

2022 EFW FISH SCREENS STRATEGIC ASSET MANAGEMENT PLAN

This Strategic Asset Management Plan for EFW Fish Screens provides alignment between the Agency strategy, stakeholder requirements, organizational objectives and resulting asset management objectives to ensure assets are managed and satisfy BPA's fish and wildlife mitigation obligations.

*For "EFW Fish
Screens"*

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1.0 EXECUTIVE SUMMARY

Fish Screens play a vital role in significantly reducing mortality of all life stages of salmon, steelhead, and other fish species by preventing them from becoming trapped in irrigation diversions. They assure safe fish passage in and through spawning and rearing areas as well as migratory corridors for federally endangered species and non-listed resident and anadromous fish.

This Strategic Asset Management Plan covers 1149 irrigation diversion screens and associated infrastructure that BPA funds through its Fish and Wildlife Program and other obligations under the Endangered Species Act (ESA). The majority of fish screens funded by BPA are operated and maintained by four state fish and wildlife managers – Oregon, Washington, Idaho, and Montana. The number of screens and the structure by which the fish screen program has been managed remains unchanged from 2020.

The maturity of the fish screen program has developed since the last plan. BPA works closely with the Northwest Power and Conservation Council (NPCC) and the Fish Screen Oversight Committee (FSOC) to update inventories, perform condition assessments, and prioritize funding for non-recurring maintenance needs. Location of screens, size, condition and number of ESA listed species and total numbers encountered are some of the criteria that are used to determine priority.

The Fish Screen program expects to use approximately \$4.7M in annual expense funding under the Fish and Wildlife Program to construct new and replace aging screens. With regular maintenance, fish screens are expected to have a lifespan of 20-25 years, and a significant portion of the assets managed are at or above that window. Therefore, this plan is intended to provide maintenance strategies to address risks associated with potential for equipment failure as these assets continue to age.

The priority list for future replacement screens and non-recurring maintenance is under development by the project partners, BPA staff, and NPCC staff and is to be updated annually. One of the long-term objectives of the fish screen program is to reach 80% of the overall asset age to 20 years and younger within 10 years. One of the barriers to achieve optimal performance include not having a standardized inventory and data management system.

The actions of the fish screen program help satisfy BPA's legal obligations under the Northwest Power Act, Endangered Species Act, and other laws to protect, mitigate, and enhance fish and wildlife. In fact, fish and wildlife mitigation and environmental compliance are essential parts of BPA's business as the environmental cost of large hydro assets and reflect the agency's core values of trustworthy stewardship and operational excellence. BPA's fish screens program is an important part of this effort.

2.0 ACKNOWLEDGEMENTS

2.1 Senior ownership

The responsibility for operational ownership, coordination, and updating of this strategy is assigned by the Fish and Wildlife (EW) Executive Manager.

Jason Sweet, Acting Executive Manager, Fish and Wildlife	JASON SWEET Digitally signed by JASON SWEET Date: 2022.02.16 09:43:25 -08'00'
Dorie Welch, Deputy Vice President, Environment, Fish and Wildlife	DOROTHY WELCH Digitally signed by DOROTHY WELCH Date: 2022.02.16 09:51:02 -08'00'
Scott Armentrout, Vice President, Environment, Fish and Wildlife	SCOTT ARMENTROUT Digitally signed by SCOTT ARMENTROUT Date: 2022.02.16 09:57:51 -08'00'

2.2 Strategy Development Approach

2.2.1 Key Contributors

EF&W’s asset management team facilitated the development of this plan, with primary input from policy staff (who also function as subject matter experts), and with support from Business Operations (EWB). EWB represents EFW within BPA’s Asset Management Committee (AMC) and provides coordination support to the asset management effort. The scope of this SAMP focuses on irrigation diversion fish screens only and not those associated with passage or power generation projects, therefore other action agencies did not contribute to the development of this plan.

2.2.2 Key Activities

Activity	Description
Asset Management Maturity Assessment	<ul style="list-style-type: none"> Conduct Asset Management maturity assessment by surveying EFW employees of various disciplines
Develop SAMP	<ul style="list-style-type: none"> Update the new 2022 Fish Screen SAMP version with new program and process information Review and Update Goals, Objectives and Initiatives with reviews by SMEs and leadership, incorporating results from the maturity assessment Update SWOT analysis Review criteria for asset criticality, and assess asset condition and trends Produce charts, tables and analysis describing historical and future program costs Perform risk assessment to Fish Screen program with program SME input Develop strategy and planned future investments and spend levels
Review SAMP	<ul style="list-style-type: none"> Review SAMP with SMEs, EFW front office and OGC Communicate SAMP updates to NPCC
Publish SAMP	<ul style="list-style-type: none"> Incorporate changes from peer reviews and finalize document Provide SAMP to Asset Planning team for input into Asset Plan

3.0 STRATEGIC BUSINESS CONTEXT

3.1 Alignment of SAMP with Agency Strategic Plan

The purpose of this Strategic Asset Management Plan is to define the longtime management and maintenance needs appropriate to sustain BPA's investments in fish screens. This helps satisfy BPA's mitigation obligations under the Northwest Power Act, Endangered Species Act, and other laws to protect, mitigate, and enhance fish and wildlife affected by the construction and operation of the federal dams in the Columbia Basin.

This SAMP supports BPA's strategic plan objectives 1a, to improve cost-management discipline and 2a, to administer an industry-leading asset management program. The Fish and Wildlife program plans to increase project performance and cost-effectiveness, while discontinuing funding for projects with insufficient mitigation value. This asset strategy will outline how the organization will identify asset funding needs for fish screens that optimize BPA's mitigation value.

3.2 Scope

This Strategic Asset Management Plan covers irrigation diversion screens and associated infrastructure that BPA funds through its Fish and Wildlife Program and other obligations such as ESA. The majority of fish screens funded by BPA are operated and maintained by 4 state fish and wildlife managers— Oregon, Washington, Idaho, and Montana. This plan will not cover fish screens at generating projects. Table 3.2-1 lists the specific fish screen assets that will be covered under this plan.

3.3 Asset Description and Delivered Services

Fish screens installed by states, tribes, and other regional sponsors help ensure safe passage of juvenile and adult fish by preventing fish from being stranded in irrigation channels or canals, or lost to irrigated fields when water is diverted or pumped from streams. These screens are built to meet criteria that have been developed by the National Marine Fisheries Service to help maintain water velocities evenly across the screen surface, preventing higher velocity points from impinging fish to the screen. To protect all life stages of these fish, these criteria were developed around the sustained swimming abilities of juvenile anadromous salmonids. Additionally, when maintained in good working order, these fish screens will prevent fish from physically contacting the screen material and passively guide fish to a bypass pipe that moves the fish away from the screen and back to the stream, thus minimizing migration delays.

The Screen Program provides a vital role in significantly reducing mortality of all life stages of salmon, steelhead, and other fish species that are at risk of being diverted into irrigation canals. Fish screens that are (partially or wholly) funded by BPA help satisfy fish and wildlife mitigation obligations. BPA also provides funds to operate and maintain the fish screens. BPA, however, does not own these screens, engage in direct management, or take on responsibilities or liabilities associated with ownership of the fish screens.

3.3.1 Table 3.3-1, Fish Screens Funded by BPA as of 2022

Sponsor	State	Number of Screens
Idaho Department of Fish and Game (1)	ID	261
Washington Department of Fish and Wildlife (2)	WA	32
Oregon Department of Fish and Wildlife (3)	OR	653
Montana Fish, Wildlife, and Parks (4)	MT	5
Colville Confederated Tribes (6)	WA	99
Burns-Paiute Tribes (7)	OR	4
Yakama Confederated Tribes (8)	WA	3
Umatilla Confederated Tribes (CTUIR) (9)	WA	11
Columbia Conservation District (10)	WA	25
Jefferson Soil and Water Conservation District (11)	OR	2
South Central Washington Resource Conservation Development (12)	WA	42
Upper Columbia Salmon Recovery Board (13)	WA	12
Total		1149

Figure 3.2-2 displays the location of the assets throughout the Columbia River Basin and the area in which BPA’s funds are used for fish screens throughout the region.

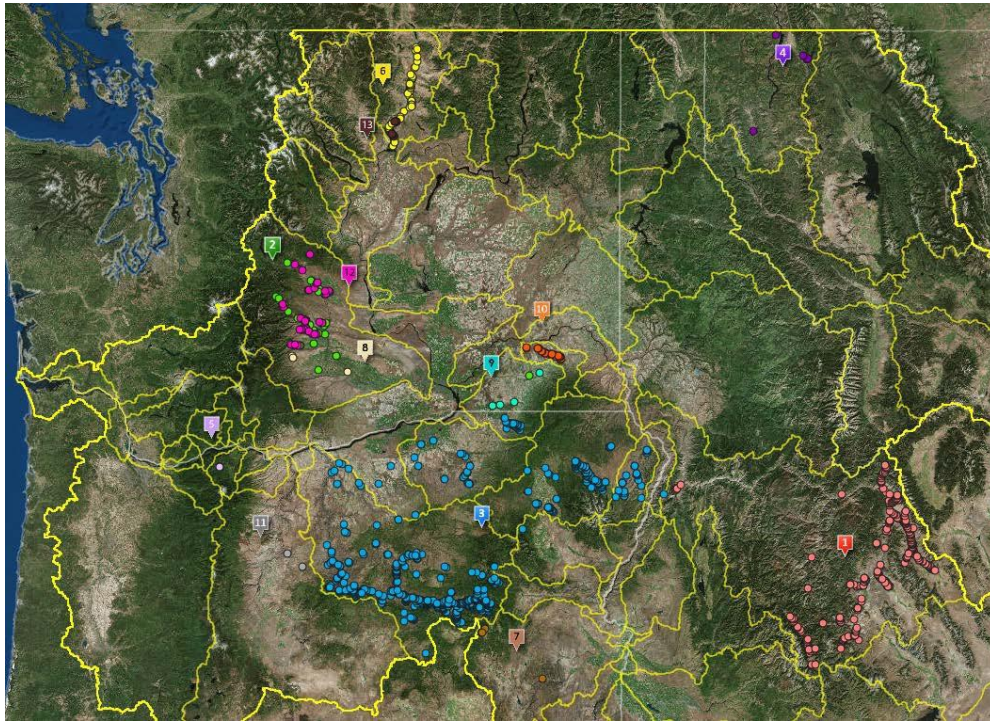


Figure 3.3-2, Asset Locations

3.4 Demand Forecast for Services

Fish screens are used as a part of the BPA’s fish and wildlife program to meet its mitigation obligations. Over the next 5 – 10 years, BPA plans to fund the operation and maintenance (including non-recurring maintenance) as well as the construction and installation of new fish screens as part of a strategy to improve fish passage in the Columbia River basin based on the sponsors’ identification of fish needs and O&M priorities.

3.5 Strategy Duration

The duration of this strategy is 10 years, though it may be amended as appropriate during that time. The strategy will be reviewed annually and published every 2 years unless there is a significant change in strategy. If there is a significant change, the strategy will be updated at the annual review.

4.0 STAKEHOLDERS

4.1 Asset Owner and Operators

Due to the enormity of BPA’s service area, the Fish and Wildlife program partners with regional organizations, also known as sponsors, to implement projects in the field. A project sponsor proposes and performs the duties of constructing, operating, and maintaining a fish screen for the Fish and Wildlife Program. Each sponsor manages its fish screen assets through a program that designs, fabricates, installs, operates, and maintains its fish screens. For fish screens that receive BPA funding, BPA provides technical reviews of the projects to ensure that it cost effectively funds high quality projects in the appropriate locations that provide the largest benefits to fish and wildlife.

4.2 Stakeholders and Expectations

Table 4.2-1, Stakeholders

Stakeholders	Expectations	Current Data Sources	Measures
States	Collaboration	Project Manager Contracting Officer’s Representative	Annual Reports Survey Results
	Project/Contract Management	Pisces Work Elements Project Documents	Milestones Status Reports Annual Reports
	Funding	Pisces Web Asset Suite Contract Modules Line Item Budgets SOY Process	Invoices Due Diligence
	Communications	Project Manager Contracting Officer’s Representative Site Visits	Pisces WE Milestones WE Reports Project Manager
Tribes	Collaboration	BPA tribal Affairs Organization Project Manager Contracting Officer’s Representative	Survey Results Annual Reports (Engagements)
	Project/Contract Management	Pisces Work Elements Project Documents	Milestones

	Funding	Pisces Web AssetSuite Contracts Modules Line Item Budgets SOY Process	Invoices Due Diligence
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Stakeholders	Expectations	Current Data Sources	Measures
	Communications	Project manager Site visits	Pisces WE Milestones WE Reports Project Manager
Other Sponsors	Collaboration	Project Manager Contracting Officer's Representative	Annual Reports
	Project/Contract Management	Pisces Work Elements Project Documents	Milestone s Status Reports Annual Reports
	Funding	Pisces Web Asset Suite Contracts Module Line Item Budgets SOY Process	Invoices Due Diligence
	Communications	Project Manager Site Visits	Pisces WE Milestones WE Reports Project Manager
Northwest Power and Conservation Council	Collaboration	Council Meetings and Agendas Sub-committees	F&W Program Reports Council Reports and Categorical Reviews of F&W program Sub-committee Participation Analyses and Recommendations
	Program Implementation	Council Meetings, Agendas, and Reports BPA F&W Reports	Periodic Reports Program Metrics
	Funding	Pisces Web Council Financial Statements	Annual Financial Reports BPA Financial Reports
Landowners/ Irrigation Districts	Collaboration	Project Manager Contracting Officer's Representative	Mutual Understandings Written Permissions Legal Documents

5.0 EXTERNAL AND INTERNAL INFLUENCES

Increased costs for operations and maintenance of the existing fish screens and replacements with new ones are further impacted by supply chain impacts in most recent years. Ongoing prioritization of FW Program expense budgets is needed to continue addressing maintenance needs in an appropriate sequence.

Table 5.0-1, External and Internal Influences

External Influences	Affects and Actions
Non-Recurring Operating and Maintenance Costs	<p>Unexpected maintenance costs (e.g. due to natural events) can affect existing and future construction and O&M for fish screen programs</p> <p>Scheduled preventative maintenance programs for fish screens reduce unexpected operating and maintenance costs and provide greater reliability of the fish screen assets and predictability of program costs.</p>
Internal Influences	Affects and Actions
Finance, budget and cost management	<p>Finance takes the lead role in defining the budget development cycle, budgeting rules, and financial policy. Finance also leads agency efforts to control costs and build budget forecasts.</p> <p>Fish and Wildlife (E&W) compile fish screen budgets in coordination with the Finance budget cycle. Cost management initiatives are increasing the need for F&W to provide comprehensive forecasts of fish screen spending.</p>
FTE resource availability and skills	<p>Workforce staffing shortages, FTE hiring constraints, long lead-times, and increasing retirement rates all impact the ability to implement the program. Fish and Wildlife will continue to prioritize critical activities, defer lower priorities, look for process efficiencies, and employ IT tools where available and appropriate.</p>
Support resources and skills (Engineering & Design, EC)	<p>F&W will continue to employ standardized processes, documentation, and automation tools as appropriate to meet engineering criteria and environmental compliance.</p>

5.1 SWOT Analysis

Table 5.1-1: SWOT

Favorable	Unfavorable
Strengths	Weaknesses
<ul style="list-style-type: none"> • Inventory: Fish screen assets have been defined and inventoried by each sponsor. • Regional Collaboration: Engaged and collaborative regional stakeholders and sponsors that help with planning, coordination, and implementation of projects. • Program Maturity: BPA has an established fish screen program that has long-standing and effective procedures for completing work. 	<ul style="list-style-type: none"> • Asset Ownership: BPA is the funding entity, but lacks ownership and maintenance responsibility over the physical asset. BPA has limited tactical control of how assets are operated and maintained. • Mitigation Plans: Lack of clear mitigation plans for external and internal influences could increase financial risk to the program
Opportunities	Threats
<ul style="list-style-type: none"> • Stakeholder Collaboration: Align priorities and strategies with Council and sponsors to improve asset management program. • Technology: Identify new technology or methods that could improve fish screening 	<ul style="list-style-type: none"> • External influences: e.g. climate change, political decisions, regulatory oversight can impact fish screen asset management plans • Financial: BPA's overall Fish and Wildlife budget is limited and as the sponsors continue to build

in important waterways.

new screens, the ability to maintain them with finite financial resources will increasingly depend upon strategic prioritization and sequencing of maintenance work.

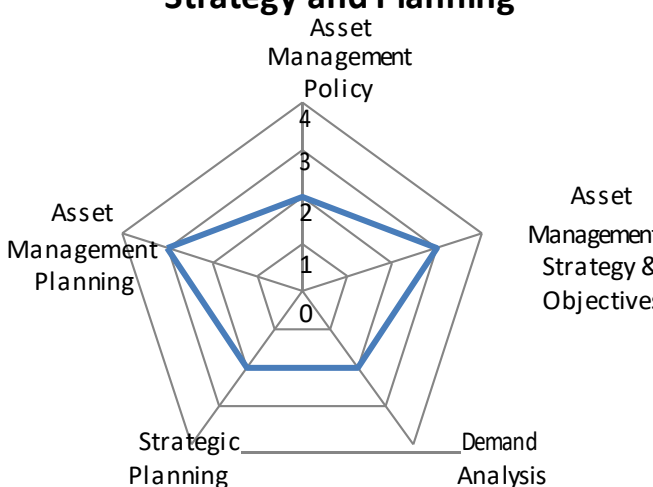
6.0 ASSET MANAGEMENT CAPABILITIES AND SYSTEM

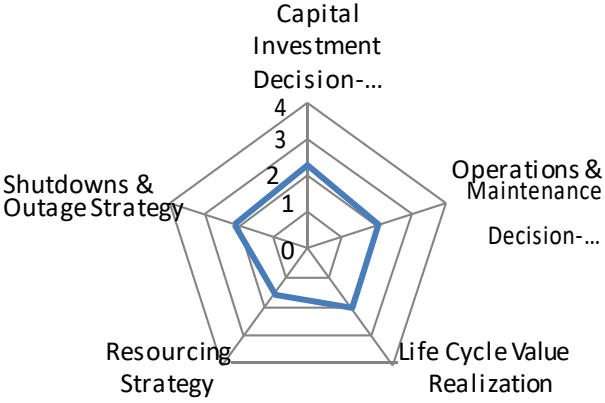
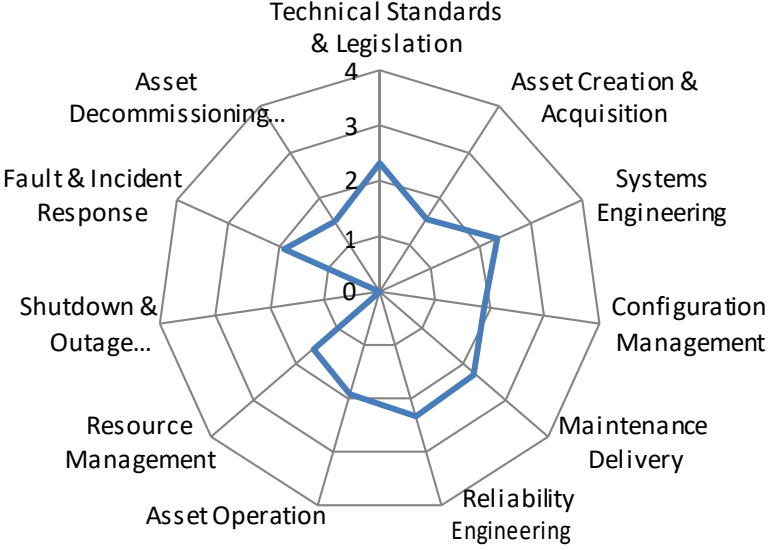
Describe the asset category’s level of maturity as it relates to the six subject groups of the IAM framework and the IAM’s maturity model questionnaire and instructions. The maturity model should be used to reassess maturity with every SAMP.

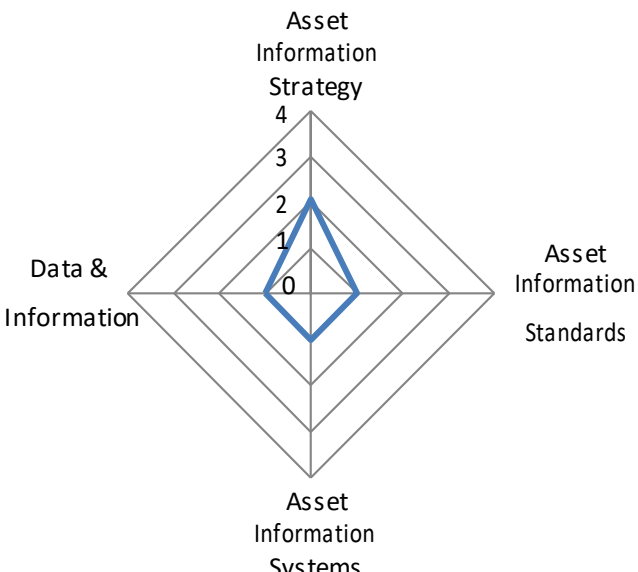
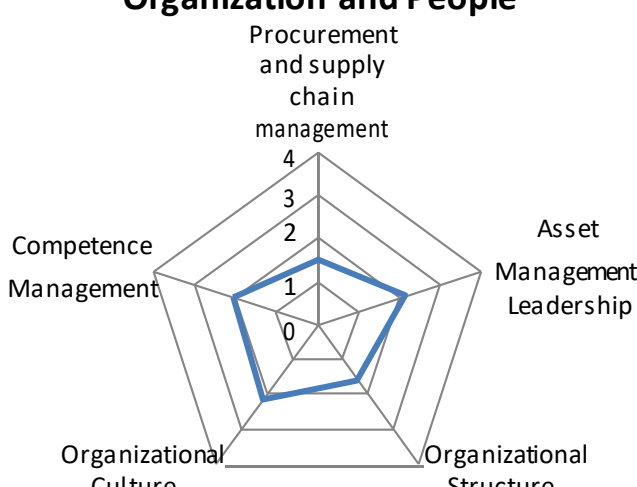
6.1 Current Maturity level

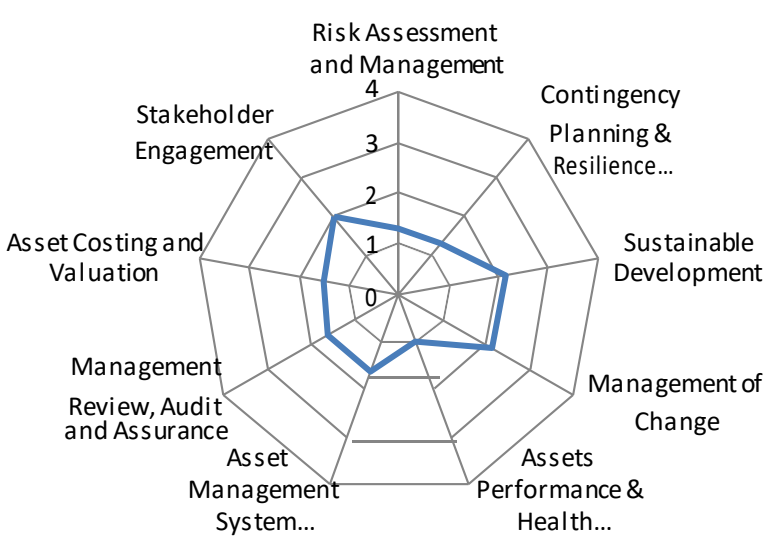
Using the IAM maturity model, Fish and Wildlife staff evaluated the maturity of the Fish Screens Asset Management program in six different categories. On average, the maturity level across all categories (Strategy and Planning, Decision Making, Life Cycle Delivery, Asset Information, Organization and People and Risk and Review) is 1.8 on a scale of 0-4. For the most part, the program has identified the means of systematically and consistently achieving competency in this subject, and can demonstrate that these are being progressed with credible and resourced plans. However, processes are often done in a reactive mode though able to achieve expected results on a repeatable basis. Moreover, the processes are insufficiently integrated, with limited consistency or coordination across the organization.

Table 6.1-1 Maturity Level

Subject Area	Maturity Level
<p>Strategy & Planning</p>	<div style="text-align: center;"> <p>Strategy and Planning</p>  </div> <p>Strength: BPA’s Fish Screen program provides necessary oversight and highlights the regional, collaborative effort between BPA, the Council, and sponsors to construct, operate, and maintain fish screens to reduce mortality of all life stages of salmon, steelhead, and other fish species that are diverted into irrigation diversions.</p> <p>Weakness: The current state of strategy and planning of the Fish Screen program asset management is reactive. Funds are prioritized within each contract based on the most critical needs in the system, sometimes after equipment is already in need of repair or replacement. It can be difficult for sponsors to maintain the level of maintenance that is desired to maximize the life span of the fish screens. This can result in higher costs</p>

Subject Area	Maturity Level
	resulting from earlier than planned replacement of the fish screen infrastructure.
Decision Making	<p style="text-align: center;">Decision Making</p>  <p>Strength:</p> <p>Weakness: Although BPA provides funding for fish screens, each sponsor is responsible for prioritizing their own fish screen work. Sponsors develop their own prioritization criteria for O&M funds, location and placement of screens, and maintenance schedules. Throughout much of the basin, fish screening is a voluntary program dependent upon landowner/irrigator permission.</p>
Life Cycle Delivery	<p style="text-align: center;">Life Cycle Delivery</p>  <p>Strength: With proper operation and maintenance, the life of a fish screen can be 20 - 25 years. Regularly scheduled O&M can greatly improve the expected functional life of a fish screen. BPA provides funds for routine maintenance to be conducted by</p>

Subject Area	Maturity Level
	<p>sponsors to maximize the life of the fish screens.</p> <p>Weakness: BPA is dependent upon the sponsors for the screens inventories and status of individual screens. A limited understanding of fish screen inventories can limit BPA’s ability to strategize the repair and replacement of aging assets that directly impacts the lifecycle of fish screen assets.</p>
<p>Asset Information</p>	<p style="text-align: center;">Asset Information</p>  <p>Strength: The Council and BPA have worked with sponsors to capture asset inventories of fish screens throughout the basin and develop an online map of locations.</p> <p>Weakness: Asset data is captured and maintained by sponsors, potentially limiting access to data for BPA staff and hindering their ability to develop coordinated strategies that maximize benefits to fish across sub-basins.</p>
<p>Organization & People</p>	<p style="text-align: center;">Organization and People</p>  <p>Strength: BPA works closely with states, tribes, and regional sponsors to plan and implement projects that are effective at providing safe passage and reducing the mortality rate of all life stages of fish.</p>

Subject Area	Maturity Level
	<p>Weakness: Currently, there is no formalized Fish Screen team within BPA’s Fish and Wildlife organization, reducing effective basin-wide coordination and communication of the program.</p>
Risk & Review	<p style="text-align: center;">Risk and Review</p>  <p>Strength: BPA works closely with sponsors to identify and prioritize screen funding.</p> <p>Weakness: Installation and maintenance of screens is dependent upon landowner permission.</p>

6.2 Long Term Objectives

The following long term objectives are meant to improve the transparency, responsiveness, and accountability of the Fish Screen program so it can strategically manage its assets, effectively and efficiently mitigate for the hydro system, and provide biological benefits to fish and wildlife throughout the region. Through this plan, the goal is to ensure the longevity and integrity of BPA’s past investments made for the benefit of fish and wildlife.

1. **Asset Management**
 - a) Develop a system for tracking asset inventories and criticality to strategize the repair and replacement of aging assets in the next 5 years.
2. **Asset Condition**
 - a) Reach 80% of the overall asset age to 20 years and younger within 10 years.
3. **Asset Performance**
 - a) Develop performance metrics and implement practices that will inform this strategy by FY 2027.

6.3 Current Strategies and Initiatives

Council and BPA staff have been working with the sponsors and the Fish Screen Oversight Committee (FSOC) over the past five years in the development of a screens inventory and assessment. The inventory received in 2015 from FSOC was cross-checked and confirmed by BPA through the Program projects’ inventory and includes a prioritization of

the structures needed repairs and/or non-recurring maintenance.

To better understand non-recurring screen maintenance needs, roles, and responsibilities, and possible future impacts associated with new screen criteria, staff developed a Fish Screen Asset Management and Strategic Planning template to solicit additional feedback and detail regarding the priorities of the fish screen managers. BPA may use these templates to develop Memorandums of Agreement (MOAs) with the larger screen-operating entities to help plan for asset management strategies of both BPA and the Council Program.

Fish screen needs associated with non-recurring maintenance will be updated, tracked, and confirmed on an annual basis through the managers, sponsors, Council staff and the FSOC.

At five-year intervals, Council and BPA staff, along with sponsors, will re-assess and update their fish screen inventories to ensure the lists are up-to-date (e.g., add or remove screens, and re-prioritize needs). This assessment will be coordinated through the FSOC and guided by the appropriate MOA and project reviews.

6.3.1.1 Key Initiatives

Council's Asset Management Strategic Plan

BPA has been working with the Northwest Power and Conservation Council's Asset Management Subcommittee to (1) implement annual funding commitments for priority non-recurring maintenance needs, which have been identified and funded using cost savings, and (2) develop a long-term Asset Management Strategic Plan to address non-recurring maintenance needs. This plan is intended to define and provide a strategy to achieve a long-term maintenance, rehabilitation, and replacement process for Program investments associated with fish screens. This includes developing a prioritized assessment for non-recurring maintenance and securing a monetary mechanism for implementation. The Council's plan is also complementary to this strategic asset management plan.

Regularly Scheduled Assessments of Asset Inventories

At five year intervals, Council and BPA staff, with the sponsors and managers, will re-assess and update fish screen inventories to ensure the lists are up to date and reprioritize needs. This assessment will be coordinated through the FSOC, an advisory and coordinating body for NPCC's fish screening programs comprised of fish and wildlife managers from across the Columbia Basin.

Design Standards

The National Marine Fisheries Service, a BPA partner in fish screen funding through the Mitchell Act, has developed screen design criteria that sponsors comply with when constructing new fish screens.

Fish Screen Asset Management and Strategic Planning Initiative

BPA is working with the states to develop asset management strategies to address the life cycle delivery of fish screens and associated O&M programs and costs. The average age of a fish screen is 20-25 years depending on maintenance practices. Roughly 25% of the fish screen inventory in use are over 20 years old and will need to be replaced in the near future.

Asset Inventories

Detailed data for fish screens are maintained by each state's Fish Screen Program in coordination with BPA's Fish and Wildlife staff. Each state's database contains detailed information on each fish screen as well as records of easements with landowners for the fish screens. Location and metric data is also entered into BPA's Pisces project system as a part of the quarterly and annual reporting requirements. BPA has worked with sponsors and managers and the FSOC over the past five years in the development of a screens inventory and assessment. The inventory received in 2015 from FSOC was cross checked and confirmed by BPA through the Program projects' inventory and includes a prioritization of the structures needing repairs and/or non-recurring maintenance. There is a coordinated effort between the Council, BPA staff, and sponsors to keep the inventory up to date with accurate asset data and funding needs.

6.4 Resource Requirements

There is currently no formalized fish screen team, however, the CORs and PMs that handle the majority of the fish screen contracts meet and communicate regularly to ensure collaboration and coordination of fish screen projects, planning, and strategy. The group is actively working to streamline screening work elements for irrigation infrastructure to improve the contract management and project implementation.

- Lead Manager Sponsor & BPA EFW Asset Management Committee Lead
- EC Lead
- Engineering and Technical Services

In general, the current expense budgets for fish screens are currently sufficient to meet program needs.

7.0 ASSET CRITICALITY

7.1 Criteria

In prioritizing new fish screen construction, BPA is most focused on tributary fish screens benefiting multiple ESA listed fish species. The primary criteria used to prioritize new fish screen needs are:

1. Location (mainstem Salmon River/John Day River versus tributary)
2. Size (percent of the river flow diverted)
3. Number of ESA listed species and total numbers encountered

These criteria are not listed in priority order. They are used collectively to determine the priority of the screens.

The primary criteria used to prioritize non-recurring maintenance for existing screens are:

1. Condition
2. Number of ESA listed species and total numbers encountered
3. Location (mainstem Salmon River/John Day River versus tributary)
4. Size (percent of the river flow diverted)

These criteria are not listed in priority order. They are used collectively to determine the O&M priority of the screens.

Almost all larger screen complexes located on tributary mainstem reaches can entrain three, if not four, ESA-listed salmonids and other species. These screens divert a high percentage of flows in the spring and the fall have the highest rates of entrainment at key times for fish. Therefore, having all these diversions screened is paramount to the recovery of these listed fish populations and protection of all fish species.

7.2 Usage of Criticality Model

The above criteria are used to evaluate and prioritize fish screen funding. The non-recurring maintenance is part of an annual review conducted between BPA Fish and Wildlife staff, Council staff, state sponsors, and FSOC. The annual process is intended to identify needs for the screens to ensure funds can be directed to the project(s) to inform their upcoming start-of-year budget(s).

At 5-year intervals, Council and Bonneville staff, with the sponsors and managers, will re-assess and update their fish screen inventories to ensure the lists are up-to-date (e.g. add or remove screens, and re-prioritize needs). This assessment will be coordinated through FSOC.

8.0 CURRENT STATE

8.1 Historical Costs

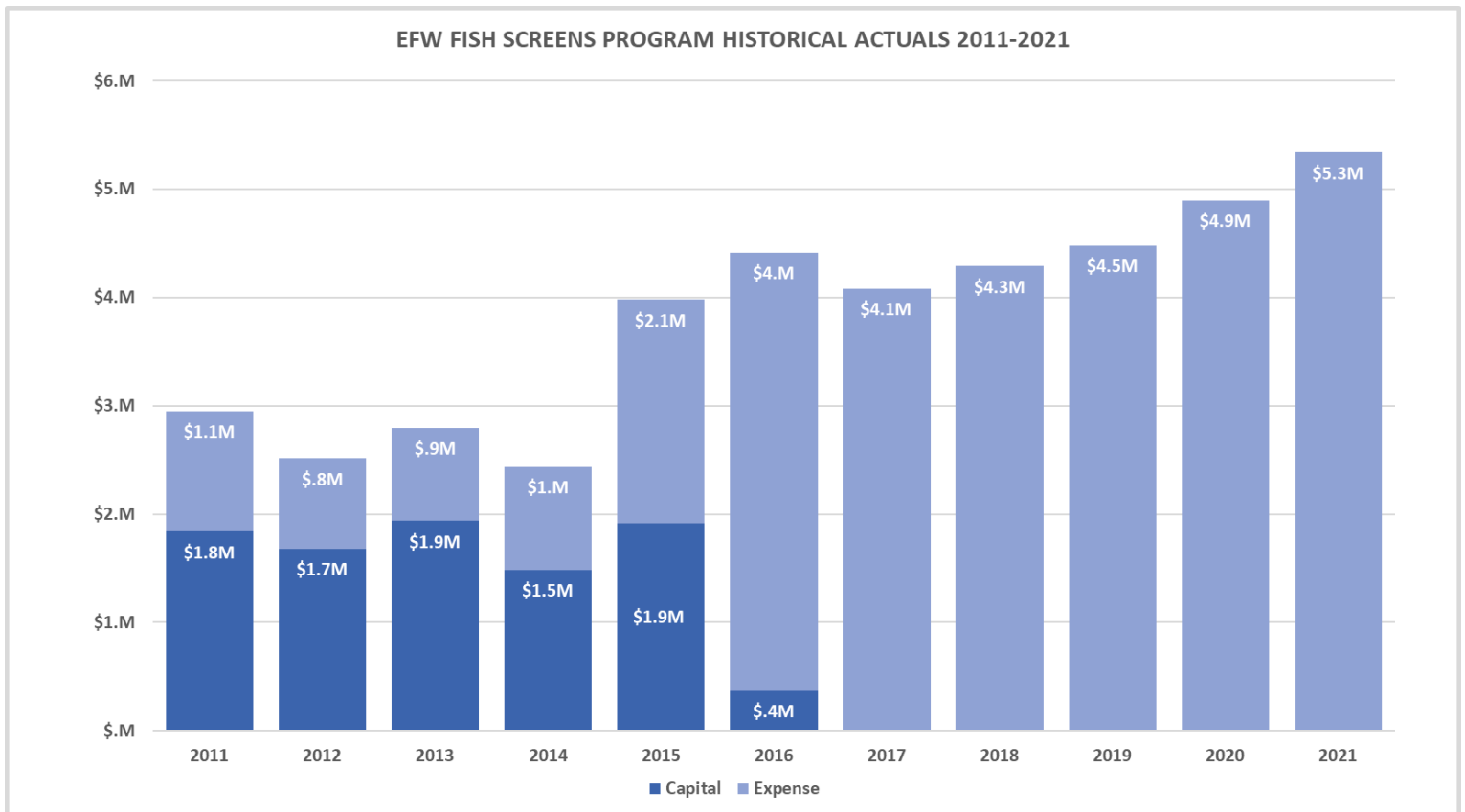
Starting in fiscal year 2016, the Fish and Wildlife program began eliminating capital funds for fish screens. Any new fish screen funding is covered by the expense budget as an identified priority for ongoing operation and maintenance. The expense budget for the Fish Screen program was increased starting in the same year to accommodate for these costs.

The following charts provide historical costs for the fish screen asset category in Fish and Wildlife:

Table 8.1-1 Historical Spend

Program Expense (OpEx)	Historical Spend (in thousands) With Current Rate Case						
	2017	2018	2019	2020	2021	2022	2023
O&M	\$4,081	\$4,288	\$4,480	\$4,283	\$4,283	\$4,283	\$4,283
Total Expense	\$4,081	\$4,288	\$4,480	\$4,894	\$5,340	\$4,771	\$4,771

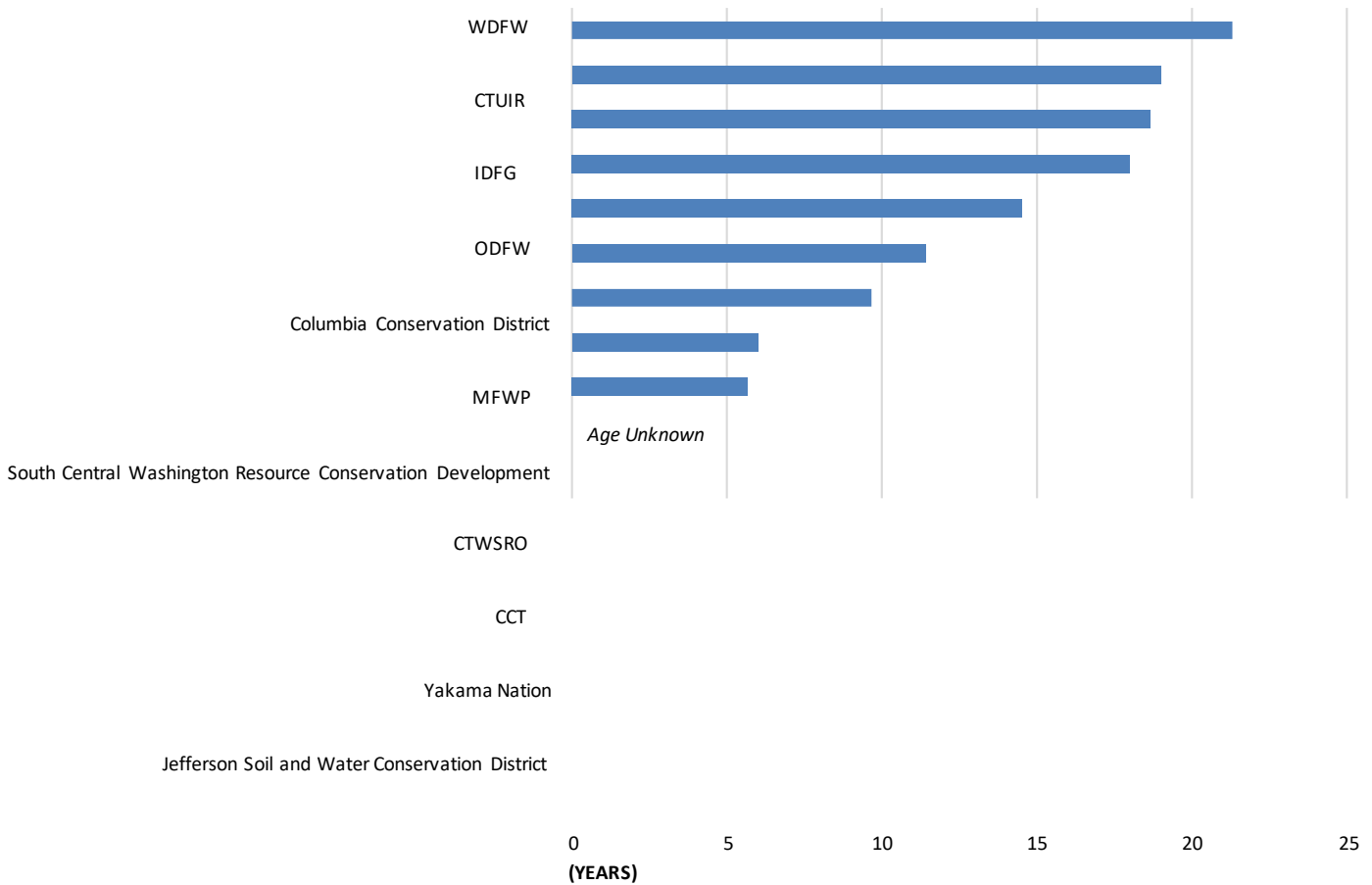
Figure 8.1-2 Historical Expenditures



8.2 Asset Condition and Trends

Fish screen operating entities perform condition assessments of the assets, prioritize the immediate and longer term maintenance needs, and share assessments with BPA and the FSOC in order to obtain funding. While age is only one of the measures used to evaluate the condition of a screen, other physical condition factors are inspected by the operating sponsor and managed through their O&M program.

The average age of a fish screen is 20-25 years depending on maintenance practices. Approximately, 25% of the fish screen inventory in use are over 20 years old and will need to be replaced in the near future. As a long-term objective, the program aims to reach 80% of the overall asset age to 20 years and younger within 10 years. BPA is working closely with the Council, sponsors, and the FSOC to prioritize fish screen funds in order to improve the overall asset health of the portfolio.



8.3 Asset Performance

Asset performance for fish screens has been tied to age and lifecycle expectations. Most fish screens are on a condition-based maintenance schedule, allowing screens to operate until they fail. BPA attempts to fund fish screens that meet design standards developed by the National Marine Fisheries Service through the Mitchell Act and prioritizes funding O&M programs that help to increase the reliability of screens. Sponsors make their best effort to time the replacement of fish screens as optimally as possible, but due to the large amount of screens, distances between screens, and limited maintenance resources, it is not always possible to replace a screen before it fails. Sub-basins and assets are prioritized to manage maintenance needs. Shown in the table below is an example of a performance metric the fish screen program could track to demonstrate improvement in age of assets.

Strategic Goal	Objective	Measure	Units	Year -5	Year - 4	Year - 3	Year - 2	Year - 1
Modernize assets	Screen Reliability	Asset Age	% under 15 years	30%	45%	55%	65%	70%

8.3.1 Table 8.3-1, Historical Asset Performance Summary

Over the last few years, sponsors have begun installing equipment to monitor fish passage at screens to better understand screen performance. PIT Tag readers have been installed in bypass pipes to measure the amount of fish that are diverted from irrigation ditches back to the stream by the fish screen. Preliminary data taken by IDFG in the Salmon River and its tributaries estimates roughly 50% - 90% of fish would be lost without screens in place. As more data is gathered, performance metrics will be refined and incorporated more intentionally into this strategy.

8.4 Performance and Practices Benchmarking

Due to the unique nature of the fish screen asset, it is difficult to benchmark performance against industry standards. Project sponsors are responsible for designing and constructing fish screens in accordance with specifications developed by the National Marine Fisheries Service.

9.0 RISK ASSESSMENT

9.1 Risk Identification

Risk Category	Risk Name, Description and Assessment	Likelihood	Impact
Safety	Liability: As the majority of constructed fish screens are not in BPA ownership, liability associated with personal safety remains the responsibility of the property owner, not BPA.	Low	Low
Reliability	Equipment Failure: The possibility of equipment failure of a physical asset is always a risk to the reliability of the system. A fish screen and its associated support equipment are always at risk of failing and needing repair and/or replacement.	Possible	Moderate
Financial	Costs: Financial risks associated with fish screens are represented by risks to equipment failure and reliability. These risks are mitigated by BPA policies and procedures that require prioritization, but are subject to unplanned events or design issues that could result in increased and unforeseen costs.	Low	Low
Environment/ Stewardship	Environment Hazards: Environmental risks include the possibility of insufficient water instream to provide adequate passage for fish upstream and downstream, and injury or mortality for fish that are caught in irrigation diversions.	Low	Low
Compliance	Regulatory Assets: Fish screens are an integral part of BPA’s Fish and Wildlife program that help address certain legal responsibilities of BPA (Endangered Species Act, Northwest Power Act) to mitigate for the impacts of the Federal Columbia River Power System.	Low	Moderate

Due to the range of fish screens, each asset may have its own risk profile.

9.2 Risk Score

SCORE	PROBABILITY	IMPACT
5	Almost Certain	Extreme
4	Likely	Major
3	Possible	Moderate
2	Unlikely	Minor
1	Rare	Insignificant

Probability

Risk Event Probability Scoring	Rare = .05	Unlikely = .10	Possible = .20	Likely = .40	Almost Certain = .80
Occurrence	0 - 10% Very unlikely to occur This event could occur within the next 100 years	11 – 40% Unlikely to occur This event could occur within the next 50 years	41 - 60% May occur about half of the time This event could occur within the next 13 years	61 - 90% Likely to occur This event could occur within the next 5 years	91 - 100% Very likely to occur This event could occur within the next 2 years

Impact

Risk Event Impact Scoring	Insignificant = .05	Minor = .10	Moderate = .20	Major = .40	Extreme = .80
Safety The potential impact of a risk event and liability with worker safety issue	No injuries or illness	Minor injuries or illness to few employees, public members or contractors requiring first aid	Minor injuries or illness to several employees, public members or contractors requiring first aid	Serious injuries or illness to few employees, public members or contractors hospitalization, disability or loss of work	Fatality, permanent disability, serious injuries or illness to many employees, public members or requiring hospitalization, disability or loss of work
Reliability The potential impact of a risk event due to equipment failure	No equipment failure or inconsequential equipment failure	Equipment failure that can be fixed or resolved in 1 hour or less, no outage or impact to ancillary systems	Equipment failure that can be fixed or resolved in 1 day or less, no outage, but potential impact to ancillary systems	Equipment failure that cannot be fixed or resolved in 1 day, potential outage, with impact to ancillary systems	Equipment failure that cannot be fixed or resolved in 1 week, outages with significant impact to ancillary systems
Financial The potential risk event resulting financial costs to program measured in incremental dollar impact	Impact of less than \$30k in costs; consider costs to customers, shareholders, and third parties.	Impact between \$30k - \$300k in costs; consider costs to customers, shareholders, and third parties.	Impact between \$300k - \$1M in costs; consider costs to customers, shareholders, and third parties.	Impact between \$1M- \$5M in costs; consider costs to customers, shareholders, and third parties.	Impact above \$5M in costs; consider costs to customers, shareholders, and third parties.
Environmental The potential impact on natural resources such as air, soil, water, plant or animal life	Resulting in negligible or no damage	Immediately correctible damage to surrounding environment	Resulting in moderate short term damage of a few months, reversible damage to surrounding environment with no secondary consequences	Resulting in significant medium term damage greater than a few months, damage to surrounding environment	Irreversible and immediate damage to surrounding environment (e.g. extinction of species)
					of

Risk Score Matrix

Probability	IMPACT				
(5) = .90	0.05	0.09	0.18	0.36	0.72
(4) = .70	0.04	0.07	0.14	0.28	0.56
(3) = .50	0.03	0.05	0.10	0.20	0.40
(2) = .30	0.02	0.03	0.06	0.12	0.24
(1) = .10	0.01	0.01	0.02	0.04	0.08
	(1) = .05	(2) = .10	(3) = .20	(4) = .40	(5) = .80

● Low Risk ● Balanced ● High Risk

Risk Assessment

Probability	IMPACT				
(5) = .90					
(4) = .70					
(3) = .50			Reliability		
(2) = .30		Safety Financial Environmental	Compliance		
(1) = .10					
	(1) = .05	(2) = .10	(3) = .20	(4) = .40	(5) = .80

Risk Ranking and Response

Identified Risks	Probability	Impact	Quantitative Score	Priority	Rank	Risk Response
1) SAFETY: Failure of fish screen operator to maintain safety standards for staff/crew	2	2	.03	●	5	Mid-term monitoring
2) RELIABILITY: Failure of fish screen operator to prevent equipment failure with impact to species.	3	3	.10	●	1	Attention Required
3) FINANCIAL: Failure to maintain Fish and Wildlife 1085 Program expenditures within capital and expense budgets.	2	2	.03	●	3	Mid-term monitoring
4) ENVIRONMENTAL HAZARD: Failure to prevent environmental hazards to the surrounding ecosystems caused by the operation of fish screens	2	2	.03	●	4	Mid-term monitoring

10.0 STRATEGY AND FUTURE STATE

As identified in Section 9, failure of fish screens and their associated support equipment have been identified as a possible risk with moderate impact. The initiatives described in Section 6, specifically work being done between BPA, sponsors and the Fish Screen Oversight Committee (FSOC) include prioritization of the structures that need repairs and/or non-recurring maintenance on an annual basis. This structure for managing the program will continue in the future. In addition, future expense funding levels are expected to be in line with present levels, and potentially adjusted for inflation.

10.1 Future State Asset Performance

With regular maintenance, the assets are expected to have a lifespan of 20-25 years.

10.1.1 Table 10.1-1, Future Asset Performance Objectives

Objective	This Year	Year +1	+2	+3	+4	+5	+6	+7	+8	+9	+10
System Reliability – Age of Fish Screen <20 Years	59%	62%	65%	68%	71%	74%	77%	80%	80%	80%	80%

10.2 Strategy

The fish screen program is expected to maintain its current processes and existing O&M activities.

10.2.1 Sustainment Strategy

The following sustainment strategy is expected for the major fish screen sponsors:

1. The Washington Department of Fish and Wildlife does not expect to construct or add any new fish screens to their inventory over the next 5 years. Funding will be used only for O&M on existing fish screens.
2. The Idaho Department of Fish and Game plans to add a small amount of new screens each year, but a majority of their funding will be used for O&M. IDFG also plans to consolidate screens when possible to reduce their number of assets.
3. The Oregon Department of Fish and Wildlife plans to use funding to add new fish screens, operate and maintain existing fish screens, and consolidate multiple fish screens where possible.

In order to maintain an appropriate schedule for O&M, sponsors are:

1. Reducing the number of screens required through irrigation ditch consolidation.
2. Identifying less expensive options or new technology for both construction and maintenance of screens E.g. pump screens.

10.2.2 Growth (Expand) Strategy

The Fish Screen program expects to use expense funding to construct and replace aging screens. The priority list for future replacement screens, or non-recurring maintenance, is under development by the sponsors, BPA staff, and Council staff and will be updated annually. As noted in section 10.2.1, WDFW does not plan to add new fish screens, IDFG may add a small amount every year, and ODFW plans to use funding to add new fish screens. Any additions are currently planned through the use of current expense funding made available.

10.2.3 Strategy for Managing Technological Change and Resiliency

Screen technology and design are driven by biological need, for example if Lamprey get listed then entirely new screen technology may be needed to accommodate for the change.

103 Planned Future Investments/Spend Levels

Table 10.3-1 Future Expenditures (in thousands)

Expense (OpEx)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Hatcheries O&M	\$48,967	\$50,436	\$51,949	\$53,507	\$55,112	\$56,766	\$58,469	\$60,223	\$62,030	\$63,890
Land Acquisition EXP	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$1,000	\$0	\$0	\$0
Land O&M	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500	\$12,500
Fish Screens	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677	\$4,677
Total Expense	\$70,344	\$70,344	\$70,344	\$70,344	\$70,344	\$70,344	\$67,144	\$66,144	\$66,144	\$66,144

10.4 Implementation Risks

Table 10.4-1, Implementation Risks

Risk	Impact	Mitigation Plan
natural disasters	High	Flooding can pose a high risk of damage to screens. Developing appropriate maintenance practices and procedures in case of emergencies will help to mitigate for the loss of any fish screens.
Staff turnover, resource limitations	Moderate	Better alignment of project workloads to spread knowledge and experience of the program across various resources.
Uncertainty regarding long-term financial obligations	Moderate	Continue to maintain budgets at or below inflation and identify cost savings in projects through improved technology or combining fish screen diversion points when possible.
Third party maintenance	High	Minimize maintenance requirements or require the state or federal agencies to perform maintenance work.

10.5 Asset Conditions and Trends

As aging fish screen assets are replaced with new screens or consolidated with other screens, the average condition and age of assets will improve.

10.6 Performance and Risk Impact

With the implementation of this strategy, it is expected that the probability and consequence of fish screen risks will decrease. As older fish screens are repaired or replaced, age and condition will improve, therefore reducing the likelihood of a risk actually occurring. Fish screen consequences are already rather minor, so reducing probability through asset repair or replacement will help to mitigate risks.

11.0 Addressing Barriers to Achieving Optimal Performance

Program alignment with broader Fish and Wildlife program

Optimal performance of this asset is contingent on its alignment with the broader BPA Fish and Wildlife program, including any future Biological Opinions. A change in fish screen strategy away from the current/status quo approach would need to be considered in terms of this broader program, and a modification of the broader program may modify the approach to this asset. Fish screens are one component of many that address the broader mitigation requirements BPA addresses.

Data management and sharing

In terms of the management actions that will support sustaining the asset, the near-term emphasis will be on updating and standardizing the inventory and associated data, including the ability to efficiently produce desired metrics and reports, as well as cost forecasts under various program scenarios. Actions should be identified that will potentially enhance the current information management and other areas where efficiencies in reporting might be evaluated.

Program resources

Budget constraints on the Fish and Wildlife program could require creative new strategies for prioritization or sequencing of mitigation work to optimally implement this asset management strategy. Fish and Wildlife plans to improve asset management competencies across its staff by encouraging staff to take the IAM training offered by the agency. This will improve the confidence of its employees to adopt and continually improve their strategic asset management plans.

12.0 DEFINITIONS

Reference BPA Policy 240-2 and BPA Procedure 240-2-1 for standard definitions.