umatilla Rapids (now McNary), John Day Rapids, The Dalles, and Warrendale (now Bonneville) in both Oregon and Washington. It described and briefly discussed a number of sites in the Clark Fork-Pend Oreille River Basin, particularly where possible storage would materially affect the flow on the main stem. On the Columbia, the Grand Coulee and Bonneville Dams have been built by Federal agencies; the Rock Island Rapids site has been developed for power by private interests; McNary Dam was authorized for construction by the River and Harbor Act of March 2, 1945, and Foster Creek [1] Dam by the River and Harbor Act of July 24, 1946. Of the sites described in the Clark Fork-Pend Oreille Basin, the Polson site (Kerr Dam), on the outlet of Flathead Lake, and the Thompson Falls site, on Clark Fork, have been developed by private interests; and Hungry Horse Dam on the South Fork of Flathead River was authorized for construction by the Secretary of the Interior by H. R. 3570, Seventy-eighth Congress, second session, approved June 5, 1944. Z Canyon, about 2 miles upstream from the international boundary, and Albeni Falls were the two sites on Pend Oreille River that were mentioned in the previous report. The Albeni Falls site, which is the subject of this report, is in Idaho about 2.5 miles upstream from the Washington State line and 5 miles downstream from the mouth of Priest River.

4. *Scope.*—This interim report is limited to consideration of improvements that will be obtained by development of the Albeni Falls site on Pend Oreille River. In accordance with the terms of the resolution by the Committee on Commerce of the United States Senate, dated September 24, 1943, quoted in paragraph 1, the development of the site is considered as part of a comprehensive plan of improvement for the Columbia River system. The multiple-purpose aspects of the development are presented, together with preliminary plans, cost estimates, and economic analyses. The interrelationship of this project with other elements in a comprehensive plan for basin development is shown sufficiently to assure that it will be properly coordinated with such development and be a valuable and integral part thereof.

5. *Geographical names.*—Certain terms and place names used in this report are defined or clarified as follows:

(*a*) *Grand Coulee Dam.*—The dam structure across Columbia River near the Grand Coulee, a prehistoric, dry channel from which the dam takes its name.

(*b*) *Grand Coulee.*—Used briefly for the Grand Coulee project, which includes the dam, reservoir, and power development. In connection with hydrology, it refers to the gage just downstream from the dam.

(*c*) *Franklin D. Roosevelt Lake.*—The reservoir formed by Grand Coulee Dam and extending to the international boundary.

(*d*) *Clark Fork-Pend Oreille River.*—Clark Fork is the main stem of the river system upstream from Pend Oreille Lake. Pend Oreille River is the name of the stream from the lake to the Columbia.

[1] Now Chief Joseph.

(*e*) *Albeni Falls.*—The official name of the falls in Pend Oreille River just upstream from the Washington-Idaho line according to the decisions of the United States Geographic Board for the year July 1, 1938, to June 30, 1939. (Not Albani, Albene, Albane, nor Albany Falls as used in the report under review.)

6. *Available data.*—The data available at the inception of this report and additional to those contained or referred to in the report under review consist of records, maps, and reports made since about 1930. The water-supply papers of the United States Geological Survey and climatological data of the United States Weather Bureau are particularly important. The river surveys and quadrangle sheets of the United States Geological Survey; the national forest maps and aerial survey photographs of the United States Forest Service; plans and profiles of highway and railway locations acquired from Federal, State, and private agencies, and the supplementary dam site and special surveys made by this office constitute adequate bases for the purposes of this report. Several valuable technical reports dealing with hydrology and geology also have been used. The more important of these various data are listed in the bibliography at the end of this report.

7. *Prior reports.*—The Albeni Falls site, together with its power and storage possibilities, was described and discussed briefly in the report under review. The site also was studied and a dam was recommended for construction in a report on the possibilities of storing 3,000,000 acre-feet of water in the Clark Fork-Pend Oreille Basin for use in generating power for war production. The report was prepared in cooperation with engineers of the Federal Power Commission and the Bureau of Reclamation at the request of the Bonneville Advisory Board in 1943 and was published in the account of the hearing referred to in paragraph 54 herein. No action was taken on the recommendations for construction of a dam at Albeni Falls to pool elevation 2,069 contained therein. One published report and two unpublished reports have been made on the Clark Fork-Pend Oreille River Basin, or parts thereof, in recent years. These are:

(*a*) A combined report on preliminary examination of Clark Fork of Columbia River, Mont., Idaho, and Wash., Hungry Horse Dam, St. Regis River, and Flathead River and tributaries, submitted by the division engineer, North Pacific Division, October 8, 1938. A survey was recommended.

(*b*) A reconnaissance report submitted by the district engineer, Seattle District, Corps of Engineers, dated May 6, 1940, which presented data on many locations in the basin where field investigations were necessary for the formulation of a survey report.

(*c*) An interim report on survey of Hungry Horse Dam submitted to Congress by the Chief of Engineers August 27, 1941, and published as House Document No. 643, Seventy-eighth Congress, second session. This report stated that construction of the dam would be justified economically when a market for the power was definitely established. Its construction for flood control was not considered advisable at that time.

8. Earlier reports by the War Department on Pend Oreille River were primarily concerned with navigation. These were submitted at various times from 1891 to 1909, inclusive.

CHAPTER II. GENERAL DATA

9. *Description.*—The Clark Fork-Pend Oreille River Basin is largely in western Montana, but it includes a part of northern Idaho, most of Pend Oreille County in the northeastern corner of Washington, and two areas totaling 1,203 square miles in British Columbia, Canada

(See pl. 2.). The portions of the basin contained within the various geographical subdivisions, and their drainage areas tributary to the dam site, are shown below:

Subdivision	Area (square miles)	
	United States	Canada
British Columbia—upper basin		649
Montana	21,430	
Idaho	2,056	
Washington	1,271	
British Columbia—lower basin		554
Total	24,757	1,203
Total basin	25,960	
Upstream from dam site	24,200	

10. The basin is largely a conifer-forested mountain region lying on the westerly slope of the Rocky Mountain system. Its perimeter is defined by the divides of various mountain ranges, the Continental Divide marking the east, southeast, and south boundaries. Numerous other ranges, generally trending in a northwest-southeast direction, occupy the interior of the basin. Summit elevations range up to more than 10,000 feet.

11. Intermontane valleys and small prairies suitable for agriculture are found along most of the major tributaries and many of the minor streams. Cultivable areas are separated by deep, narrow valleys and canyons where the streams cut through the interior mountains. This alternate arrangement of wide and narrow valleys provides numerous storage and dam sites.

12. A multitude of natural lakes and many small, man-made reservoirs are situated in the basin. The largest of the lakes are Flathead Lake on Flathead River, Pend Oreille Lake at the mouth of Clark Fork, and Priest Lake on Priest River. The total surface area of the lakes and reservoirs is about 475 square miles, or about 2 percent of the basin area. The storage in these natural and artificial reservoirs materially regulates the flow in the river system.

13. Clark Fork, which, with Flathead River its principal tributary, drains the 22,287 square miles of basin area upstream from Pend Oreille Lake, rises near Butte, Mont., and with few deviations flows northwesterly to enter the easterly side of Pend Oreille Lake in Idaho. Other important tributaries are the Blackfoot, Bitterroot, and St. Regis Rivers. The Flathead, which joins Clark Fork about 26 miles downstream from St. Regis, Mont., drains the northern two-fifths of the basin, comprising approximately 9,100 square miles. It rises in the northeast extremity of the basin in British Columbia, Canada, thence flows generally south for most of its length, passing through Flathead Lake en route, to Dixon, Mont., where it turns abruptly and flows west to joint the Clark Fork. The principal tributaries of the Flathead are the Middle and South Forks, two north-flowing streams, which join the main stream 53 and 44 miles respectively, upstream from Flathead Lake.

14. Pend Oreille River is the outlet stream for Pend Oreille Lake. It flows westerly from the lake at Sandpoint, Idaho, crosses into

Washington, then flows north to the international boundary. After entering Canada, the stream turns west again and flows 16 miles to join Columbia River just north of the boundary. The principal tributary of the Pend Oreille is Priest River.

15. Clark Fork, from its source near Butte to Pend Oreille Lake, falls with a gradually decreasing slope a total of approximately 3,500 feet. (See pl. 3 [1].) This fall is characterized by a succession of steep and moderate slopes. Pend Oreille River from Pend Oreille Lake to the brink of Metaline Falls has a relatively flat gradient, broken at Albeni Falls, where the low-water fall is about 7 feet, and at Box Canyon, where the stream drops 8 feet in three-quarters of a mile. At Metaline Falls the slope changes abruptly and in the 27-mile reach from the falls to the Columbia, the Pend Oreille falls 645 feet, of which 390 feet are in the last 16 miles in Canada. The Pend Oreille joins the Columbia at the head of Franklin D. Roosevelt Lake, the reservoir created by Grand Coulee Dam, on the international boundary at about elevation 1,300 feet.

16. Columbia River flows south from the border for 112 miles to a point below the mouth of Spokane River. It then turns and flows westerly for 100 miles to the mouth of Okanogan River, passing Grand Coulee Dam and the site of the authorized Foster Creek [2] Dam en route. Swinging south, the river follows the eastern foothills of the Cascade Mountains for 209 miles to its confluence with Snake River, passing Rock Island Dam a few miles downstream from Wenatchee. A little beyond the Snake, it turns sharply westward and flows 324 miles to the Pacific Ocean. In this latter reach, it passes the site of the authorized McNary Dam and the existing Bonneville Dam.

17. *Regional geology.*—The Albeni Falls dam site is located in the northern Rocky Mountain physiographic province, a region characterized by rugged highlands and intermontane basins. The rocks of most of the basin are ancient argillitic and quartzitic materials, but the Pend Oreille section of the basin contains slightly younger metamorphosed sedimentary rocks and granite. These rocks have been folded and faulted in later mountain-building movements that formed the Rocky Mountains millions of years ago. The site lies within a minor, irregular basin of structural origin that has been modified considerably by stream and glacial erosion. About 24 miles to the south is the nearest outcrop of basalt of the Columbia River Plateau province. The Priest Lake trench is northeast, and the Pend Oreille River-Little Spokane trench southwest, of the site. The entire region has been heavily glaciated by continental glaciers, but as the site lies in an intermediate position between the two trenches, it has not suffered as heavy glacial erosion as have the trench bottoms themselves. A very resistant granite reef crosses the river at Albeni Falls, flanked upstream and downstream by less resistant, more deeply weathered rock. The more resistant rock forms the foundation for the proposed dam.

18. Previous to the Ice Age, some 25,000 years ago, the course of Clark Fork had been determined largely by the character and the pattern of faulting and folding. At that time, it probably did not flow through the Pend Oreille section but turned southward near the present Pend Oreille Lake to join Spokane River in Rathdrum Prairie.

[1] Not printed.
[2] Now Chief Joseph.

Pend Oreille River at that time was a southward-flowing tributary stream. The glaciers eroded a divide between the headwaters of this tributary and a small northward-flowing tributary of Columbia River, forming a more favorable outlet for Clark Fork drainage after the old channel in Rathdrum Prairie was blocked by deep terminal deposits of the glaciers. Since removal of the ice sheet, Pend Oreille River has incised deeply into bedrock north of Metaline Falls, making a series of tortuous and picturesque canyons, whereas the section between Metaline Falls and Pend Oreille Lake remains sluggish, except at Box Canyon and Albeni Falls.

19. *Climate.*—The climate of the basin is characterized by warm, dry summers and cool winters during which deep snow accumulates at higher elevations. The geographical location of the basin subjects it to both oceanic and continental modified meteorological influences. Oceanic influences are the strongest during the winter and cause snowfall as the relatively warm, moisture-laden air from the Pacific Ocean is cooled in passing inland and over the mountain ranges. Continental influences are strongest during the summer, particularly over the southwestern portion of the basin.

20. Climatic data are available for Newport, Washington, approximately 2.5 miles downstream from the dam site. During 30 years, the extremes in annual precipitation were 32.31 inches in 1927 and 11.42 inches in 1929. The mean annual precipitation for the period of record was 23.27 inches. On the average, there are 121 days per year with 0.01 inch or more of precipitation. The average annual snowfall is 59 inches. Snow generally remains on the ground from early December through the middle of March. Temperatures have ranged from 107° F. to minus 36° F. and have averaged 44.6° F. during the same 30 years of record from 1910 through 1919 and 1926 through 1946.

21. *Stream flow.*—Four stream-gaging stations on Pend Oreille River have produced records over various periods, beginning in 1903. Gages were operated at Metaline Falls from October 1912 through September 1928, and below Z Canyon from October 1926 to date, representing a drainage area of approximately 25,200 square miles. A gage at Priest River, Idaho, was operated from July 1903 through April 1905 and from October 1921 through September 1941. A gage at Newport, Wash., was operated from May 1905 through September 1921. The area tributary to the latter two stations is about 24,200 square miles. The difference in mean flow recorded at the four gages is negligible, and the peak flows registered at the two downstream gages are only from 1,000 to 3,000 cubic feet per second greater than those at the upstream gages; therefore, the records are considered interchangeable and, for all practical purposes, constitute a 44-year continuous record to date. A continuous hydrograph of daily discharges based on these records, for the period 1913 through the 1945 water year, is shown in the appendix, plates 6 [1] and 7 [1].

22. *Characteristics.*—The annual discharge pattern of the Pend Oreille River is quite regular, with low flows occurring from August through March and high flows from April through July. All maximum annual discharges have occurred during May or June. Occasionally a winter rainstorm combined with snow melt will cause an abnormally high flow for that season. The most pronounced river rises of this

[1] Not printed.

type occurred in January 1918, December 1933–January 1934, and December 1941–January 1942.

23. The average discharge at Albeni Falls dam site for the 42-year period consisting of the water years 1904 through 1945 was 24,600 cubic feet per second. The maximum annual discharge of 37,800 cubic feet per second occurred in the water year 1916, and the minimum of 13,000 cubic feet per second occurred in the water year 1941. Both figures are adjusted for storage in Pend Oreille Lake. Corresponding annual run-off figures are: Mean, 17,800,000 acre-feet; maximum, 27,400,000 acre-feet; minimum, 9,400,000 acre-feet. The ratio of extremes is 2.9:1.

24. *Extremes of discharge.*—Pend Oreille River normally begins to rise during the latter part of March, and continues to rise rather steadily until the crest is reached in May or June and then recedes at about the same rate until the normal low winter flow is reached in September. Several weeks warning of high water on the Pend Oreille River is given by the gradual spring rise.

25. During the 45-year record of peak discharge from 1903 through 1947, 14 floods with flows greater than 100,000 cubic feet per second have occurred at the dam site. Flow and stage data on these floods, in order of magnitude, are shown in table 1. Data on the larger of these floods at various points in the Clark Fork-Pend Oreille River Basin are contained in appendix I.[1]

TABLE 1.—*Flood data*

Year	Month	Peak flow of Pend Oreille River at Priest River (thousands of cubic feet per second)	Peak stage of Pend Oreille Lake at Hope (feet above mean sea level)
1913	June	[1] 136.0	2,069.10
1933	do	135.0	2,068.78
1928	do	135.0	2,068.67
1916	July	[1] 131.0	2,068.38
1927	June	131.0	2,068.20
1903	do	[1] 126.3	[2] 2,067.50
1908	do	[1] 124.0	2,067.40
1917	do	[1] 119.0	2,066.74
1925	May and June	112.0	2,065.37
1921	June	[1] 109.0	2,065.28
1922	do	106.0	2,064.72
1909	do	[1] 104.0	2,064.50
1947	May	102.5	2,064.20
1943	June	[3] 101.0	2,063.65

[1] Flow at Newport.
[2] Gage was established June 26, and flow on that date was 126,300 cubic feet per second. It is possible that the crest was greater than the maximum observed flow.
[3] Estimated from discharge below Z Canyon.

The historical flood of 1894 is estimated to have had a peak discharge of 217,000 cubic feet per second at the dam site. As a result of a study of the 90-year stream-flow record on Columbia River at The Dalles, Oreg., and a comparison of the 45-year record on Pend Oreille River with the record for the same period at The Dalles it is concluded that the 1894 flood was the largest flood on the Pend Oreille for the 90-year period. This flood is the largest of record in the Columbia Basin and its peak flow is considerably greater than that of any other flood during the 90-year period.

[1] Not printed.

26. The average maximum annual flood for the 45-year period ending with the water year 1946–47 was 86,600 cubic feet per second. The average peak flow for the 15-year period 1928–42 was 78,900 cubic feet per second, which is 9 percent below the 45-year average. The average volume of run-off, March through August, for the 42-year period 1904 to 1945, inclusive, was 13,700,000 acre-feet. For the 15-year period, 1928 to 1942, inclusive, it was 12,300,000 acre-feet, or 10 percent less than the 42-year average. The above figures indicate that subnormal run-off has been experienced in recent years. Comparison of peak flows on the Pend Oreille with peak flows on the Columbia at Grand Coulee indicate that the Pend Oreille contributes approximately 30 percent of the peak flow at Grand Coulee during major floods.

27. The instantaneous observed minimum discharge at Albeni Falls, 2,200 cubic feet per second, occurred in December 1919. The minimum monthly observed flow of 4,271 cubic feet per second was that of January 1937. The observed minimum and mean discharges for the 5-month low-water period of October through February are 5,610 cubic feet per second and 11,400 cubic feet per second, respectively.

28. *Existing storage.*—Existing storage projects in the Clark Fork-Pend Oreille Basin, except a few small reservoirs of unknown capacity, are listed in table 2.

TABLE 2.—*Storage projects*

Name of project	Location	Stream	Purpose	Usable storage (acre-feet)
Kerr	Flathead Lake	Flathead River, main stem.	Power	1,180,000
Flathead (15 reservoirs)	Flathead Indian Reservation.	Flathead River tributaries.	Irrigation	142,725
Flint Creek	Granite County, Mont.	Flint Creek (Clark Fork tributary).	do	25,000
Nevada Creek	Powell County, Mont.	Nevada Creek (Blackfoot River tributary).	do	12,640
Bitterroot: Lake Como	Near Hamilton, Mont	Rock Creek (Bitterroot tributary).	do	33,000
West Fork	Ravalli County	West Fork of Bitterroot River.	do	32,000
Various small reservoirs	Various	Small Bitterroot tributaries.	do	17,200
Total				1,442,565

29. The only storage project downstream from Albeni Falls is Franklin D. Roosevelt Lake, formed by Grand Coulee Dam on Columbia River. It extends upstream from the dam 150 miles to the international boundary and has a usable capacity of 5,200,000 acre-feet.

30. *Economic development.*—The Clark Fork-Pend Oreille Basin is 80 percent forested, predominantly mountainous, and separated by long distances and rough terrain from major concentrations of population and industry. It is endowed with great wealth of natural resources, but their development has been retarded in many instances by the natural barriers.

31. Approximately 45 percent of the population of the basin is found in towns of 2,500 persons or more, located at centers of agriculture, mining, or lumbering activities. There are no general industrial centers. The few large food-processing plants, lumber mills,

and ore refineries are scattered and the manufacturing plants are small, primarily serving local markets. The nearest population center in the region is Spokane, Wash. (122,000 in 1940), situated in the adjacent Spokane River Basin. It is the largest interior industrial and supply center of the Northwest, and the hub of transcontinental and international transportation routes. Spokane functions as the economic capital of northeastern Washington, northern Idaho, and western Montana, which contain a large portion of the Clark Fork-Pend Oreille Basin.

32. Selected population statistics for these States and for the basin are shown in table 3.

TABLE 3.—*Population*

Location	Population		Percent increase 1930–40	Density (persons per square mile) 1940
	1940	1930		
Clark Fork Basin	187,727	170,345	10.2	7.6
States:				
Washington	1,736,191	1,563,396	11.0	25.9
Idaho	524,873	445,032	17.9	6.3
Montana	559,436	537,606	4.1	3.8

33. Some 9,400 farm units, containing 3,190,000 acres, occupy about 20 percent of the total basin area. Of this area in farms, only one-quarter, or 5 percent, of the basin area is arable. Irrigated land, which comprises 11 percent of the total farm-land area, produces about two-thirds of the agricultural income of the basin.

34. Fifty-three percent of the basin area is covered by forest stands of commercial character. This valuable resource is being depleted by logging, fire, disease, and insects at a greater rate than it is being replenished. Efforts of the United States Forest Service to establish a sustained-yield program for the lumber industry, if successful, will insure an important and lasting source of income for the area.

35. Water power is the greatest undeveloped natural resource of this basin, as of the entire region. At present, only about 1½ percent of the Clark Fork-Pend-Oreille potential hydroelectric power is being utilized. Well-planned exploitation of this resource might well accelerate economic growth of the immediate tributary area, as it has in other parts of the Pacific Northwest.

36. Only two generating stations in the basin have installed capacities exceeding 5,000 kilowatts. These are the 56,000-kilowatt generator at Kerr Dam near Polson, Mont.; and the 30,000-kilowatt installation at Thompson Falls, Mont. Both are hydroelectric and are owned and operated by the Montana Power Co. Lesser plants scattered throughout the basin have a total installed capacity of only 19,330 kilowatts.

37. The following tabulation indicates the value and extent of present and potential economic resources of the Clark Fork-Pend Oreille Basin:

Forests, commercial stands:		
Total stumpage	thousand feet, log scale	24,828,000
Annual cut (average, 1925–40)	do	376,400
Annual value (average, 1925–40)		$4,269,000

Agricultural lands:		
Total cropland and plowable pasture	acres	800, 000
Total cropland harvested (1939)	do	470, 708
Annual value of agricultural products (1939)		$12, 133, 000
Minerals:		
Total mineral reserves		Indeterminate
Annual ore production (average, 1941–44)	tons	5, 628, 500
Annual value (average, 1941–44)		$53, 266, 500
Water power:		
Undeveloped water power:		
Minimum	kilowatts	4, 500, 000
Maximum	do	7, 000, 000
Installed generating capacity, 1947	do	105, 330
Total gross annual value at site		$50, 000, 000 to $75, 000, 000
Manufacturing: Total value of manufactured goods, 1939		$24, 364, 000

38. Because of the mountainous nature of the basin, transportation routes, both highways and railroads, follow the main streams. As the bulk of the population invariably settles in the valleys, the existing facilities are reasonably adequate in number. However, the standards of highway construction have been sharply limited by great distances, difficult locations, and small proportion of taxable property from which to derive funds.

39. Obstructive rapids and falls prevent through navigation of the Clark Fork and Pend Oreille Rivers. Smooth stretches of the river and the larger lakes were used extensively for local transportation of freight and passengers in the early days of settlement, but this commerce gradually disappeared with the advent of railroads and highways. Present-day traffic consists either of logs towed in rafts or floated by the current, or pleasure boats. The bulk of the log traffic on the Pend Oreille originates in the Priest Lake area and passes through the Albeni Falls dam site to a mill near Newport. Provision for such passage is included in the proposed project.

40. Public lands and reservations cover about 60 percent of the Clark Fork-Pend Oreille Basin area. By States, the proportions of Federal-owned land within the basin are: Washington, 67.5 percent; Idaho, 48.7 percent; Montana, 60.3 percent. Most of these lands are in national forests and, except for minor areas, are best suited for forest purposes. Kalispel Indian Reservation, a relatively small area, borders the Pend Oreille opposite Cusick, Wash., downstream from the dam site.

41. *Vicinity of project.*—The Albeni Falls Dam and Reservoir site is entirely within Bonner County, Idaho. (See pl. 4.) Bonner County had a population of 15,667 in 1940. The principal communities in the county bordering on the reservoir are: Sandpoint, 4,356; Priest River, 1,056; and Clark Fork, 430.

42. The principal economic activities in Bonner County, as in the entire basin, are mining, farming, and lumbering. Mines near Clark Fork produced metals in 1944 worth $51,000. Farms in Bonner County totaled 1,405 in 1944 and contained 278,000 acres. The value of these farms, with their equipment, totaled $7,157,000, and the value of their products was $1,949,000. In 1940, the logging industry cut 100,732,000 feet, log measure, valued at $1,377,000. A large sawmill located across the river from Newport, Wash., is just east of the Washington-Idaho line. Several smaller mills are located elsewhere in the county.

43. Three railroads serve that portion of Bonner County within the basin. All three follow separate routes northerly from Spokane, Wash., to Sandpoint. From Sandpoint, the Great Northern and the Spokane International Railways continue northerly on nearly parallel routes to Bonners Ferry, Idaho, whereas the Northern Pacific Railway follows an easterly route along the north shore of Pend Oreille Lake and the valley of Clark Fork. The primary highways serving the county generally parallel the routes of the railways.

44. *Existing projects.*—There are no existing Corps of Engineers projects on Pend Oreille River. A former navigation project providing for channel improvement between Box Canyon and Pend Oreille Lake was abandoned by section 10 of the River and Harbor Act approved March 4, 1913. Existing and authorized projects of the War Department or other agencies that will affect or be affected by the Albeni Falls project are named in paragraph 3 hereof. Plate 1[1] shows their locations on the river system.

45. *Improvements by other Federal and non-Federal agencies.*—There have been no improvements on Pend Oreille River by other Federal agencies. In 1909, local diking district No. 2, containing about 14,500 acres, was organized under State law to protect agricultural lands in the vicinity of Cusick, Wash., from flooding by Pend Oreille River. The embankment carrying the Chicago, Milwaukee, St. Paul & Pacific Railroad constitutes the main part of the dike system, which is adequate to protect the area from river floods of ordinary magnitude but is overtopped by extreme floods. Interior drainage still floods a considerable portion of the enclosed area when the river is high. A pumping plant, installed early in the life of the district to dispose of the interior drainage water, was found to be inadequate and was removed. About $190,000 has been expended by the district for the dikes and pumping plant.

46. *Extent and character of flooded areas.*—Areas subject to flooding under natural conditions are low-lying lands contiguous to Pend Oreille Lake and Pend Oreille River. Most of these lands are agricultural, used mainly for raising hay and grain crops and for pasture; and to a more limited extent, for seed and commercial potatoes, orchards, berries, and truck crops. Only a comparatively few acres are irrigated.

47. The most extensive agricultural area is located in the section downstream from Albeni Falls, in the vicinity of Cusick, Wash. This area, comprising the diking district described in paragraph 45, is protected against floods of ordinary magnitude by a combination of dikes and railroad embankment. With minor exceptions, all other areas, including cities and towns, are unprotected.

48. The city of Sandpoint, Idaho, as well as the towns of Cusick and Metaline, Wash., together with several other small communities, are either wholly or partially subject to flooding. Main highways and railroad lines occupying the valley are subject to damage by floods of 1894 magnitude or greater, as are some power and communications lines. Land on the east bank of the river opposite Cusick, Wash., now occupied by the Kalispel Indian Reservation, was inundated by the 1894 flood to the extent of about 2,100 acres.

49. *Flood damages.*—Only along the reservoir can a reduction of flood stages and flood damages be achieved by the proposed project.

[1] Not printed.

Surveys of the area subject to flooding, including the lake shores and the delta area of Clark Fork, have been made in detail and flood damages estimated on the basis of present development at 1947 prices. Damage data were obtained for three floods and summarized in table 4.

TABLE 4.—*Flood damage*

Item	1933 flood		1894 flood		Maximum probable flood [1]	
	Acres	Damage	Acres	Damage	Acres	Damage
Agricultural land	7,811	$267,724	9,263	$314,270	10,993	$401,315
Wooded, brush, waste land	5,251		6,764		8,566	
Municipal and other land	255	11,119	443	18,700	794	34,676
Utilities and transportation facilities		12,866		[2] 1,711,389		[3] 5,058,888
Buildings and contents		61,730		552,860		2,601,645
Other damages		77,132		210,868		741,037
Total	13,317	430,571	16,470	2,808,087	20,353	8,838,561

[1] Estimated peak flow at Priest River station, Pend Oreille River is 298,000 cubic feet per second. Estimated lake elevation, 2,085.8 feet.
[2] Includes $382,866 indirect costs to bus and truck lines and other utilities.
[3] Includes $454,102 indirect costs to bus and truck lines and other utilities.

50. From the above damage data for three floods, a stage-damage relationship curve was drawn to indicate the damage at any stage of Pend Oreille Lake. Based on this curve and the record of peak lake stages for the period 1903–47, the total damages and average annual damages in the area upstream from Albeni Falls for this period are estimated at $3,436,000 and $76,400, respectively. Adding the 1894 flood, the average annual damages amount to $132,500. These figures form the basis for evaluated flood control benefits that would result from the proposed project.

51. Detailed surveys to determine the extent and nature of flood damages in the Pend Oreille Valley downstream from Albeni Falls have not yet been made. From limited data available, it is estimated that about 32,000 acres of low-lying land would be inundated by floods of 1894 magnitude or larger. The area flooded in 1933 was about 14,500 acres. Total damages for the period 1903–47 in the downstream areas are believed to have been about $3,568,000, and the average annual damages, $79,300. Adding the 1894 flood, the average annual damages amounted to $168,200. The proposed project will neither increase nor decrease the flood damages along this reach.

52. *Views of local interests.*—Public hearings concerning river developments in the Clark Fork–Pend Oreille Basin date back to 1938 when the Corps of Engineers and the Department of Agriculture invited all interested residents to Missoula, Mont., for the purpose of outlining local desires. This meeting was general in scope, providing an inventory of the improvements desired, which served as a partial guide in the subsequent reconnaissance of possible developments.

53. Hearings specifically concerning storage in Pend Oreille Lake were held by the division engineer, Pacific division, in Sandpoint, Idaho, on June 18, 1943, and in Priest River, Idaho, on June 19, 1943. These hearings were in connection with the report mentioned in paragraph 7, which proposed regulation of Pend Oreille Lake below elevation 2,069. The preponderance of sentiment at Sandpoint was

opposed to the project at elevation 2,069, whereas local sentiment at Priest River favored the proposal. The Governor of Idaho stated that a license and certificate of water rights had been issued in 1928 to the Governor, in trust for the people of Idaho, by the State commissioner of reclamation, for 2,400,000 acre-feet of water in Pend Oreille Lake. This action was directed by the legislature in the laws of 1927, chapter 2, section 1, which declared the preservation of the unappropriated water of Priest, Pend Oreille, and Coeur d'Alene Lakes "in their present condition" for scenic beauty, health, recreation, transportation, and commercial purposes necessary and desirable for all inhabitants of the State to be a beneficial use of such water. The Governor also stated that just prior to the hearing he had made application to the same official for a permit for the construction of a concrete power dam at Albeni Falls, which would impound 1,615,000 acre-feet and stabilize the lake level at elevation 2,064. Presumably this degree of regulation would, in the eyes of the State officials at that time, preserve the lake in its "present condition." The attorney general of Idaho later confirmed that such a permit had been issued. However, there has been no subsequent action toward development of the site by the State, and the testimony of these officials indicated clearly that the water-right filing was for the purpose of controlling, rather than either preventing or undertaking, the development locally.

54. One of a series of hearings held by the subcommittee of the Committee on Irrigation and Reclamation of the House of Representatives, Seventy-eighth Congress, first session, to investigate the plans for the improvement of Columbia River and tributaries, was held in Sandpoint, Idaho, August 28, 1943. The account of this hearing is published as part 2 of the publications covering the series. The Governor of Idaho testified (p. 533) that construction of a dam at Albeni Falls creating a top reservoir level at elevation 2,062.5 feet had been agreed upon by representatives of Bonner County and the State administration, following the June hearings.

55. A report entitled "Proposed Program of Development of Columbia Drainage Basin," issued December 17, 1943, by an advisory committee of the Northwest States Development Association, recommended for emergency or immediate postwar construction, a dam for power and storage at Albeni Falls with height of normal water surface at elevation 2,062.5. The association is formed by the Governors of Idaho, Oregon, Montana, Washington, and Wyoming. The committee is representative of the respective State departments having to do with the planning and administration of the land and water development resources within the Columbia Basin States.

56. A gradual crystallization of local opinion favoring limitation of storage in Pend Oreille Lake to an elevation not exceeding 2,062.5 has been evidenced through the course of the public hearings and official studies mentioned above. That criterion, therefore, was adopted by the Corps of Engineers in considering possible developments between the lake and the international boundary. The development that would produce maximum navigation, flood control, and power benefits is a dam at Boundary dam site to develop practically the entire length of Pend Oreille River within the United States and form a reservoir continuous with Pend Oreille Lake. Such a proposal was presented at public hearings at Sandpoint, Idaho, and Metaline Falls, Wash., during May 1947. The Boundary project was opposed by

many owners of farms in the area in the vicinity of Cusick, Wash., whose lands would be flooded, and by business interests connected with agriculture there. It was also strongly opposed by mining interests in the vicinity of Metaline Falls on the grounds that seepage of reservoir water would interfere with operating properties and might render inaccessible the great undeveloped zinc and lead ore resources of that area.

57. The representative of the Governor of Idaho stated that the pool level proposed for the Boundary project (elevation 2.062.5) was not objected to by the State. The majority of private interests in Idaho also did not object but some farmers in the vicinity of the town of Clark Fork and a few other property owners opposed development of the pool to this elevation. Many who opposed construction of Boundary Dam favored a series of low dams or development of sites upstream as alternatives. Several proposed that a dam with pool elevation not exceeding 2,062.5 be constructed at the Albeni Falls site.

58. It is believed that the voluminous expressions of public and official opinion available concerning development of Pend Oreille River establish conclusively that the maximum storage level now acceptable to the people of northern Idaho is elevation 2,062.5, and that the only site that is economically feasible and at the same time acceptable to the people of northeastern Washington for development in the foreseeable future, is at Albeni Falls.

CHAPTER III. PROJECT PLAN

59. *Functions of the project.*—Albeni Falls project will serve the multiple purposes of power generation, navigation, flood control, fish and wildlife conservation, and recreation. Power development at the dam and increased power potentiality at all downstream generating stations through river regulation in the proposed reservoir will be a valuable and needed addition to the power supply of the region, now inadequate to meet the rapid growth of power loads. The value of power benefits is the predominant factor in the economics of the project. Navigation conditions in the lower Columbia, which constitutes an important artery of commerce extending more than 300 miles inland, will be improved by increases in minimum channel depths resulting from regulation in the reservoir. The opportunities for recreational boating, now an important activity on Pend Oreille Lake, will be extended and conditions for the support of fish will be improved by the greater constancy of water stages. The capacity for sustaining fish also will be increased somewhat by the prolongation of the lake downstream. A small adverse effect on wildlife will result from the project, largely to fur-bearing animals. (See appendix V.[1]) Substantial benefits will accrue to the marginal areas around Pend Oreille Lake that are now periodically damaged by high water during the spring run-off. Improved channel conditions at the dam site, which now forms a constriction in the lake outlet, will permit floods to pass through the lake at lower peak stages. The proposed method of reservoir operation will provide simultaneously the maximum in system-power benefits and the maximum in flood-control benefits. Floods above normal pool elevation 2,062.5 will be passed through the reservoir as rapidly as possible and surplus waters will be impounded and

[1] Not printed.

held at normal pool level until fall, thereby stabilizing Pend Oreille Lake levels through the spring and summer recreational period of about 6 months, in contrast with the rapid recession of lake levels now experienced from June to September. During the fall and winter period when regional power supply is lowest and power loads are greatest, the stored water will be drawn upon for power purposes at such a rate that maximum draw-down will occur just before the spring floods.

60. The maintenance of Pend Oreille Lake levels at or near the normal reservoir pool elevation of 2,062.5 throughout the summer growing season may foster the economical irrigation of certain adjacent shorelands by means of pumping from the lake. Any such irrigation probably would be developed as small private enterprises by individual landowners whenever economic conditions provided incentive. As these enterprises would not be components of the project development, the benefits that might be realized are not ascribed to the project nor included in the economic analysis thereof. Instead, they are considered more properly to be contingent advantages offsetting in some degree the reduction in agricultural production resulting from prolonged inundation of flood lands now capable of limited use following subsidence of high water. Ground-water levels in the Spokane and Little Spokane River valleys, where certain irrigation water supplies are pumped from wells, are believed to be related to Pend Oreille Lake levels. The maintenance of the lake at the proposed elevation through the summer may augment slightly the Spokane Valley irrigation supply and reduce pumping lifts for a part of the season. However, this eventuality is too uncertain to constitute a specific objective. In view of the indefinite nature and limited extent of possible benefits, irrigation is not considered to be a purpose of the project.

61. *Investigations, field.*—The principal investigations for this project, conducted on the ground, were:

(*a*) Topographic surveys made at the site, and soundings taken in the immediate vicinity of the proposed structures, as indicated on plate 10.[1]

(*b*) Subsurface site investigations made by means of 9 exploratory drill holes at the dam and powerhouse sites, and seismic investigations consisting of 74 lines along the channel between Albeni Falls and Pend Oreille Lake.

(*c*) Seepage-loss investigations at the south end of Pend Oreille Lake.

(*d*) Surveys to determine flowage costs, including relocations of highways, railroads, and other utilities, and effects on agricultural lands and production and on local tax revenues.

(*e*) Geological reconnaissance of the site and reservoir banks to determine the possible effects of the project upon existing structures.

(*f*) Water-surface elevations at 16 points along the channel between Sandpoint and the site, taken throughout the high-water period of the 1943 season.

62. *Office investigations.*—Studies constituting the bases for this report include:

(*a*) Estimate of future irrigation developments in the United States and Canada, together with their water requirements, the probable amounts and distribution of return flow, and the effects upon stream discharge.

(*b*) Backwater studies, preparation of backwater curves, water-surface profiles for various flows between Pend Oreille Lake and the dam site, and hydraulic studies of spillway capacities.

(*c*) Calculation of the effects of channel improvement to various extents at evident controls between Pend Oreille Lake and the dam site, together with estimates of quantities of costs.

[1] Not printed.

(*d*) Meteorological and hydrological studies to determine maximum and minimum discharges, spillway-design criteria, and conditions affecting construction and critical periods for power.

(*e*) Regulated-flow studies to determine the probable effects upon existing, authorized, and proposed generating stations on the Columbia River system.

(*f*) System-power studies to determine potential power and required capabilities of generating units at the site, the storage benefits to downstream plants, and the cost of power.

(*g*) Preliminary design, lay-out, and cost estimates of the project.

(*h*) Economic analyses of costs; of navigation, flood control, and power benefits; of methods of cost allocation, and of project repayment to the Federal Government.

(*i*) Laboratory tests of construction and foundation materials.

63. *Other plans considered.*—

(*a*) Boundary site, about 1 mile upstream from the Canadian boundary line, was thoroughly investigated and data thereon were presented at public hearings. This site would permit the most complete physical development of Pend Oreille River in the United States, and would be economically favorable both for power developed at the site and downstream by reason of storage. However, it is not acceptable to local interests, which have raised vigorous objections. Mining interests operating on narrow margins in the Metaline Falls area fear detrimental seepage, and farmers cultivating the area near Cusick, Wash., which would be drowned out, object to displacement. A lower dam at Boundary in conjunction with Albeni Falls for storage would not flood the cultivated area, but would be subject to the same objection by the mining interests.

(*b*) The Z Canyon site, located about a mile upstream from the Boundary site, originally was investigated by Hugh L. Cooper in 1915. It was eliminated as less desirable than the Boundary site because it has limited powerhouse area and 15 feet less head, and would develop less power at about the same unit cost per kilowatt. It has no apparent advantages over the Boundary site.

(*c*) A site at Box Canyon was investigated by means of a topographic survey, six drill holes, and seven seismic lines. It was discarded because of higher unit power cost than either Albeni Falls or Boundary projects. It would be subject also to some of the same objections as Boundary.

(*d*) Power diversion of 14,000 cubic feet per second from the stream in the vicinity of Box Canyon to Deep Creek through a pair of 11-mile tunnels has been proposed. A dam near the mouth of Deep Creek with power intake at Northport, Wash., would place the tailrace at the normal level of Franklin D. Roosevelt Lake. Normal head for this project would be approximately 600 feet with maximum prime power of 630,000 kilowatts. This plan was discarded, not only because of Canada's interest in the lower 16 miles of the river, but also because of the high unit cost of power and the limitation the plan would impose on the utilization of future upstream regulation.

(*e*) A plan involving diversion at Albeni Falls by canal and tunnels into the Little Spokane River, using the water through plants on Spokane River, also has been considered. This plan was discarded because of high unit-power cost and lack of adaptability to future upstream regulation, as well as in consideration for Canada's interest in the waters of the Pend Oreille River.

(*f*) The construction of the project at Albeni Falls to several higher elevations was studied. The higher elevations were eliminated in favor of the plan presented herein because the latter stabilizes the elevation of Pend Oreille Lake at the highest level which would comply with the desires of local interests, discussed in paragraphs 57 and 58.

64. *Adopted plan.*—The plan adopted for this report includes a concrete gravity structure with a spillway section occupying the left channel, which will be widened to include part of the area now island, and a powerhouse occupying the right channel. (See pl. 5.[1]) The normal full reservoir pool is established at elevation 2,062.5 feet above mean sea level. The minimum level of the lake will not be reduced by the project and the duration of low lake levels will be much briefer. The stored water will be used to produce power at the site, and to firm up the power flows at all downstream generating stations on the Columbia. The spillway is designed to reduce by

[1] Not printed.

amounts up to 1.5 feet the flood levels of Pend Oreille Lake for all floods which, under natural conditions, would cause lake stages between elevation 2,062.5 and elevation 2,076.1, which was reached in 1894 during the highest known flood. The reservoir will extend from the site to include Pend Oreille Lake, forming a body of water 67 miles long. The total reservoir area at elevation 2,062.5 will be 94,600 acres. The area now within the meander lines of the lake is 83,500 acres, and of that portion of the river between the lake and the dam site, 4,800 acres, making a total area within meander lines of 88,300 acres. Only a part of the area around the lake which is subject to frequent inundation by floods, under natural conditions, will be covered by this reservoir. The river valley between Albeni Falls and the lake is generally narrow and walled with steeply rising banks, but a few places have relatively low banks with small tracts of arable land. These also are frequently inundated by floods under natural conditions and would be included in the reservoir.

65. *Site description.*—Albeni Falls Dam site on Pend Oreille River is in Bonner County, Idaho, at river mile 90.3, about 2 miles easterly from the Washington-Idaho State line. It includes parts of sections 19, 20, 29, and 30, T. 56 N., R. 5 W., Boise Meridian. Here the river is divided by a rock island and flows through two constricted channels at low water, each adjacent to prominent rock abutments on the river banks. High water breaks through two additional channels near the middle of the island. The fall through the two main channels is about 8 feet for discharges approximating the mean annual, and a lesser amount for higher flows, ranging down to about 6 feet for the greatest known flood.

66. *Geology and foundation conditions.*—The site is at a granite reef that crosses the river. The reef continues to the south, rising gradually to the mountainside about 2 miles away. To the north, rock is exposed for about 4,000 feet and then is covered by alluvium in a surface sag for about 2,500 feet. From there the rock rises on the mountainside, reaching elevation 4,100 feet about 3½ miles to the north. The half-mile surface sag may mark a deeper channel in the bedrock through which some seepage conceivably might bypass the proposed dam. The seepage path would be about 2 miles long, and the head about 30 feet. Although the physical characteristics of the alluvium within the sag are unknown, the hydraulic gradient through this possible channel would be so low that only negligible seepage can be expected.

67. The right bank, on the downstream side of the reef, is a deeply weathered zone of granite with fault contact against the hard, unweathered granite that forms the reef across the valley. The wide, deep pools downstream from the site probably have cut into this deeply weathered zone. Upstream from the reef, a more closely jointed zone of granite apparently explains the presence here of a wider, deeper channel in the river. The rock forming the reef is jointed at intervals of 2 feet or more, and the large blocks thus formed offer strong resistance to stream erosion. This granite provides an excellent foundation for the dam and its appurtenant works.

68. *Hydrology.*—Regulated-flow studies: An investigation of stream flow of Pend Oreille River at Z Canyon, for the continuous record years 1913 to date, shows that the production of prime power at the Albeni Falls site and for downstream benefit on Columbia River would

have been comparatively low during the 15-year portion of the record period beginning October 1, 1927, and ending September 30, 1942. This 15-year interval, therefore, was selected as the basis for hydrological and power studies. The mean annual run-off during the 15 years was approximately 90 percent of that for the entire period of record. In the 15-year study period, the low-water seasons of 1936–37 and 1929–32, inclusive, were most critical. Albeni Falls Dam will be operated to produce maximum system power, as explained hereinafter in the discussion of hydroelectric power. The critical period for such operation would have been that of the 1936–37 low-water season. An extremely cold December and January, rather than deficiency in precipitation, caused this low run-off. The critical power period at Grand Coulee Dam with present upstream developments would have been October 1936 through March 1937. With the development of the authorized Hungry Horse project and the Albeni Falls project, assuming both to be operated to yield maximum dependable flow at Grand Coulee, a condition that approximates maximum system prime power, the critical period would have been October 1936 through April 1937.

69. *Dependable flow at site.*—The minimum mean monthly flows that would occur under critical water conditions identical to those of the winter of 1936–37 for progressive conditions of existing and future storage are shown in the following tabulation. Items 3 and 4 are the flows at the Albeni Falls site if the storage projects are operated to provide maximum dependable flow at Grand Coulee Dam. Item 5 is the flow at the site if the storage projects are operated to provide maximum system power, as contemplated herein.

Item	Storage conditions	Minimum mean monthly flow
		Cubic feet per second
1	Corrected for storage in Pend Oreille Lake and assumed operation at Kerr Dam	6,350
2	Observed flow (January 1937)	6,900
3	With future irrigation and 2,860,000 acre-feet stored in Hungry Horse Reservoir (October 1936 to April 1937)	13,200
4	Item 3 with Albeni Falls storage added (October 1936 to April 1937)	18,400
5	Item 3 with Albeni Falls storage added (September 1936 to April 1937)	17,200

70. The allowance for ultimate irrigation demands, mentioned above, is based on estimated annual diversion of approximately 817,000 acre-feet upstream from the site. Of that amount, approximately 492,000 acre-feet will return to the river. Therefore, the eventual depletion in Pend Oreille run-off because of irrigation is estimated at 325,000 acre-feet. As irrigation diversion occurs during the summer season of high river discharge, whereas return flow of unconsumed irrigation water occurs throughout the year, the net effect of irrigation above the dam site is beneficial in decreasing floods and augmenting low flows. Reference is made to appendix I[1] for a detailed discussion of the hydrology pertaining to the water-supply studies.

71. *Spillway-design flood.*—Stream-flow records indicate that run-off from snow melt has been the primary factor in all major floods on Pend Oreille River. Therefore, the derivation of the spillway-design flood involves the evaluation of the worst possible climatological and

[1] Not printed.

meteorological conditions for a snow-melt flood. Steps in the derivation are outlined in appendix I,[1] section C, and plate 9.[1]

72. The spillway-design flood has a peak discharge of 350,000 cubic feet per second, and a flood volume of 36,200,000 acre-feet, representing 28.1 inches of run-off from the watershed area. The inflow hydrograph of the spillway-design flood into Pend Oreille Lake has a peak of 404,000 cubic feet per second. Because of the large volume of storage in the lake, the resultant outflow is reduced to 350,000 cubic feet per second. The spillway-design flood hydrograph of Albeni Falls Dam site is the same as the outflow from Pend Oreille Lake. The calculated spillway-design flood has a maximum discharge somewhat less than twice that of the historical flood of 1894 and approximately 2½ times as great as the maximum observed flood of June 1913.

73. *Hydroelectric power.*—System viewpoint: The power resources of the Pacific Northwest in Washington, Oregon, Montana, Idaho, and Utah, are physically integrated through the Northwest Power Pool, an operating group including most of the major electric utility companies, the Bonneville Power Administration, and the two large municipal systems, Seattle, and Tacoma, Wash. The power pool coordinates the operation of Columbia River and all other power sources under its control for maximum over-all effectiveness. The efficiencies attained during wartime by such coordinated operation were so impressive that the power pool has continued in existence to meet heavy peacetime power demands. The extensive transmission network of the Bonneville Power Administration distributes the energy from Bonneville and Grand Coulee Dams, and provides a medium for major interchanges of energy between pool members. By law, the same agency will market the power from other Federal projects in the Columbia River Basin.

74. Albeni Falls project will add power not only at site, but at downstream generating stations. It is evident that any such project must be designed to fit into the system, all elements of which will be operated in coordination to supply the system load. Moreover, the revenues and obligations of the project will be merged in the system accounts of the marketing agency. For these reasons, both the power studies and the economic analyses of Albeni Falls project for this report necessarily consider the project as an addition to the system of existing projects and those now authorized which, as mentioned in the next paragraph, are assumed to be built earlier.

75. The regional Federal power system, to which the proposed project is considered as an addition, is that consisting of Bonneville and Grand Coulee generating stations (10 and 18 units, respectively), together with the authorized Hungry Horse, McNary, and Foster Creek[2] projects (4, 12, and 16 units, respectively), and an expanded transmission system of the Bonneville Power Administration to serve them. Hereafter, this group of facilities will be referred to as the initial system. Authorized projects on the Willamette and Lower Snake Rivers are not included, as they are assumed to follow rather than precede Albeni Falls in sequence of construction. Power installation on the Willamette is not yet authorized, and the Lower Snake River development may be delayed by fishery problems. In any case, projects on these two streams would not affect the Albeni Falls project directly by common use of water, and their indirect

[1] Not printed.
[2] Now Chief Joseph.

effects will be only such as are shared by other interconnected facilities in the five States.

76. *Storage.*—Flow of the Columbia River stream system, excepting its few tributaries west of the Cascade Mountains, is lowest during the winter, whereas power loads are greatest at that season. The storage of spring and early summer flood run-off for winter release to meet power demands, therefore, is essential to the most advantageous development of the river for power purposes, as it is also for flood control, navigation, and other beneficial purposes. The existing and authorized storage projects fall far short of accomplishing the degree of river regulation needed for economic multiple-purpose utilization of the water resources. Therefore, the 1,140,000 acre-feet of usable storage proposed at Albeni Falls, effective through about 620 feet of head in the initial system in the United States, will be a particularly valuable addition to the system. It would be effective potentially through more than twice that head in the comprehensive plan, including about 400 feet in Canada.

77. *Load factor.*—The most recent forecasts of regional load conditions made by the Bonneville Power Administration indicate that the average annual load factor in 1960 may be about 67 percent. This figure agrees with independent estimates made by Corps of Engineers offices to guide the studies of future comprehensive development of the Columbia River system. It is therefore adopted as reasonable for purposes of system analysis herein.

78. *Peaking requirements.*—Because of the low head at the site, with resulting high cost of installation, it is not proposed to provide sufficient capacity at the Albeni Falls project for normal system peaking. Also, as neither Bonneville nor Grand Coulee, the two existing Federal power developments, have space for adequate power installations fully to utilize the increase in dependable flow while following the adopted regional load curve, it is planned to operate these three stations on high load factors and supply required peaking capability by adding to the initial system two units at Foster Creek [1] and one at McNary, making the total installations at these plants 18 units and 13 units, respectively.

79. *Definitions.*—Power terms used herein accord with the Glossary of Important Terms Commonly Used in Connection With Electric Power, Draft No. 2, December 10, 1946, prepared by the Federal Power Commission. Definitions of terms not included therein are as follows:

(*a*) *Firm capability.*—The firm capability of a generating unit, generating station, power site, or combination of generating stations or power sites, or of a power system, is that capability which is intended to be always available even under emergency conditions, to the extent necessary to meet the peak requirements of a load of known or assumed characteristics.

(*b*) *Nominal prime power.*—The nominal prime power of a generating station is that station's average power output during the few low month's operation in the critical hydro year, which is made prime by virtue of the firming effect of other hydroelectric generating stations within the system.

(*c*) *Nominal firm capability.*—The nominal firm capability of a generating station is the nominal prime power of that station divided by the assigned load factor.

80. *Proposed installation.*—It is proposed to install three units at the site. Each unit would consist of a Kaplan vertical-shaft turbine, directly connected to the generator. The turbine would be 280 inches in

[1] Now Chief Joseph

diameter and would have a rated capacity of 19,600 horsepower at 22 feet gross head. The corresponding rated capacity of the generator would be 14,200 kilowatts, or 15,000 kilovolt-amperes at 95 percent power factor. One bank of three transformers, each with a capacity of 17,000 kilovolt-amperes, would be installed to serve the three units.

81. The critical period for power in the system with Albeni Falls added was 8 months from September 1, 1936, to April 30, 1937, as mentioned in paragraph 69. As the reservoir would have been depleted by the demands of system operation during the critical period, the gross head on the turbines would have been reduced to 13 feet by the fourth week of March, with a resulting capability of 6,600 kilowatts per unit. The plant then would be shut down for the remainder of the critical period, and storage would be drawn off through the spillway gates. Two similar shut-downs of lesser duration might occur during the 15-year period selected as the basis for power studies.

82. *System power, coordinated operation.*—The prime power and firm capability of the initial system, and of the initial system plus Albeni Falls, are shown in table 5. System power is shown graphically on plate 12 [1] of the appendix.

TABLE 5.—*System power and capability*

System	Generating units	Installed generating capacity	Nominal prime power	System prime power	System firm capability at 67 percent load factor
	Number	*Mw.*	*Mw.*	*Mw.*	*Mw.*
A. Initial system	(1)	4,816		2,950	4,403
B. Initial system plus—Albeni Falls—					
Hungry Horse	4	286	187		
Albeni Falls	3	43	27		
Grand Coulee	18	2,160	1,280		
Foster Creek, now Chief Joseph	18	1,152	674		
McNary	13	897	539		
Bonneville	10	[2] 518	411		
System total		5,056		3,118	4,654
C. Incremental (B minus A)		240		168	251

[1] Equals B minus Albeni Falls, 2 Foster Creek, now Chief Joseph, units and 1 McNary unit.
[2] Can produce 570 Mw. for short periods.

83. The effects of regulation at Albeni Falls on future projects that may be constructed on the main stem of the Columbia River are not included in the evaluated system power benefits for this project, as such benefits properly will be considered in the eventual justification of the respective future projects, each considered as an addition to the regional power system as it then exists. However, the fact that this storage eventually will be effective through a head much greater than that now utilized, and will contribute greatly to the economic development of later projects, is an important aspect of the project. As heretofore explained, adjustment of flow for future irrigation requirements has been made in computing prime power under all conditions involving regulated flow.

84. The nominal prime power added to the system by the Albeni Falls project is 168,000 kilowatts, as shown in table 5. The corresponding firm capability at the assumed annual load factor of 67 percent

[1] Not printed.

is 250,700 kilowatts. The system capability would have been minimum in the month of April 1937, with system reservoirs at lowest stages. At that time, the required capability would be about 85 percent of the maximum, or 213,000 kilowatts. The proposed incremental installation at other generating plants in the system; i. e. two at Foster Creek [1] and one at McNary, has been based on the nearest even number of units that will approximately supply the capability needed in April, the time of minimum system capability.

85. *Project lay-out.*—The proposed plan, shown on plate 5,[2] provides a straight spillway section across the left and middle channels and through a large part of the island. Short, nonoverflow gravity sections connect the spillway with the abutment on the left and with the powerhouse structure on the right. The powerhouse occupies the right channel, which will be widened to accommodate three generating units, an assembly bay, and a log chute. All major structures will be founded on the solid granite reef that forms the river bed, the island, and both abutments. Overburden on the rock surfaces within the structural area above water is negligible. The small number of channel borings in this area indicates that the overburden there also is negligible.

86. The main spillway will consist of nine gated openings, each 40 feet wide, with crest of the ogee section at elevation 2,031 feet. Fixed-wheel lift gates 40 feet wide, each constructed in two sections, will control the pool to elevation 2,062.5. They will be operated by two gantry cranes, traveling on a deck supported by concrete girders and piers. Deck elevation at 2,097 feet will permit the spillway-design flood to pass clear of all deck structure. An auxiliary spillway, consisting of three ungated openings 40 feet wide, with crest of the ogee section at elevation 2,062.5, will be located at the right of the main spillway. The craneway will be continued across this spillway section to facilitate gate installation and gate storage. The main and auxiliary spillways are designed to handle safely the design flood and to pass a flood equivalent to the 1894 flood without raising the elevation of Pend Oreille Lake. The main spillway alone will release the total required power flow at minimum reservoir level with all gates open. Regulation for downstream plants may thus be accomplished when the powerhouse is not in operation. The ungated auxiliary spillway will automatically operate when the pool exceeds the normal established level of 2,062.5 feet, a requirement to supplement the main spillway during major floods. The spillways will reduce by 1 to 1.5 feet the high levels on Pend Oreille Lake for lesser floods up to that of 1894 magnitude. The possible location of a lock, should future navigation warrant its construction, is shown at the left end of the spillway.

87. The powerhouse will be constructed across the channel adjacent to the right bank, at right angles to the direction of flow. The intake structure and powerhouse will be constructed as an integral unit, affording the best hydraulic conditions with an ample approach channel leading directly to the forebay. Water for each unit will be supplied through an intake divided by two vertical splitters, thus allowing for control of each unit by three gates. Each set of gates will consist of one fixed-wheel, vertical-lift type, and two slide gates, all to be operated by a gantry crane. This crane will operate on a track ex-

[1] Now Chief Joseph.
[2] Not printed.

tended beyond the assembly bay where, in addition to its use for head gates, it can unload heavy equipment from railroad cars and dispose it either through a large hatch to the floor level of the generators, or transfer it to the craneway on the spillway.

88. The powerhouse will contain three Kaplan units, spaced 82 feet on centers. Because of low head at extreme draw-down, a Diesel-electric stand-by plant will be provided for station service in emergencies. Power transformers will be located at the right end of the powerhouse, adjacent to the house track serving the project. By use of a short spur from this track and the intake gantry, the transformers may be transferred to the service bay for untanking. The switching yard will occupy the knoll immediately above the transformer bank, and the transmission lines will be erected along the right bank of the river. Access to these structures will be from State Highway No. 10–A.

89. *Access and operating facilities.*—A bench on the right bank immediately upstream from the site affords areas on either side of the highway favorable for location of both permanent operators' colony and construction camp. Ample water supply probably can be developed by wells through the overburden at a depth not much lower than the river level. Sewage will be treated and discharged into the river.

90. Vehicular access will be provided by the construction of a short road from State Highway No. 10–A at a point just downstream from the project to a turning yard on the right end of the powerhouse at the level of the intake deck. A construction road will be required on the left bank for the downstream cofferdam in the left channel. This road also will furnish access to the project by connection with a county road in the near vicinity.

91. Rail access will be provided by a track connecting to the Diamond Match Co. spur, which in turn connects to the main line of the Great Northern Railway on the right bank. Commercial power for construction purposes is assumed to be available at Newport, Wash., requiring the building of about 2.5 miles of transmission line. The Government transmission system is also accessible within reasonable distance.

92. *Reservoir lands.*—Yearly maximum high-water stages on Pend Oreille Lake, and on Pend Oreille River upstream from Priest River, exceeded elevation 2,062.0 in 22 of the 45 years of record. An elevation 5 feet higher has been exceeded five times. Therefore, improvements on lands below the proposed pool elevation of 2,062.5 are quite limited. Railroad and highway installations are well above flood levels.

93. Of the total reservoir area at elevation 2,062.5, only some 6,300 acres lie outside the existing meander lines of Pend Oreille Lake and River. These are to be acquired for project purposes. Some additional area will be required for freeboard along the shores of the reservoir to provide against wave wash, ground-water effects, and special severance damages. A few small tracts that would become islands or otherwise inaccessible also must be acquired. An arbitrary allowance for acquisition beyond the reservoir flow line, the area of which cannot be determined accurately in advance, has been included in the cost estimates. Agricultural lands within the limits of the pool are used mainly for raising hay (table 7). The estimated total value of the crops produced in 1947 was $90,000, or 6 percent of the Bonner County

total. No land is required for rights-of-way for relocation of railroads and highways.

94. The possibility of leveeing the larger areas of usable lands lying below the reservoir flow line was considered as an alternative to acquiring them. Five areas, containing a total of 3,020 acres, and physically possible of protection, were investigated. In all five, the estimated per-acre cost of the levees far exceeded the average per-acre value of the protected land. In addition, the loss of some 22,000 acre-feet of usable storage capacity, valued at the cost per acre-foot of the proposed project, would amount to more than one-half million dollars. Therefore, the segregation of these lands from the reservoir by diking is not economically feasible.

95. The areas, ownership, and present use of reservoir lands below pool level 2,062.5, are shown in tables 6 and 7.

TABLE 6.—*Ownership of reservoir land areas*

Ownership	Bonner County, Idaho
	Acres
Private	6,203
State	19
Federal	71
Total	6,293

TABLE 7.—*Present use of reservoir lands*

Land use	Bonner County, Idaho	Land use	Bonner County, Idaho
	Acres		*Acres*
Wild hay	2,439	Pasture	1,187
Tame hay	445	Waste	15
Grains	46	Brush or wooded	1,997
Potatoes	92	Business, industrial and residential	70
Other crops	2	Total	6,293
Total cropland	3,024		

96. *Relocations and alterations.*—Main lines of the Northern Pacific, Great Northern, and Spokane International Railroads and United States Highways Nos. 10–A and 95 pass through the reservoir area. Of these, the railroads will not have to be relocated, and only 1.30 miles of Highway No. 10–A will have to be raised. All railroads and highways except Highway No. 95 will require riprapping in places for a total distance of 13.27 miles, to withstand wave action. The county-road bridge at the town of Priest River must be altered to provide openings for navigation. None of the other river bridges nor the ferry facilities at Thama and Laclede will be disturbed.

97. The relocations and changes required for the entire project are summarized in table 8.

TABLE 8.—*Relocations and changes in existing facilities*

Facility	Relocation or change
Railroads:	
Great Northern	Riprap 5.67 miles.
Northern Pacific	Riprap 4.43 miles.
Spokane International	Riprap 1.40 miles.
Highways and roads: State Highway No. 10-A	Raise 1.30 miles; riprap 1.77 miles.
County bridge across Pend Oreille River at Priest River	Provide opening for navigation.
Wire lines (other than railway)	Relocate 51 miles of power and telephone lines.

98. *Construction plan—River diversion.*—This project lends itself naturally to construction and diversion in two stages by alternate use of the existing channels. During the first stage, the spillway area will be enclosed between cofferdams and the river diverted through the right channel. The upstream cofferdam will be of crib construction with the top at elevation 2,066 feet. The downstream cofferdam will be of earth and rock, with the top at elevation 2,058 feet. Removal is contemplated of about 6,000 cubic yards of rock down to water surface at low flows in the right channel prior to diversion through it. Although not required for powerhouse construction purposes until the second stage, its removal for first-stage diversion will improve the channel capacity. This plan will pass 136,000 cubic feet per second (the maximum flood during the period of record since 1903) with a freeboard of about 3 feet on the upstream cofferdam. When the spillway section with crest at elevation 2,031 has been substantially completed, the second stage of construction will follow. The spillway cofferdams will be removed and the right channel blocked by cofferdams, diverting all flow through the completed part of the spillway structure. These second-stage cofferdams, enclosing the powerhouse area, will be like those of the first stage: That upstream, a crib to elevation 2,053 feet, and that downstream, an earth and rock fill to elevation 2,052 feet. About 100,000 cubic feet per second can be diverted through the spillway while the powerhouse is under construction. The adopted construction schedule (pl. 13,[1] appendix) is based on the foregoing plan. It involves a construction period of 3 years and 4 months to complete the installation of one unit, and an additional 8 months to complete the last two units.

99. *Construction materials.*—Preliminary reconnaissance indicates adequate quantities of natural concrete aggregates available by truck or rail haul within a reasonable distance. Cofferdam material is available on the left bank downstream from the site. A contractors' road on the left bank will be necessary for cofferdam construction in the left channel and disposal of the excess rock excavated from the spillway area. It appears possible to underpass or overpass the Great Northern Railway track with this road to reduce the hazard of rail traffic in such close proximity to the construction.

100. *Recreation and health.*—Pend Oreille Lake, one of the largest bodies of fresh water wholly within the United States, is becoming a major recreational center of the Northwest. Its clear waters and beautiful environment of forests and mountains attract not only the vacationists of the surrounding region, but sportsmen from everywhere. The opportunities nearby for deer, elk, pheasant, and water-

[1] Not printed.

fowl hunting are exceptional, as are the varieties of fishing afforded by the tributary streams and the lake itself. Some of the largest and gamiest varieties of trout on this continent have been introduced with such success that catches from Pend Oreille Lake are conspicuous in the national records. The area is strategically situated with respect to east-west and north-south rail and highway routes linking other popular tourist destinations. It lies approximately in the center of a circle that includes the Canadian national parks, and Glacier, Yellowstone, Crater Lake, and Rainier national parks in this country; Seattle, Victoria, Vancouver, the Olympic Peninsula, and San Juan Islands of the Puget Sound area; the high Rockies, the Cascades, and the primitive area of central Idaho. All of these and many other attractions bring touring vacationists to, or within easy driving reach of, this locality.

101. Sandpoint, Idaho, is the focus of activity on the lake. The town and the Federal Government, through the Works Progress Administration, have invested substantial sums in the improvement of boat moorings, beaches, bathhouses, and water-front access. The opportunities for recreational use of the lake will be greatly expanded by the maintenance of the project pool level through the summer season, in contrast with the rapid recession of lake levels that now occurs through July and August. Such stabilization of the lake level is a primary objective in the earlier of two congressional authorities under which this report is submitted. Recognition of the attendant recreational opportunities and inclusion of their development as a part of multiple-purpose improvement projects is required by existing legislation.

102. At such time as the Albeni Falls project is authorized by Congress, the further development of basic recreational facilities at Sandpoint and other localities on the reservoir will be an important part of the project, requiring a carefully prepared and detailed recreational plan. Preliminary consideration for the instant report suggests several features that might be advantageously incorporated in such a plan. Dike construction on the Sandpoint water front, necessitated by prolonged maintenance of the lake level at 2,062.5, may be combined economically with excavation for a small-boat basin. The existing municipal beaches and their improvements must be restored at the higher level and, in the process, could be extended and provided with adequate bathhouses, parking and picnic grounds, recreational equipment, landscaping, and access. Mooring facilities at Priest River and other points might be included.

103. Certain other improvements may be desirable at Sandpoint or other places on the reservoir, not only in connection with recreational development, but in the interest of public health as well. The existing Sandpoint municipal septic tank may require overhauling and enlargement to provide more complete treatment of sewage before it is discharged into the lake. The slough that now forms the outlet of Sand Creek would become a lagoon throughout the summer. If further improved by deepening and realining as an extension of the boat basin, with suitable landscaping of the banks, it would become a substantial asset adjoining the business district, rather than the swampy, littered nuisance it now is.

CHAPTER IV. PROJECT ECONOMICS

104. *Capital costs.*—Construction of the Albeni Falls project, in conformance with the plan and schedule herein presented, is estimated to require a gross Federal investment of $28,480,000 at 1947 prices. The investment includes construction cost of $26,995,000, summarized in table 9, and interest during construction, computed at $1,485,000.

TABLE 9. *Summary of estimated construction costs*

No.	Item	Cost
1	General	$1, 195, 000
2	Diversion and care of river	2, 215, 000
3	Spillway and abutments	4, 119, 000
4	Intake works	2, 264, 000
5	Powerhouse	14, 130, 000
6	Permanent buildings and grounds	185, 000
7	Lands and improvements	1, 537, 000
8	Reservoir clearing	482, 000
9	Relocations	868, 000
	Total for project	26, 995, 000

The construction cost estimate was prepared in August 1947 and is based on material costs and wage rates prevailing at that time. Interest during construction is calculated at 3 percent per annum applied to the estimated construction cost for one-half of the construction period, herein averaged at 3⅞ years.

105. *Annual costs.*—The annual costs of the project after completion will include interest on, and amortization of, the gross capital investment; cost for replacement of items having estimated lives less than the assumed 50-year economic life of the project; pay roll and materials charges for operation and maintenance of the project. To these have been added assumed annual payments of nominal amount to local taxing units which would suffer loss when property for the project is acquired. The estimated total annual cost is $1,280,000.

106. Table 10 contains a summary of the estimated annual costs of the Albeni Falls project and interrelated Federal projects constituting the initial system in the Columbia River Basin. For the Bonneville, Grand Coulee, and Hungry Horse projects, annual charges against power are taken from published reports of the Bonneville Power Administration. For the authorized Foster Creek [1] and McNary Dam projects and for the project proposed herein, annual costs are computed as follows: Amortization of the capital investment is spread uniformly over an assumed economic life of 50 years, with 3 percent interest per annum; operation and maintenance costs and allowances for interim replacement of the powerhouse equipment, spillway gates, trashracks, other miscellaneous machinery, and underwater metal that have an assumed life of less than 50 years, are based on studies of experience at existing major Federal projects; and for Foster Creek and Albeni Falls projects only, payments to cover the loss in taxes sustained by local taxing units are calculated on the basis of actual revenue lost when lands and improvements are removed from tax rolls through Government acquisition.

107. Compensatory payments from project revenues for loss of taxes have been authorized by law only for certain projects, but it is assumed for purposes of this report, that similar authority may be granted prior to or at the time of authorization of the Albeni Falls project.

[1] Now Chief Joseph.

TABLE 10.—*Summary of capital costs and annual charges*

Item	Initial system			Initial system plus Albeni Falls project				Albeni Falls project plus incremental downstream installations, columns 5+6+7+8−(2+3+4)
	Bonneville, Hungry Horse, and Grand Coulee with 18 units [1]	McNary, 12 units	Foster Creek,[4] 16 units	Bonneville, Hungry Horse, and Grand Coulee with 18 units [1]	McNary, 13 units	Foster Creek,[4] 18 units	Albeni Falls, 3 units	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Capital costs:								
Estimated construction costs, items having less than 50-year life		$60,812,000	$68,750,000		$65,407,000	$77,034,000	$10,467,000	$23,346,000
Estimated construction costs, items having 50-year life		143,255,000	105,148,000		144,989,000	110,629,000	16,528,000	23,743,000
Total estimated construction costs		204,067,000	173,898,000		210,396,000	187,663,000	26,995,000	47,089,000
Interest during construction,[2] items having less than 50-year life		5,473,000	5,930,000		5,611,000	6,241,000	576,000	1,025,000
Interest during construction,[2] items having 50-year life		12,893,000	9,069,000		12,945,000	9,275,000	909,000	1,167,000
Total interest during construction [2]		18,366,000	14,999,000		18,556,000	15,516,000	1,485,000	2,192,000
Investment, items having less than 50-year life		66,285,000	74,680,000		71,018,000	83,275,000	11,043,000	24,371,000
Investment, items having 50-year life		156,148,000	114,217,000		157,934,000	119,904,000	17,437,000	24,910,000
Grand total investment		222,433,000	188,897,000		228,952,000	203,179,000	28,480,000	49,281,000
Annual charges:								
Interest [2]		6,673,000	5,667,000		6,869,000	6,095,000	854,000	1,478,000
Amortization [2]		1,973,000	1,676,000		2,031,000	1,802,000	253,000	437,000
Interim replacements [2]		418,000	471,000		448,000	525,000	70,000	154,000
Operation and maintenance		1,423,000	1,486,000		1,478,000	1,611,000	100,000	280,000
Payment for lost taxes		0	2,000		0	2,000	3,000	3,000
Total annual charges	[3] $17,568,000	10,487,000	9,302,000	[3] $17,568,000	10,826,000	10,035,000	1,280,000	2,352,000
Grand total system annual charges		37,357,000				39,709,000		2,352,000

[1] From U. S. Department of Interior report on repayment of operating expenses and construction costs of the Bonneville Power Administration, Bonneville Dam project and Columbia Basin project, Supplement No. 1, Jan. 31, 1947; and Hungry Horse project pay-out analysis, Apr. 30, 1947. Costs for incremental additions at Grand Coulee have been increased 50 percent for 3 instead of 2 units as indicated in the Hungry Horse pay-out report.

[2] Interest during construction, annual interest, amortization, and interim replacements for all projects except those listed in column (3) were computed on the basis of a 3 percent interest rate.

[3] Includes $12,287,000 as an annual cost of Bonneville and Grand Coulee Dams which is allocated to be paid from power revenues as indicated in the reports cited in [1] above. Annual costs of these projects for purposes other than power are excluded.

[4] Now Chief Joseph

A summary of assessed valuations in Bonner County, Idaho, for land and improvements that would be inundated by the proposed reservoir, together with the current annual tax levies thereon, and their relation to all assessed property in the county, is shown in table 11.

TABLE 11.—*Tax data, lands, and improvements in Bonner County, Idaho, and in project at pool elevation 2,062.5*

Item	County	Project	Project (percent)
Area of lands (acres)	1,111,040	6,293	0.57
Assessed valuation:			
Lands	$2,243,300	$57,213	2.55
Improvements	1,299,020	7,673	.59
Total assessed valuation	3,542,320	64,886	1.83
Annual taxes levied in 1945	473,383	2,760	.58

108. *Navigation benefits.*—The release of water from the reservoir for power purposes will increase the existing minimum channel depths in two navigable river reaches downstream from Grand Coulee Dam: (1) from the foot of Priest Rapids to the head of McNary Dam pool, 50 miles; (2) from McNary Dam to head of the Celilo Canal, 92 miles. Data pertinent to these reaches are:

Item	Priest Rapids to McNary	McNary to Celilo Canal
Present depth available—feet	6.5	7.0
Incremental depth by:		
Albeni Falls project—do	.4	.3
Future projects—do	2.1	1.7
Minimum depth required for fully loaded barges—do	9.0	9.0
Estimated annual tonnage	162,500	3,460,000

109. The increases in minimum depths will reduce shipping costs by permitting barges to be loaded to greater drafts. As shown in appendix V,[1] the estimate of savings in the Priest Rapids-McNary reach amounts to $15,000 each year and is based on the share of prospective Columbia Basin project tonnage that will be carried on that reach, and the tonnage that can be attributed to the Hanford plant of the Atomic Energy Commission. The savings in the McNary-The Dalles reach, calculated at $79,000, are based on existing and future potential tonnage originating upstream from McNary Dam. Details of computation for these estimated benefits are shown in tables 1, 2, and 3 of appendix V.[1] No savings in shipping costs will be realized downstream from The Dalles, but there is every indication that some benefit will accrue from the probable reduction in annual dredging costs downstream from Bonneville Dam. This benefit has not been evaluated. Similarly, no value has been placed upon the benefits that will accrue to the city of Priest River, Idaho, by reason of its location on the pool. Facilities for accommodation of small commercial and pleasure craft may be provided at the time of construction to the extent such work can be economically justified.

[1] Not printed.

110. *Flood-control benefits.*—Construction of the Albeni Falls project would produce annual flood-control benefits upstream from Albeni Falls through reduction in flood stages on Pend Oreille Lake as a result of increased channel capacity provided by the spillway of the project. In order to evaluate properly the damages eliminated by such improvement, it was assumed that the Hungry Horse project would be in operation and that only the incremental reduction in flood stages on Pend Oreille Lake beyond the lowered elevations produced by regulation at Hungry Horse and Kerr Dams could be attributed to the Albeni Falls project. Details of computation for determination of these flood-control benefits are presented in appendix V.[1] On the basis of field examination of the lands now affected by flood stages of Pend Oreille Lake, it is estimated that the reduction in damages would average $22,000 annually.

111. *Power benefits.*—The predominant Federal power rate in the Pacific Northwest is the schedule C–3 rate of the Bonneville Power Administration, amounting to $17.50 per kilowatt of maximum demand per year for power delivered anywhere on the Federal transmission system. Regional transmission costs are estimated to average $7.65 per kilowatt of firm generating capability; therefore, the net evaluation of power at the dam site is based on $9.85 per kilowatt of firm capability. This rate assumes, on the basis of a recent estimate by the Bonneville Power Administration, that peak losses in transmission are compensated for by gains through diversity of load.[2] As indicated by table 5, chapter III, the nominal prime power added to the initial system by the Albeni Falls project will be 168,000 kilowatts, and the corresponding nominal firm capability at 67 percent annual load factor will be 251,000 kilowatts, producing an annual system power benefit of $2,472,000. Table 12 summarizes in round figures the evaluated power benefits on a system basis, before and after addition of the Albeni Falls project.

TABLE 12.—*Summary of annual power benefits (nearest $1,000)*

System considered	System prime power	System firm capability	Incremental firm capability	Incremental firm capability at $9.85 per kilowatt	Total system annual power revenue
	Kilowatts	*Kilowatts*	*Kilowatts*		
A. Bonneville, Hungry Horse, and Grand Coulee with 17-unit installation	[1] 1,756,000	[1] 2,036,000	----------	----------	[1] $17,102,000
B. Initial system; system A plus McNary, Foster Creek,[3] and eighteenth unit at Grand Coulee	2,950,000	[2] 4,403,000	2,367,000	$23,315,000	40,417,000
C. System B plus Albeni Falls project	3,118,000	4,654,000	251,000	2,472,000	42,889,000

[1] From U. S. Department of Interior Report on Repayment of Operating Expense and Construction Costs of Bonneville Power Administration, Bonneville Dam project, and Columbia Basin project, supplement No. 1, Jan. 31, 1947, and Hungry Horse Project Pay-out Analysis, Apr. 30, 1947.
[2] At 67 percent system annual load factor.
[3] Now Chief Joseph.

112. Although the regulation at Albeni Falls would add prime power at the Rock Island Dam of the Puget Sound Power & Light Co., the utility has advised the Federal Power Commission that expansion of the generating capacity at the Rock Island project to develop this in-

[1] Not printed.
[2] 1960 Pacific Northwest Peak and Average Loads by Consumer Classification, Bonneville Power Administration, September 5, 1947.

creased potential power is not feasible under existing conditions. Inasmuch as the question of expansion at this site is still under deliberation by the Federal Power Commission, and the effect of this station on the economic analysis of the Albeni Falls project would be small whether the additional installation were made or not, power benefits at Rock Island have not been evaluated herein.

113. *Power market.*—The growth of average load and the increase in installed generating capacity in the five Northwest States of Washington, Oregon, Idaho, Montana, and Utah, are shown on plate 14 [4] in the appendix. Similar data for the entire United States are shown also for comparative purposes. Although some of the anticipated postwar recession of power demand in the Pacific Northwest occurred, it was soon offset by the requirements of aluminum reduction and rolling mills and other industries that reopened for peacetime production. These loads, together with those resulting from retention of a large proportion of the wartime population increases, when superimposed on the substantial normal growth trends, resulted in power demands during the winter of 1946–47 substantially greater than all previous peaks. During this critical period, all serviceable stand-by steam plants were in operation, all hydroelectric generating capacity was fully loaded, and adequate reserves did not exist. Responsible agencies familiar with the situation are seriously concerned as to whether the rapidly growing power demands can be met even though all authorized Federal projects are pushed to the utmost. A joint conference, including the majority of the private utility companies and municipal power producers, has made strong representation as to the need for immediate construction of additional Federal power projects in this region.[3]

114. A preliminary estimate of probable load growth in the five Northwest States as made by this Office in 1946 is shown also on plate 14 [4] in the appendix. This study indicated that nearly 6,000,000 kilowatts of installed generating capacity will be needed in 1953 and more than 8,000,000 kilowatts by 1960. A more recent and detailed forecast of future power requirements in the Pacific Northwest is that of the Bonneville Power Administration for the year 1960, indicating the need for more than 10,000,000 kilowatts of installed capacity, as shown in appendix V.[4] The addition of millions of kilowatts of generating capacity, of the order contemplated in these estimates, will have to be supplied principally by the Federal Government, if at all, because economical power sites that can be developed by private and municipal electric utilities are comparatively few and small. The normal design and construction period for a major hydroelectric development under favorable circumstances is many years. The immediate allotment of funds in substantial amounts for all authorized Federal projects would not permit development at a sufficiently rapid rate to meet even the 1953 estimate of demand without incurring excessive costs by abnormally fast construction programs. The 1960 load requirements cannot be met unless additional projects are authorized. The Albeni Falls project is the most economical and the most promptly available of several new developments that will be required to prevent a serious power shortage in the Pacific Northwest.

[3] Interior Department appropriation bill for 1948—Hearings before the subcommittee of the Committee on Appropriations, House of Representatives, 80th Cong., 1st sess., pt. 2, pp. 341–342.
[4] Not printed.

115. *Irrigation benefits.*—Irrigation is neither a function nor a purpose of the project. Some small contingent benefits may be realized by virtue of opportunities to pump irrigation water from the reservoir or from ground waters whose elevations may be increased by the reservoir, but these are too indefinite for evaluation. The State of Idaho, at the hearing in Sandpoint, Idaho, on August 28, 1943, referred to in paragraph 54 herein, advocated that water for the Rathdrum Prairie project be supplied from storage proposed for development at the Albeni Falls site. Subsequently, however, a report by an advisory committee of the Northwest States Development Association, dated December 17, 1943, referred to in paragraph 55 hereof, recommended substitution of Spokane River water for Pend Oreille Lake water in development of the Rathdrum Prairie project. Current plans of the United States Bureau of Reclamation for supply of water to that project have been stated as follows: "Plans for providing water for the project involve pumping the water supply from the Spokane River * * *." Diversion from the Clark Fork-Pend Oreille River system is not now contemplated.

116. Still more recently, in reply to an inquiry of the district engineer concerning Bureau plans for irrigation that advantageously could be associated with the Boundary project, or the availability of data on irrigation benefits, the United States Bureau of Reclamation stated that "there may be small areas along some of the tributaries susceptible to irrigation development, but we have not made the necessary investigations to determine these areas, and believe they would be so small that mention in your report would not be justified." The Boundary project would have included the same reservoir as Albeni Falls plus lower reaches of Pend Oreille River, and would have had the same normal pool level; consequently, the comment above quoted applies to the Albeni Falls project.

117. Consideration has been given to the possibility of supplying supplemental water for irrigation to cultivable lands near Cusick, Wash., from the Albeni Falls Reservoir. However, the advantage of such irrigation is questionable because of the heavy partnership investment required by the farmers to increase the productivity of the shallow soils common in that area. Furthermore, the United States Bureau of Reclamation, in its report on the comprehensive development of the Columbia River Basin, dated June 1946, did not propose additional irrigation in the Cusick area.

118. *Other benefits.*—The benefits accruing from recreational opportunities created or augmented by the project, and those resulting from the conservation of fish and other wildlife are closely associated, because the latter will be entirely game varieties. Ultimately, the recreational and conservational aspects of the project, particularly with respect to the extension and stabilization of Pend Oreille Lake, will be substantial. A report by the United States Department of the Interior, Fish and Wildlife Service, included as a section of appendix V,[1] has established the net annual benefit to conservation by the Albeni Falls project at $12,500. The exact nature and extent of recreational developments are somewhat dependent on the desires of the many agencies, such as private business interests, sportsmen's associations, and municipal and State authorities, who may join with the Government in providing facilities. Improvements such as those mentioned previously in paragraphs 102 and 103 usually result from

[1] Not printed.

a gradual crystallization of public demand. Costs of such facilities cannot be estimated satisfactorily until such time as a master recreational plan reflecting the desires of local interests and establishing the economic justification of each proposal can be formulated. It can be assumed, however, that the benefits from recreation and improved sanitation will at least equal the costs by whomsoever incurred, and the omission either of expected costs or probable benefits will not prejudice the economic justification of the Albeni Falls project. Therefore, the evaluation of these highly important benefits has not been attempted at this time.

119. The annual power benefits in terms of anticipated power revenues under existing rates have been shown in table 12 for the initial system and for Albeni Falls added thereto. Projects of the initial system that have been authorized but not built—namely, McNary, Foster Creek,[2] and Hungry Horse Dams—will create certain benefits other than power. These, together with the nonpower benefits added by the Albeni Falls project, are shown in table 13.

TABLE 13.—*Benefits other than power at authorized projects not yet constructed, including Albeni Falls project*

Purpose served	Initial system	Initial system plus Albeni Falls	Attributable to Albeni Falls project
Navigation	$843,000	$937,000	$94,000
Flood control	172,000	194,000	22,000
Irrigation	298,000	298,000	
Conservation		12,000	12,000
Miscellaneous	11,000	11,000	(1)
Total	1,324,000	1,452,000	128,000

[1] Not evaluated.

120. *Intangible benefits.*—The construction of the project would create many intangible benefits throughout the locality, the region, and the Nation, that are not susceptible of monetary evaluation. Local intangibles would include the temporary stimulation of business during the construction period, the permanent establishment of an operating pay roll and dependent businesses in the community, and the expenditures by visitors who come to see the project. These are believed to outweigh the intangible losses occasioned by the destruction of producing agricultural lands and their attendant commercial activity. Much broader intangible benefits will accrue to the regional and national economy. It has been estimated that each 100 kilowatts of new power capacity leads to the investment of $67,000 in new industrial plants and the employment of 10 additional workers, providing direct and indirect support for 53 additional people.[5] On that basis, the intangible benefits realizable from the power feature alone of the Albeni Falls project and incremental down stream power installations would amount to more than three times the added system cost and would support over 150,000 additional population.

121. *Project justification—Benefit-cost ratios.*—It is apparent from the relative magnitudes of the evaluated benefits in tables 12 and 13 that system power is the predominating purpose and controlling basis

[2] Now Chief Joseph.
[5] Leland Olds, Chairman, Federal Power Commission, addressing the Association of Western State Engineers, Denver, Colo., November 14, 1944.

upon which the project must be considered. A similar importance attaches to the power function and power benefits of the system of projects to which Albeni Falls would be added. The essential economic analyses can be made most significant, therefore, if they show benefit-cost ratios in terms of power, before and after addition of this project to the Federal power system. Data available in published reports for the Bonneville, Grand Coulee, and Hungry Horse projects show net revenues and annual costs for the respective power features. Consequently, presentation of data on annual benefits and charges for other projects (to be considered with these three) must be made on a comparable basis. To accomplish this, and in the absence of annual cost allocations for future projects, the assumption is made that costs allocable to purposes other than power equal the benefits from such purposes. Benefit-cost ratios for power on the system basis are then derived by comparing the annual costs allocable to power with the annual net power revenues. Derivation of the power benefit-cost ratios for the initial system, the initial system plus Albeni Falls project, and for the increment added by the Albeni Falls project, are presented in table 14.

TABLE 14.—*Power benefit-cost ratios*

Item	Initial system	Initial system plus Albeni Falls	Attributable to Albeni Falls project
Total annual costs	$37, 357, 000	$39, 709, 000	$2, 352, 000
Annual costs of purposes other than power	1, 324, 000	1, 452, 000	128, 000
Annual power costs	36, 033, 000	38, 257, 000	2, 224, 000
Annual power benefits	[1] 40, 417, 000	42, 889, 000	2, 472, 000
Power benefit-cost ratios	1. 12	1. 12	1. 11

[1] Any excess of power benefits over power costs at Grand Coulee Dam is, by the Secretary of the Interior's allocation, obligated to subsidize irrigation.

122. *Other factors.*—Further justification for the project can be cited in the many intangible economic benefits that attend the development of major water-utilization projects, as mentioned in paragraph 120. Two additional factors should be noted in connection with economic considerations: (1) the probability that construction costs will decrease substantially from the current price peak that was used in the preparation of the cost estimate; (2) the fact that power benefits are evaluated on a net revenue basis under a rate that has been unchanged since construction of two highly favorable Columbia River projects during a period of depressed prices. Consideration of these two factors indicates that benefits are estimated at a low point, whereas construction costs are estimated at a high point in relation to probable long-term economic trends. In consequence, the most probable trend in each of the component factors will materially enhance the benefit-cost ratio. For example, as indicated by results of a study made to ascertain the relation between present construction costs and those likely to prevail during construction of the project, there is every likelihood that the actual cost will be about 15 percent less than estimated herein. The benefit-cost ratio for the Albeni Falls project and the attendant downstream incremental installations then would be 1.29.

123. *Allocation of costs.*—All costs of the project, other than those for power facilities, are allocable jointly among the navigation, flood-control, and power purposes of the project. No allocation is suggested to recreation as a separate purpose because the only costs included in the project estimate for recreational facilities are those considered essential for the recreation of persons engaged in construction of the project; the costs of such features are considered properly allocable, along with other joint costs, to all project purposes. Similarly, an allocation to conservation is not warranted at this time for the reason that the evaluation of conservation benefits, as made by the Fish and Wildlife Service, United States Department of the Interior, is preliminary only and depends greatly on the nature and extent of fish-protection facilities that may be required. This study cannot be undertaken until definite project plans are completed and the engineering data thereon made available to the Fish and Wildlife Service.

124. *Allocation methods.*—The equitable allocation of the cost of jointly used features among the purposes served has been approached by various authorities in many different ways. A method based on the evaluated benefits appears to be most applicable for this project. It is suggested, therefore, that the allocation of annual costs to navigation and flood control equal the respective benefits and that all remaining annual costs be allocated to power. The total investment in the Albeni Falls project then would be allocated to the respective purposes in the same proportion as established for annual costs. The suggested allocations are:

Purpose	Allocation of annual costs	Allocation of investment
Navigation	$94,000	$1,138,000
Flood control	22,000	266,000
Power	2,236,000	27,076,000
Total	2,352,000	28,480,000

These allocations are suggested tentatively. They should be reviewed and adjusted in the light of changing costs or other economic factors that may affect the evaluation of benefits, whenever the project is authorized, and again when it is completed. The proper allocations to recreation and conservation, if any are deemed justified, may be determined at that time.

125. *Repayment of investment—Navigation.*—The allocation of project cost to navigation, herein suggested as $1,138,000, is by law nonreimbursable.

126. *Flood control.*—The allocation to flood control, calculated herein at $266,000, also would be nonreimbursable.

127. *Power.*—Full capital recovery of the project investment allocable to power is required by law. As shown below, the annual power income of $2,472,000, attributable to the project under existing Bonneville Power Administration rates, will meet this requirement. Moreover, it will carry all other annual costs of the improvement, whether allocable to power or other purposes. Furthermore, it will provide, with a comfortable margin, sufficient annual earnings to carry all annual costs of the additional installations concurrently justified at existing and authorized projects downstream.

Estimated power benefits (at-site value under Bonneville Power Administration rate C–3)	$2,472,000
Required for amortization of, and interest on, the investment allocable to power	1,052,000
Remaining income	1,420,000
Additional required for all annual project costs, power or other	228,000
Remaining income	1,192,000
Amortization, interest, interim replacements, operation and maintenance of additional installations at existing and authorized projects downstream, justified by Albeni Falls storage	1,072,000
Income margin	120,000

128. *Local cooperation.*—No contributions by local interests toward the cost of constructing or maintaining Albeni Falls project would be required under existing law.

CHAPTER V. DISCUSSION

129. *Place in the comprehensive plan.*—The inclusion of Albeni Falls project as an element in the long-range, comprehensive development of Columbia River water resources will have the following physical and economic advantages: It will provide storage regulation at a location effective through some 1,600 feet of existing and potential power head downstream in the United States which, together with the power development at the site, will increase the regional power supply as now urgently needed. Among favorable possibilities that have been investigated in comparable degree and appear to be practicable of early development, this project will furnish system power at the lowest unit cost. The power generated at the site will be available in a locality now distant more than 100 miles from the nearest Government generating station on the Bonneville Power Administration transmission system.

130. The project also will provide substantial navigation, recreation, conservation, and flood-control benefits which, like the bulk of the power benefits, stem from the development of storage and the attendant stabilization of Pend Oreille Lake levels through much of the year. The project, therefore, is truly multiple-purpose in character and exemplifies the advantages to be gained throughout the region from the regulation of Columbia River stream flows.

131. Although Pend Oreille River could be economically developed to a much greater extent by construction of a dam at Boundary site to the same pool level as proposed herein, or by a development either at Albeni Falls or Boundary to a higher pool level, it does not appear now that such development will be practically attainable within 50 years, the period during which the proposed investment at Albeni Falls will have been retired. The existence of this project after that time, therefore, would not necessarily obstruct an ultimate, greater development. If, however, unforeseen national emergency or other exigency should become so pressing as to require a development that would render the proposed project useless before it has paid for itself, the part of its cost then remaining unamortized would be a trivial matter by comparison with the considerations dictating such development. It seems clear that only a strong compulsion would override the present reluctance to jeopardize a great mineral resource and/or to inundate

extensive agricultural lands and many communities along the lake and river.

132. *Site selection.*—The Albeni Falls site and the extent of development proposed there have resulted from a careful process of selection and elimination among the several alternative possibilities, guided by all the factors that could be ascertained. Although more complete development of Pend Oreille River would be obtained either by a project at the alternative site of Boundary or by development to a higher reservoir level, the possibility of damage to mineral areas, the flooding of agricultural lands, and strong opposition by local interests, including the State of Idaho, to storage on Pend Oreille Lake at levels higher than 2,062.5 feet have eliminated these possibilities from present consideration. The foundation conditions and topography are suitable for the purposes proposed. The site has long been discussed as a potential project location; and, for the amount of power added, it is low in cost.

133. *Design selection.*—The existence of the rock island on the selected site naturally dictates the arrangement of the main dam structure in two sections consisting of spillway and powerhouse, divided by the island. The lay-out proposed herein accommodates conveniently the 3-unit installation, meets the controlling hydraulic requirements, facilitates the organization of the construction and river-diversion work, and constitutes an adequate basis for the cost estimate.

134. The installation of the maximum economical generating capacity is consistent with a primary purpose of the project; namely, to provide additional sources for urgently needed power in this region at the earliest possible date. The cost of system power added by the project as proposed compares favorably with that obtainable from any alternative source; moreover, the benefit-cost ratio of system power with Albeni Falls added is practically the same as that for the initial system of existing and authorized projects, whose economic justification and ability to repay their respective costs to the Treasury in accordance with law have been satisfactorily established as prerequisites to their authorization.

135. The economic analysis of the project presented herein is believed to be severely conservative. Only net, tangible benefits have been evaluated, without resort to the many indirect and intangible benefits created by such a self-liquidating addition to the productive resources. Power benefits, which furnish the predominant economic justification for the project, were evaluated on the basis of a power rate structure that was conceived to finance Bonneville and Grand Coulee projects, both of which represented highly favored projects among the possibilities then available, and both of which were built when prices of labor and materials were depressed. On the other hand, the cost of Albeni Falls project has been estimated on the basis of prices that are high beyond all precedent. There is every likelihood that costs taken on a trend curve for the next several years, rather than at present peaks, will prove to be some 15 percent lower. The latter factor alone would increase the benefit-cost ratio of table 14 to 1.29.

136. The estimates of land areas required for reservoir purposes are based on those within the proposed pool elevation 2,062.5, as the

only definite figures available before lands to be acquired are definitely selected. Provision of certain margins above the pool elevation to provide for wave action, seepage, and minimum severance damages, will be made later. Ordinarily, the best plan of acquisition is by legal subdivision, rather than following a meandering contour. An arbitrary allowance believed sufficient to cover the cost of these fragments above the reservoir flow line was included in the cost estimates.

137. *Effects on local interests.*—Albeni Falls project, as proposed herein, complies with the expressed desires of local interests and State officials. The agricultural lands that must be acquired for flowage are so limited that lost production will be far outweighed by the project stimuli on the local economy. The project will have no adverse effect on the commercial fishery or lumbering. It will not conflict with national forest, national park, or Indian reserves. It appears, therefore, to be an economically and physically feasible development that is relatively free of strong objections from one source or another.

138. *Effects on Canada.*—The project is located on an international stream and therefore would entail redress under existing treaty of any resulting injury to Canadian interests. No such injury is anticipated, however, as no diversion of water is proposed, and the project does not involve a storage reservoir extending across the boundary, as would several potential projects in the Columbia River Basin. The regulation imposed upon boundary waters by the proposed reservoir will be beneficial to Canadian interests by virtue of the added prime power made available in the Canadian reach of Pend Oreille River, where some 400 feet of fall can be developed. A potential dam site at Waneta or any other point on the Canadian side, therefore, will become potentially more valuable. Accordingly, no objection is anticipated from Canadian interests.

139. *Effects on other water uses.*—The proposed project and regulation of Pend Oreille Lake will not conflict with any other water use, present or potential. Although generous allowance was made for future irrigation use in estimating the supply available for power, such allwance was in no sense required to avoid encroachment on future irrigation needs. Practically all undeveloped irrigable lands in the Clark Fork-Pend Oreille Basin are upstream from the dam site. Diversion for these lands can be made freely under existing State laws, as requirements are established, and there is, in general, ample natural flow for the purpose. On the other hand, the maintenance of Pend Oreille Lake at elevation 2,062.5 throughout the summer should improve underground water supplies for irrigation in Rathdrum Prairie and in the Spokane Valley. The effects of increased dependable flow in Pend Oreille River and the Columbia downstream necessarily will be favorable not only to navigation but also to pollution abatement; domestic, industrial, and irrigation water supplies; or any other beneficial water use that may arise in the future.

140. *Recreation, conservation, and public health.*—The great recreational potentialities of the reservoir are recognized and appropriate provision for their further development is contemplated. Similarly, facilities for augmenting the conservational and public-health aspects of the project have been considered. The further development of these other water uses will be planned in detail with the assistance of

interested local and Federal agencies, when the project proposed herein has been authorized and the additional requirements can be determined.

CHAPTER VI. CONCLUSIONS AND RECOMMENDATIONS

141. *Conclusions.*—In view of the foregoing, it is concluded that:

(*a*) Albeni Falls project will provide desirable regulation of Pend Oreille Lake, together with local flood-control, conservational, and recreational benefits.

(*b*) Additional benefits will be realized in navigable reaches of the Columbia River by virtue of increased channel depths during low-water periods.

(*c*) Urgently needed power supplies will be added to the regional system by use of the stored water in existing and future generating stations downstream and in the hydroelectric installation proposed for the site.

(*d*) The project will add 251,000 kilowatts of needed firm capability to the system of existing and authorized Federal hydroelectric projects in the Northwest, at lowest available cost per kilowatt.

(*e*) The site is well suited to the construction of major hydraulic structures and the designs presented herein satisfactorily solve the problems involved.

(*f*) Damages caused to existing property or resources will be small in relation to the inherent benefits and compensations.

(*g*) The project is economically justified on the basis of ability to carry all annual costs, including amortization of the entire investment in 50 years or less with 3 percent interest, for both the project as proposed and the additional generating facilities suggested at Foster Creek [1] and McNary Dams.

(*h*) The costs estimated at current high prices probably exceed those that will be incurred through the actual construction period, and the presently favorable benefit-cost ratio therefore probably will increase. Important benefits will accrue additional to those direct, tangible items evaluated herein.

(*i*) The valuable recreational potentialities of Pend Oreille Lake will not be damaged by the proposed project, but rather will be materially enhanced by the lake regulation to be provided. Further study will be required in collaboration with local interests and other Federal agencies to determine what additional recreational, conservational, and public-health facilities should be provided.

(*j*) The project will be a valuable element in the comprehensive plan for utilization of Columbia River waters and it will not prevent the more complete development of Pend Oreille River if future conditions render that course practicable.

(*k*) The project at Albeni Falls with pool elevation at 2,062.5 feet above mean sea level is the only substantial multiple-purpose development of Pend Oreille Lake and River that will, within the foreseeable future, meet the essential requirements of engineering feasibility, economic advantage, and conformity with the wishes of the people most directly affected.

142. *Recommendations.*—I recommend adoption of the Albeni Falls project substantially as set forth herein, consisting of a dam and reservoir to normal elevation 2,062.5 feet, with costs to the United States estimated at $26,995,000 for construction and $100,000 annually thereafter for operation and maintenance. I recommend also that provisions be made for future recreation, conservation, and public-health facilities as may be determined by the Secretary of War to be desirable and economically justifiable.

L. H. HEWITT,
Colonel, Corps of Engineers,
District Engineer.

[1] Now Chief Joseph.

[First endorsement]

CORPS OF ENGINEERS,
NORTH PACIFIC DIVISION,
Portland 5, Oreg., October 14, 1947.

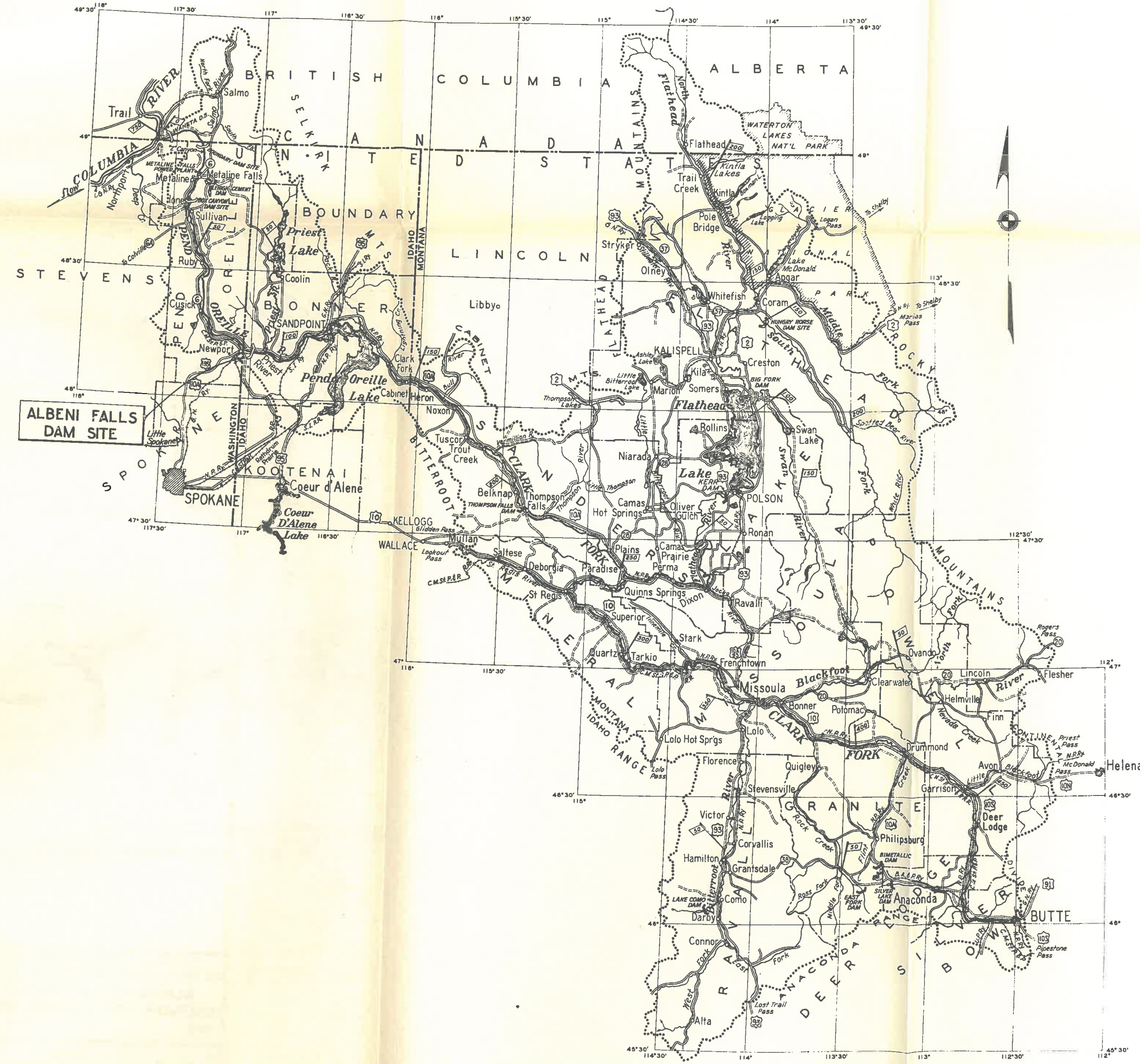
To: The Chief of Engineers, United States Army.

I concur in the report and recommendations of the district engineer, subject to such modifications of cost estimates and general design as may result from more detailed investigations.

THERON D. WEAVER,
Colonel, Corps of Engineers,
Division Engineer.

○

CORPS OF ENGINEERS, U. S. ARMY



REGIONAL MAP

25 0 50 100 150
SCALE IN MILES

LEGEND

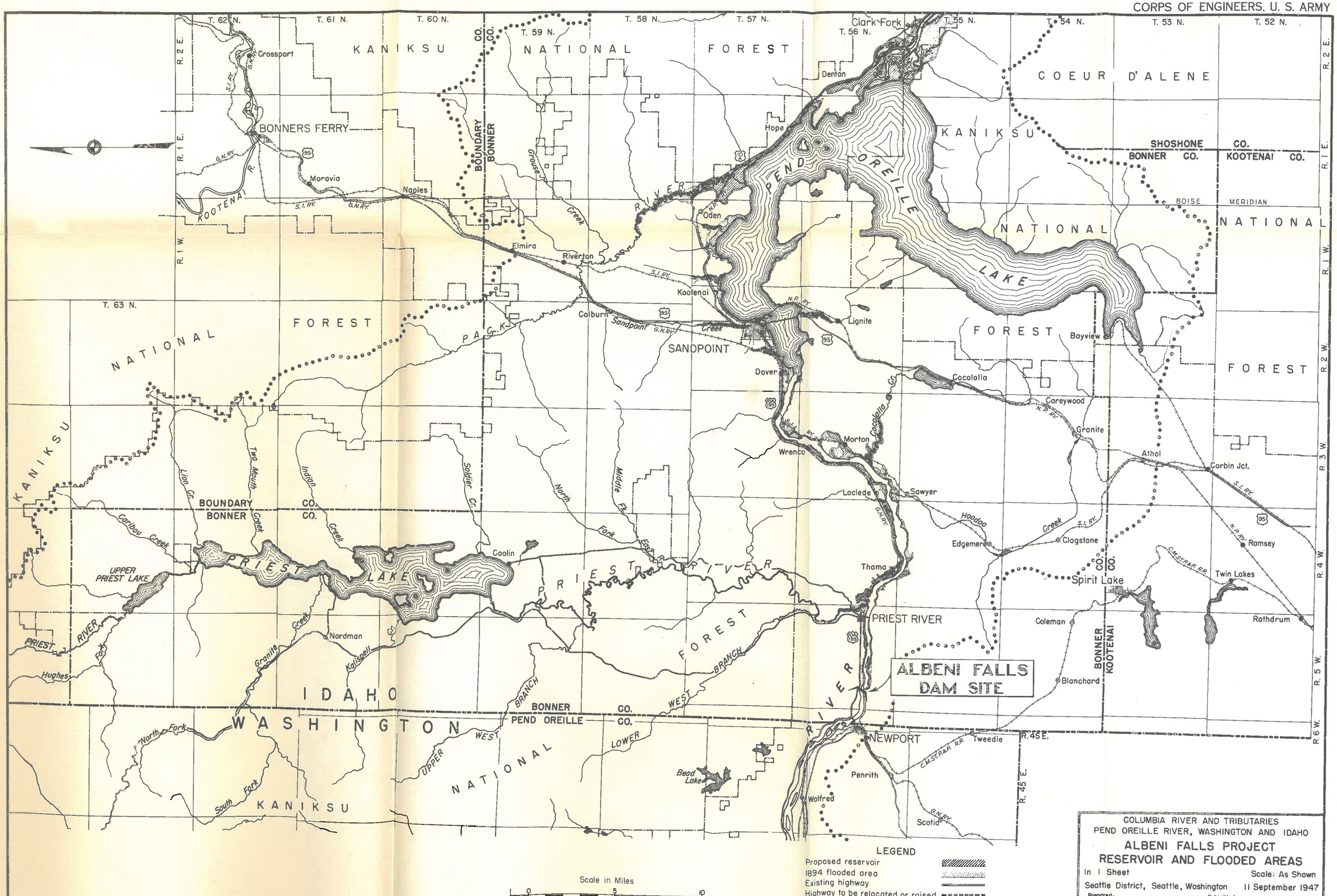
- Highways
- Passable roads
- River Miles (Mileage of Clark Fork from mouth. Mileage shown on Tributaries from junction with Clark Fork.)
- Basin Boundary.
- Constructed dam
- Proposed dam
- Authorized dam

COLUMBIA RIVER AND TRIBUTARIES
PEND OREILLE RIVER, WASHINGTON AND IDAHO

ALBENI FALLS PROJECT
BASIN MAP

In 1 Sheet
Scale: As Shown
Seattle District, Seattle, Washington
11 September 1947
Prepared:
Submitted:

CORPS OF ENGINEERS, U. S. ARMY



Scale in Miles

0 5 10

LEGEND

- Proposed reservoir
- 1894 flooded area
- Existing highway
- Highway to be relocated or raised
- Existing railroad

COLUMBIA RIVER AND TRIBUTARIES
PEND OREILLE RIVER, WASHINGTON AND IDAHO

ALBENI FALLS PROJECT
RESERVOIR AND FLOODED AREAS

In 1 Sheet — Scale: As Shown

Seattle District, Seattle, Washington — 11 September 1947

Prepared: H. W. Woodhouse — Submitted: L. M. Burwell

Gmail

Molly McCahon <lakescommission@gmail.com>

Crickets

1 message

Win <win@integrityassurance.us> Tue, May 14, 2024 at 8:49 AM
To: lakescommission@gmail.com

Molly,

The latest online graph from the ACE shows they are not filling the Lake until July. Is there any help coming from any of our elected officials? Or, are we being punished for our conservative values? Just a thought as the rationale published by the Corps does not pass the smell test.

Win Taylor
Sagle

Sent from my T-Mobile 5G Device