

MEDIA RELEASE

November 20, 2019

Columbia-Snake River Irrigators Association

Risk Mitigation Response Alternative

Irrigation Sector Direct Economic Impacts

Under Lower Snake River Dam Breaching/Drawdown Actions

The circumstances created by the Columbia-Snake River ESA litigation compel the Columbia-Snake River Irrigators Association (CSRIA) to develop a Risk Mitigation Response Alternative, to protect Irrigation Sector assets from the adverse economic impacts that would be caused by Lower Snake River dam breaching and project pool drawdowns. The Irrigation Sector assets are real, and dam breaching or pool drawdown actions would critically impair pump station capabilities, agricultural production, and on-site processing operations. All of these direct economic impacts would have to be addressed under a responsible and market-based mitigation strategy.

- The Columbia River System Operation (CRSO) agencies' EIS is required to identify appropriate mitigation measures, taking into account associated risks and liability. Per Washington Governor Jay Inslee's direction and legislative funding, the state study addressing dam breaching impacts should fully consider all Irrigation Sector impacts and viable mitigation strategies.
- Mitigation measures incorporate direct net value changes to water distribution and land assets, predicated on observable, market-based determinations for willingness-to pay.
- The direct economic impacts must be defined based on market asset values for the irrigated land impacts. The dam breaching-pool drawdown actions would create a "distressed asset value" that must be the foundation for EIS/State study impacts and mitigation compensation.
- The primary Irrigation Sector impacts can be measured through recent asset-based market transactions and the market perception toward risks associated with "distressed asset values." The asset market reflects the private, corporate, and institutional entities that have made recent market purchases, and those who have an ability to expand farming asset operations.
 - **The distressed asset capital value amounts to about \$446 to \$622 million for Ice Harbor/Upper McNary Pool Irrigation Sector impacts (90,640 acres).**
- The Risk Mitigation Response Alternative includes obligations by the Irrigation Sector and a capital repayment structure that equitably assigns mitigation costs. The Bonneville Power Administration (BPA) and Washington State will be responsible for up-front mitigation payments. Using long-term debt instruments:
 - **The combined BPA and WA State annual debt service would be about \$24-\$37 Million; for Ice Harbor/Upper McNary Pool, not including John Day Pool impacts.**
- Receiving the Risk Mitigation compensation, the Irrigation Sector will be responsible for impacts.

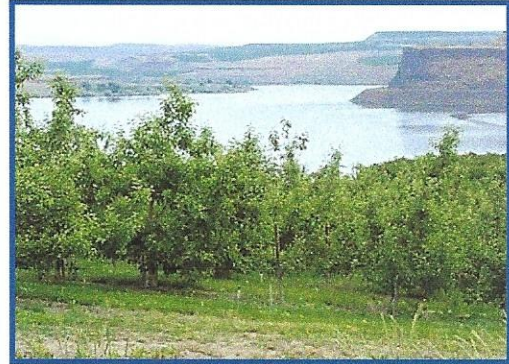
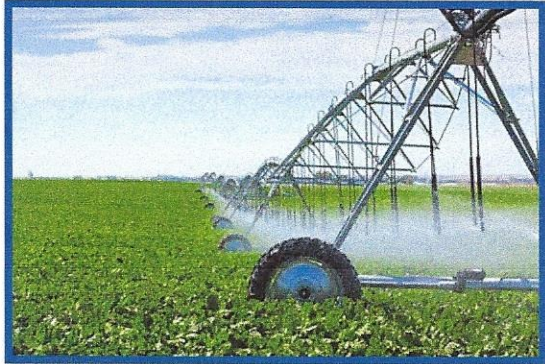
The CSRIA is prepared to discuss the Risk Mitigation Response Alternative with the CRSO agency leadership, and Governor Inslee's Office (see CSRIA White Paper Review, CSRIA.org).

For Further Information: 509-783-1623

Columbia-Snake River Irrigators Association

Risk Mitigation Response Alternative

Irrigation Sector Direct Economic Impacts
Under Lower Snake River Dam Breaching/Drawdown Actions





- ✓ *ESA Litigation EIS Review Requirements*
- ✓ *Primary and Secondary Impact Area*
- ✓ *Asset Value and Risk Mitigation*
- ✓ *Financial Payment Strategy*

White Paper Review

November 20, 2019

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Columbia-Snake River Irrigators Association

Risk Mitigation Response Alternative

Irrigation Sector Direct Economic Impacts Under Lower Snake River Dam Breaching/Pool Drawdown Actions

Council on Environmental Quality Regulations/Principles:

An EIS shall: (f) Include appropriate mitigation measures not already included in the proposed action or alternatives...This includes describing the nature, likelihood and magnitude of risks (quantitatively where feasible).

WA Governor Inslee's Office, Impact Study Recommendations:

Washington officials want to be prepared to advocate for appropriate mitigation, said J.T. Austin, a senior policy adviser to Inslee. "This is an opportunity for folks who have interests along the river to come together and talk about impacts of a decision around the dams." Required infrastructure mitigation should include...Irrigation.

The circumstances created by the Columbia-Snake River ESA litigation compel the Columbia-Snake River Irrigators Association (CSRIA) to development a Risk Mitigation Response Alternative, to protect Irrigation Sector assets from the adverse economic impacts that would be caused by Lower Snake River dam breaching and project pool drawdowns. The Irrigation Sector assets are real, and dam breaching or pool drawdown actions would critically impair pump station capabilities, agricultural production, and on-site processing operations. All of these direct economic impacts would have to be addressed under a responsible, market-based mitigation strategy. Failure to respect the risks imposed on the Irrigation Sector will pave the way for even more pro-longed litigation.

Institutional and Litigation Background

In 2016, U.S. Federal District (OR) Judge Michael Simon vacated the 2014 Biological Opinion for Columbia-Snake River hydro project operations, a centerpiece for fish protection under the Endangered Species Act (ESA). He accepted the argument by the state of Oregon, Earthjustice, and other plaintiffs that the Columbia River System Operation (CRSO) agencies had failed to include adequate operation measures to protect thirteen "listed" salmon and steelhead species from "risk of extinction." In doing so, Judge Simon further ordered the CRSO agencies to prepare a new Environmental Impact Statement (EIS), that would become the technical foundation for a new Biological Opinion, changing hydro project operations. His order was very specific, in that he told the agencies to review in detail a Lower Snake River dam breaching/drawdown alternative.¹

Since 2016, the CRSO agencies have been preparing a new EIS analyzing a set of existing and new river system management alternatives. Per the Judge's order, dam breaching actions, and project pool

¹ Order by U.S. Federal District (OR) Judge Michael Simon, Case 3:01-cv-00640-SI Document 2065 Filed May 4, 2016, Pages 1-149

drawdowns, are being reviewed, along with other measures (see Table 1). The draft EIS is to be completed by February-March 2020.

The Achilles Heel in preparing any technically and legally defensible EIS is whether all reasonable alternatives have been included for review, and whether the alternatives have received adequate technical analysis; this includes examining--and quantifying where possible--mitigation measures to compensate for an alternative's disruption to direct economic sectors. The CRSO agencies' EIS must comply with these requirements. The agencies' economic analyses also must adhere to well-established standards for water resources economics review, clearly quantifying direct economic sector risks.

Proceeding concurrently with the Federal EIS Process, the Washington State legislature approved funding for a stakeholder study to address issues associated with the possible removal of the four Lower Snake River dams. This study is to identify the needs of stakeholders, the benefits and costs, and risks posed by dam removal. The state study is to be presented to the Governor's Office and legislature by February 2020.

Risk Mitigation Response Alternative

The technical study activity of the CRSO agencies' EIS development is more "closed" than that of previous environmental/EIS reviews, where technical committees were led by the agencies, with direct participation by various experts representing the principal stakeholders. This was an effective process to vet-out and clarify analysis methodologies and alternatives' impact parameters.

The Columbia-Snake River Irrigators Association (CSRIA) has had limited consultations with the U.S. Bureau of Reclamation's Denver Technical Center staff, the CRSO agencies' lead on analyzing the Irrigation Sector impacts for dam breaching and pool drawdowns. Because the USBR group has very little experience with the mainstem Snake-Columbia River irrigation operations and the level of direct irrigator interaction has been limited, it is unclear whether the Draft USBR EIS analysis will be sufficient or require major redrafting prior to the Final EIS.

The Washington State impact study appears to be a mix of outreach to stakeholders and a reconnaissance level survey of some of the technical factors surrounding breaching/drawdown impacts. It will likely be used to support the State's response to the CRSO agencies' Draft EIS.

To convey more accurately the direct Irrigation Sector economic impacts and a required mitigation strategy, the CSRIA has developed the Risk Mitigation Response Alternative presented in this White Paper Review. The approach defines the legal, technical, and economic factors that must be fully considered by the CRSO agencies and Washington State elected leadership, under Lower Snake River dam breaching and project pool drawdowns.

These factors are succinctly presented below:

1. **The CRSO agencies' EIS is required to identify appropriate mitigation measures, taking into account associated risks and liability. Per Washington Governor Jay Inslee's direction and legislative funding, the state study addressing dam breaching impacts should include irrigation infrastructure/operations impacts and effective mitigation strategies.**

The ESA litigation EIS is authorized via the National Environmental Policy Act and structured by the Council of Environmental Quality Regulations for EIS preparation.² Within the EIS, the agencies are required to consider objectively all reasonable alternatives; and they must assess appropriate mitigation measures for the proposed action or other EIS alternatives.³ Benefit-cost analyses are optional for inclusion in an EIS, but in the case of major, federal water resources actions, B-C analyses are always prepared. Such economic analyses need to incorporate the direct economic costs for mitigation measures.

Authorized under Washington State's 2019 operations budget,⁴ the legislature allocated \$750,000 for the Governor's Office to *"contract with a neutral third party to establish a process for local, state, tribal, and federal leaders and stakeholders to address issues associated with the possible breaching or removal of the four Lower Snake River dams in order to recover the Chinook salmon populations that serve as a vital food source for southern resident orcas."*

The Governor's Office has tasked its study contractor to consult with stakeholders to form a regional approach to understand dam breaching costs, risks, and the means to address major impacts and mitigation challenges. The study focus is geared toward a dam breaching or drawdown implementation strategy.⁵

2. The concepts and analyses for Irrigation Sector direct economic impacts, with inherent mitigation measures, should be modeled on well-established principles for federal water resources management. This standard should incorporate direct net value changes to water distribution and land assets, predicated on observable, market-based determinations for willingness-to pay.

Resource economics valuation methods for land and water investments have long-embraced fundamental principles for changes to net social welfare (utility) using market-based transactions.⁶ This work largely identifies changes to direct net societal value determined through basic measures of willingness-to-pay, opportunity costs, and avoided/replacement costs. These types of marginal value changes can reflect both direct net benefits and costs.

Specific to these economic evaluations: *"Risk and uncertainties should be identified and described in a manner that is clear and understandable to the public and decision makers. This includes describing the*

² NEPA, Pub.L. 91-190, 24 U.S.C. 4321-4347, as amended 1970, 1975, 1982; CEQ Regulations 2005, and October 10, 2019, Title 40 Protection of the Environment, Part 1502—Environmental Impact Statement.

³ Providing mitigation plans under NEPA/EIS frameworks is applied as standard practice, for example, see Jeffery Jacquet, "A Short History of Social Impact Assessment," Dept. of Sociology and Rural Studies, South Dakota State University, SIA-NEPA Guidance Memorandum, 2014; NOAA, U.S. Dept. of Commerce, "Guidelines and Principles for Social Impact Assessment," NOAA Interagency Committee, May 1994. CSRIA Representatives note that virtually all EIS preparation handbooks elaborate on defining mitigation measures for proposed alternatives.

⁴ House Appropriations Committee, Operations Budget, ESHB 1109, Section 118; and see Southern Resident Orca Task Force, "Report and Recommendations," November 2018, November 2019.

⁵ WA Governor's Office and OFM Contractor Scope of Work, September 2019; and subcontractors' stakeholder interview questions, October-November 2019.

⁶ Since the 1950s, federal water resources management agencies have followed methodologies outlined in evolving forms of "Principles and Guidelines" (WA-DC 1982); or "Principles and Requirements for Federal Investments in Water Resources in Water Resources" (CEQ-DOI 2013, CEQ 2014 and 2015); and described historically in Alvin Goodman, "Principles of Water Resources Planning," Prentice Hall, 1984.

nature, likelihood, and magnitude of risks (including quantitatively where feasible)...Mitigation of adverse effects associated with each plan, strategy, or action is to be an integral part of all alternatives.”⁷

- 3. The direct economic impacts must be defined based on market asset values for the irrigated land impacts, taking into account pump station modifications, loss of production, and on-site processing infrastructure. The dam breaching-pool drawdown actions would create a “distressed asset value” that must be the foundation for EIS/State study impacts and mitigation compensation.**

The Lower Snake-Columbia River Irrigation Sector impacts would cover the total asset values of the pump stations and water delivery system modification, the loss of agricultural production during re-construction, and the costs on-site product processing facilities. In total, this represents the full asset value being impaired (or potentially lost); it is the direct net impact (value) that should be included under National Economic Develop accounting--that should be used in the CRSO agencies' EIS and the State impact study.

This asset value is best measured by the market value of the land that “bundles” all values in a land transaction between buyers and sellers. This is the true expression of willingness-to-pay, and it measures the direct net value baseline for the existing water/land assets, as well as allowing for a determination of the impaired asset value under breaching/drawdown conditions.

The breaching/drawdown action would create “distressed assets,” where the assets' value in the market is diminished. The distressed assets are created by the risks associated with the uncertain costs of modifying pump stations, the unknown time frame for loss of operations, how effective the future pumping operations will be, and how the agricultural production markets respond to interruptions to site-specific supply.

It is this inherent asset risk that defines the Irrigation Sector costs and the required mitigation compensation caused by breaching/drawdowns. Like the baseline asset value, the risk mitigation impairment value can be best measured by the market—what is the market's willingness-to-pay for land assets that will be subject to breaching/drawdowns.⁸ What does the change to asset market value reveal?

- 4. The Irrigation Sector requires a well-specified impact area, taking into account the full effect of dam breaching and pool drawdowns on the Mainstem Snake and Columbia River system. The primary impact area should include the Ice Harbor and Upper McNary Pools; the Lower McNary and John Day Pools could be severely affected, as well, by minimum operating pool (MOP) or near-MOP operations.**

Figures 1 and 2 display the irrigated acres served by surface water diversions and groundwater withdraws⁹ along the Ice Harbor and Upper McNary pools. In total, approximately 90,640 acres are being irrigated along

⁷ “Principles and Requirements,” CEQ, March 2013.

⁸ It is unclear to CSRIA if the USBR will accurately measure fully the Irrigation Sector impacts, and how they will account for asset value effects.

⁹ The area one mile from the river is defined by statute (RCW 90.90) as being in direct hydraulic continuity within the Columbia-Snake River management area for water rights.

the pools.¹⁰ About 53,610 acres are served by the Ice Harbor Pool, and about 37,030 are served below Ice Harbor Pool and along the Upper McNary Pool reach.

Under the four Lower Snake River dam breaching alternatives, the Ice Harbor Pool would be lowered by about 80 ft. at the project forebay location (assuming some remaining in-river head elevation). This creates a deep pool drawdown condition for all pumping stations (and wells), eliminating existing water access to the pumping intakes. The topography of the river system is not 90 degrees vertical, but involves various gradients depending on location. Under breaching conditions, the entire pump station intake system would have to be rebuilt and debris/fish screens rebuilt/repositioned. In many cases, pumping plants would need to be reconfigured and repositioned. The overall stability of the existing pool elevations would change, and with a narrowed/reconfigured channel, pumping elevations would fluctuate—the reconstructed pump stations would need to be rebuilt to deal with these variable conditions. The existing pool stability would no longer exist, moderating river elevations for river flows varying between 20-120 kcfs during the irrigation season.

The Upper McNary Pool reach would be very problematic under dam breaching conditions, as it is unclear what would happen to reconfigured pool stability between Ice Harbor Dam and the Snake River confluence; and the area below the confluence to the mouth of the Walla Walla River is a shallow backwater area. This entire eastern-side reach area would be severely affected under minimum operating pool (MOP) drawdowns on the McNary Pool, about 2-6 ft., that are included within the EIS alternatives and could be employed in combination with Lower Snake River dam breaching. Even without McNary MOP operations, the Lower Snake River siltation deposits will settle in the McNary Pool backwater area, requiring major dredging and pump station intake reconfiguration measures.

The Draft EIS alternatives also affect the Lower McNary Pool reach and the entire John Day Pool reach. This is a very sensitive area for changing pool elevations relative to Oregon and Washington river station pumping. Many of these pump stations have already been modified to accommodate a minimum irrigation pool set at elevation 262.5 ft. Any changes to minimum operating pool (MOP elevation 257 ft.) will produce significant impacts to stations on both sides of the river with the greatest impact in Oregon. Although the Draft EIS, MOP drawdown alternative for the John Day Pool is unclear, operating at elevations 257-261 ft., this impact range will impair some of the river pump stations. Operations below 262.5 ft. exhibit noticeable changes to pump station head adjustments and pumping efficiencies, and effect some intake systems. Also, vegetation and river debris problems should be expected leading to more operation and maintenance needs. At this point in the EIS review process, the full impacts to uncertain (or vaguely specified) MOP changes on the John Day Pool are unknown.

5. The primary Irrigation Sector impacts can be measured through recent asset-based market transactions and the market perception toward risks associated with distressed asset values. The asset market reflects the private, corporate, and institutional entities that have made recent market purchases, and those entities who have an ability and desire to expand farm asset operations.

¹⁰ Estimates based on irrigated acres/water rights data reviewed from the Washington State Dept. of Agriculture Crop Mapping Project (2018); the Washington State Dept. of Ecology GWIS and WRTS data bases (2019); and data modeling by the Benton-Franklin Conservation District (2019). See Figures 1 and 2.

The direct economic value baseline for the affected irrigated acres is well known, and it is the market asset value displayed through irrigated land purchases and sales.¹¹ These transactions take into account the full land asset value for pump stations, agricultural production, and on-site processing facilities serving irrigation operations. The values also reveal the market's true accounting for real irrigated land escalation rates and future terminal values, that are not captured in conventional lenders' enterprise/production budget calculations.¹² This full market valuation factor is extremely important to the privately held farming operations along the pools, as these lands are perhaps the most desired irrigation holdings in the Western U.S.¹³

In Table 2, the more recent land/asset value sales are displayed for the farming operations served by the Ice Harbor, McNary, and John Day pools. This sales information is accumulated from County Assessor land transaction and taxation data bases, private realty land value data bases, CSRIA members' comparable land sales information, and land sales contracts reviewed by CSRIA representatives. This information covers the 2016-2018 period.

To provide a single asset value estimate, in dollar value per acre terms, the land asset sales data have been weighted by acres for the direct sales involved, and then adjusted to reflect the current acreage mix for tree fruit-grape production versus field-row crop production. This yields an "average" asset value of about \$16,400/acre, relevant to the primary impact acres (90,640 acres). In total, the baseline, primary asset value is about \$1.486 billion. This serves as the baseline value from which to estimate the risk mitigation value affecting the primary impact acres.

Like the direct asset value, the risk impacts create a "distressed asset value" that is best estimated by the market. In this circumstance, the market is composed of the individual land holdings owners and farm managers who have written the checks to acquire the existing assets, and they are actively engaged in the market to purchase additional holdings where opportunities occur. Most of these market entities are CSRIA members.

The calculation of the distressed market is made by how the market discounts the asset value given the dam breaching-pool drawdown risks. These risks include intake and pump station rebuilding costs, lost production income during the initial breaching/drawdown phase, stranded asset costs for on-site processing facilities, and potential market losses or reintroduction costs with product buyers. The question becomes, if the breaching/drawdown action is known to happen today, how does that affect the baseline asset value? How much would the new distressed asset value be worth? What would be the market's new willingness-to-pay to acquire the subject land assets?

A structured ranking question was posed to individual market entities (12 separate entities), and again collectively to the CSRIA Board of Directors, identifying land asset discounting ranges (90% to "no sale"), where the entities had cash-in-hand or financing preapproval for new purchases. The market entities

¹¹ In more technical terms, the market value is equivalent to the capitalized value of the annual income streams to ownership and management over time, discounted to present value dollars. This market value is the direct economic value that should be applied to National Economic Development accounting. Changes in direct net economic value form the basis for federal water resources benefit/cost analyses, for river management impacts.

¹² The irrigated land enterprise/production budgets used by the USBR to measure direct net value are inadequate to measure the full asset values of irrigated land, for high quality, 21st Century irrigated farming operations. Lenders and appraisers are moving away from these types of analyses as well, preferring direct asset market measures.

¹³ There is strong market demand for all the Columbia-Snake River direct-pumper farms, with the CSRIA regularly contacted for land market availability.

provided a consistent asset (capital) discount rate of 30-50% (two entities replied “no sale”). In effect, the market would not reject the land assets for new purchase, but the market entities would substantially reduce the asset value of the land holdings, confronted with the risk surrounding many unknown costs.

The breaching/drawdown risk deflates the asset holdings. The difference between the asset value baseline and the distressed asset value level establishes the amount of the risk mitigation response required for Irrigation Sector compensation. Allocated for each pool, the risk mitigation value is:

- Ice Harbor Pool, 30-50% distressed asset value: \$263,761,000--\$439,602,000.
- Upper McNary Pool, 30% distress asset value: \$182,188,000.

This risk mitigation response estimate establishes a benchmark compensation value at about \$445,505,000 to \$621,790,000. This is the “average” compensation value required to bring the Irrigation Sector back to a baseline, market-based value level of \$16,400 per acre, for 90,640 acres (see Table 3).

Within this White Paper Review, the CSRIA has not attempted to estimate the risk mitigation response value associated with MOP operations on the Lower McNary and John Day pools, likely affecting about 275,000 acres (MOP at elevation 257-261 ft.). The impact levels could easily be comparable to, or exceed, the asset changes affecting the Ice Harbor and Upper McNary pools given the larger acreages involved and depending on pool elevation operations.

6. The risk mitigation response alternative includes obligations by the Irrigation Sector and a capital repayment structure that equitably assigns mitigation costs. The Irrigation Sector will be responsible for pump station and infrastructure modifications, incurred agricultural production costs, and disrupted market functions. The Bonneville Power Administration and Washington State will be responsible for up-front mitigation payments to the Irrigation Sector.

Compensation to injured parties by those holding liability is a normative legal standard¹⁴ and is implicitly expressed in EIS mitigation alternatives. This standard applies more cogently, where intent is premeditated or is part of an agency action that benefits some broad societal objective at the expense of select parties. In this case, the Irrigation Sector is the party to be compensated for injuries, and the social liability payments are best compensated through the Bonneville Power Administration (BPA) and the state of Washington.

The Irrigators can be unequivocally recognized as the affected (injured) party, they must bear the costs of changes to river operations that impair irrigation water pumping. The BPA has received power benefits from the hydro projects, distributed throughout the Western States, and it is responsible for fish mitigation costs under the Northwest Power Act of 1980. The state of Washington has received significant economic benefits from the Lower Snake River-Columbia system irrigation projects, including direct and secondary impacts from income, employment, and taxation. These statewide benefits should now engender some degree of liability for the Irrigation Sector impacts, and for continued contribution to the state economy and tax structure.¹⁵

¹⁴ For example, see Steven Shavell, “Foundations of Economic Analysis of Law,” Fellows of Harvard College, Harvard University Press, 2004.

¹⁵ The State also assumes some inescapable liability by requesting a dam breaching study per the Orca Task Force, formed by Gov. Jay Inslee.

Under a shared compensation responsibility, the BPA and Washington State would need to borrow about \$446,000,000--\$622,000,000 to provide up-front capital payments, for risk mitigation response compensation. If borrowed from long-term Federal Treasury debt and state General Obligation capital bonding sources, the annualized BPA and State debt repayments would be approximately:

- Bonneville Power Administration (T-bonds), \$223--330 million: \$12.0--16.8 million annually.
- Washington State (General Obligation Bonds), \$223--330 million: \$12.0--\$16.8 million annually.

Using the above benchmark estimates for risk mitigation response, the total annual Irrigation Sector cost for debt repayment would be about \$24.0 to \$33.6 million (see Table 3).

Receiving the risk mitigation response compensation, the Irrigation Sector would be responsible for pump station and infrastructure modifications, incurred agricultural production income losses, and impaired market functions. All these obligations would be incurred by the private sector irrigators.

The Future Federal-State Obligations

The CRSO agencies and their Washington DC leadership have determined that the ESA litigation process is their preferred ESA statutory route,¹⁶ apparently assuming that the state of Oregon, Earthjustice, et al., and U.S. District Judge Michael Simon will accept the EIS alternative essentially depicted by the 2018-19 Interim BiOp; or the Draft EIS Alternative 1 actions. And presumable this is the agencies' preferred alternative.

Given the unpredictability underlying this litigation path and agency logic, the CSRIA holds that an adequate Risk Mitigation Response Alternative should be prepared to satisfy legally the EIS process and respond prudently to the State's study intent. The risk scenario for Irrigation Sector assets is a potential reality—mitigation compensation must encompass market-based determinations of distressed asset value.

The CSRIA is prepared to discuss the Risk Mitigation Response Alternative presented in this White Paper with the CRSO agency leadership, Governor Inslee's office, and key members of the legislative leadership.

¹⁶ The CRSO agencies have made no attempt to invoke the ESA Exemption allowed under the existing ESA statutes. Under this action, the agencies' Alternative 1 would, in effect, become the hydro operations Mitigation Plan per the Exemption.

Table 1. Columbia River System Operations (CRSO) Agencies, ESA Biological Opinion (BiOp) Litigation EIS Alternatives

With New Irrigation Sector Impacts Highlighted

Alternative	Hardware OM&R	Flow Augmentation	MOP Pool Operations	Project Spill	Dam Breaching-Pool Drawdowns	Juvenile Fish Transport	Fish Accords	Other Measures
No Action Alternative	2014 BiOp (2016 Measures)	2014 BiOp (Up to 10 MAF)	2014 BiOp (McN-JD NO)	2014 BiOp All Projects	2014 BiOp (NO)	2014 BiOp (LG-LG-LM)	Existing \$ (\$120M/Year)	As Planned Per 2014 BiOp
Multiple Objectives-1 (2014 BiOp-Plus)	Some Additional Measures	2014 BiOp (Up to 10 MAF)	2014 BiOp (McN-JD NO)	2019 Spill Program	2014 BiOp (NO)	2014 BiOp (Enhanced)	Existing \$ (\$120M/Year)	Shift Dworshak Operations
Multiple Objectives -2 (2014 BiOp-Negative)	Some Additional Measures	2014 BiOp (Up to 10 MAF)	2014 BiOp (McN-JD NO)	Similar to 2014 BiOp-All Projects	2014 BiOp (NO)	2014 BiOp (Enhanced)	Existing \$ (\$120M/Year)	Some Re-Reg. at Storage Proj.
Multiple Objectives-3 (Dam Breaching)	Total Change to OM&R	2014 BiOp (Up to 10 MAF)	MOP Operations Allowed at (McN-JD)	2019 Spill at L. Columbia Proj.	Breaching at LG-LG-LM-ICE	Eliminated	Existing \$ (\$120M/Year)	Some Re-Reg. at Storage Proj.
Multiple Objectives-4 (More Water)	Some Change to 2016 OM&R	2014 BiOp (Up to 12 MAF)	MOP Operations (L. Sn.-Col. Projects)	2019 Spill Program+	2014 BiOp (NO)	Similar to 2014 BiOp	Existing \$ (\$120M/Year)	Project Structural Changes-Spill
Other Draft EIS Revised Alternative(s)* Per Litigant-Public Response to Draft EIS	Some Additional Measures	2014 BiOp (Up to 12 MAF, with 0.5-1.0 MAF Idaho)	MOP at MN-ICE (L. Snake R.)	2019 Spill at LM ICE and L. Col. R. Projects	Deep Pool Drawdowns at L. Gran.-L. Goose	Variable Transport at L. Monumental	Existing \$ (\$120M/Year)	Some Re-Reg. at Storage Proj.

Source: Alternatives information for No Action and Alternatives 1-4 from CRSO.info, October 2019 (<https://www.nwd.usace.army.mil/Media/>).

* In response to litigant or public comments, the CRSO agencies may add/modify alternatives with the release of the Draft EIS, to secure a Preferred Alternative for new BiOp operations. The measures noted here have been discussed in various meetings, forums, and issue/operations papers.

Above table prepared by CSRIA 10-2019.

**Table 2. Land/Production Asset Market Sales Values,
For Ice Harbor, McNary, and John Day Pools 2016-2019**

<u>Columbia-Snake R. Project Pools*</u>	<u>Approximate Irrigated Acres</u>	<u>Sale Composition</u>	<u>Est. \$/Acre 2018\$</u>
Ice Harbor Pool-R	2,200	Pumps/System/Land (Equipment)	\$14,500
Ice Harbor Pool-R	2,200	Pumps/System/Land (Equipment)	\$11,700
Ice Harbor Pool-T/V	510	Pumps/System/Land (Contract Bid)	\$17,800
Ice Harbor Pool-T/V	6,200	Pumps/System/Land Processing, Other	\$23,000
Ice Harbor Pool-R	1,250	Pumps/System/Land Processing, Other	\$20,100
John Day Pool-R	13,500	Pumps/System/Land (Equipment)	\$13,000
John Day Pool-T/V	20	Pumps/System/Land	\$21,100
McNary Pool-T/V	150	Pumps/System/Land	\$30,000
McNary Pool-R	130	Pumps/System/Land	\$17,600
McNary Pool-R	160	Pumps/System/Land	\$10,500
Transaction Acres:	26,320	Weighted Ave. \$/Acre:	\$15,900
		Adjusted Ave. \$/Acre: For Site Crop Types	\$16,400

Sources: Benton, Franklin, Walla Walla Counties' Assessor Offices, Taxation and Sales Web Site Data 2019; Acre Value Google Website, WA Land Sales and Prices for Benton, Franklin, and Walla Walla Counties, September 2019; CSRIA Board Member Land Valuation Comparables Appraisal; Personal Communications with CSRIA Members (land sales); and CSRIA Representative Review of Selected Land-Water Purchase and Sales Agreements (2017-2019).

* T/V = Trees/Vineyards; R = Row or Field Crops.

**Table 3. Risk Mitigation Asset Values,
Market-Based Determinations for Baseline Values and Impacts**

Columbia-Snake R. Project Pools*	Approximate Irrigated Acres	Ave. Land Asset Value \$/Acre 2018\$	Total Impact Area Baseline Asset Value
Ice Harbor Pool	53,610	-----	-----
Upper McNary Pool	37,030	-----	-----
Total Acres/Asset Value	90,640	\$16,400	\$1,486,496,000
Distressed Assets	Market Based		
Impact Value by Pool	Estimated Impact	Value of Distress Assets	Total
Ice Harbor Pool	30%	\$263,761,000	-----
	50%	\$439,602,000	-----
Upper McNary Pool	30%	\$182,188,000	-----
		Total Distressed Asset:	\$446 to \$622 Million
	Shared Payment Level	Capital Asset Liability	Annual Long-Term Debt Repayment Liability*
Distressed Assets	Bonneville Power Admin. 50%	\$223 to \$311 Million	\$12 to \$17 Million
Capital Repayments	State of WA 50%	\$223 to \$311 Million	\$12 to \$17 Million
			<u>Total</u>
			\$24 to \$34 Million

Sources: Market-Based Distressed Values estimated by current land sales purchasers and active market participants, CSRIA members and CSRIA Representatives.

* Assumes BPA financial obligation tied to long-term Federal Treasury Bonds (or similar debt), and long-term WA State general obligation bonds. A "mixed" interest/discount rate of 3.5% annually is applied to the above financing assumptions.

Figure 1. Lower Snake River-Columbia River Primary Impact Area, 90,640 Acres

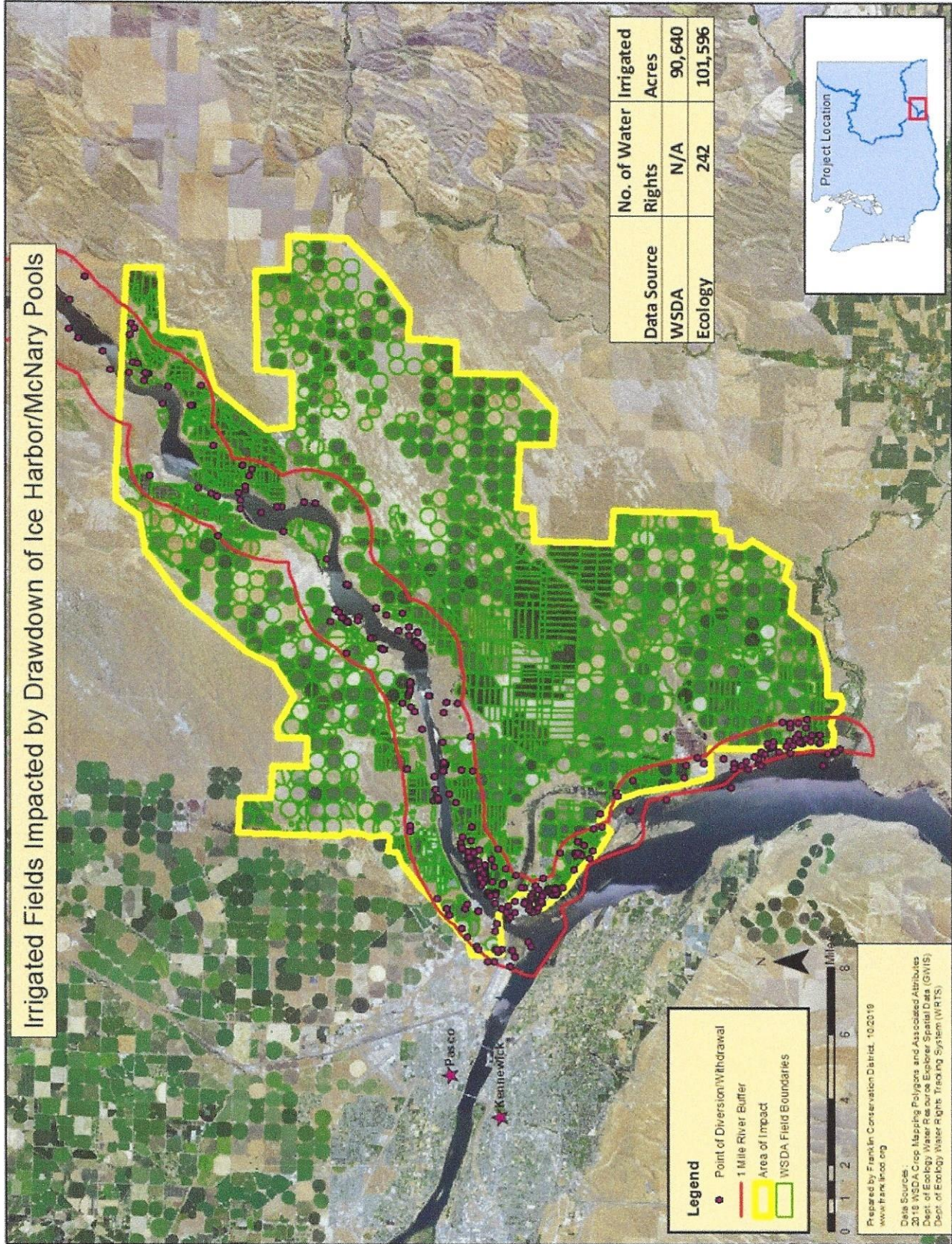


Figure 2. Lower Snake River-Columbia River Primary Impact Area, Ice Harbor-McNary Pools

