GCDAMP Knowledge Assessment: Effects of Experimental & Management Actions

Resource Topic:	Hydropower and energy
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Resource Characteristic	Specific Measure	Management Action	Strength	Direction	Confidence	Rationale: Strength & Direction	Rationale: Confidence	Recommendations
Electric generation (energy production)	MWh generated/year	Spring HFEs ≤ 45,000 cfs in March or April	Moderate	Negative Effect	High	Bypass	Amount of bypass and its cost can be measured	
Electric generation (energy production)	MWh generated/year	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	Negative Effect	High	Bypasses less water	Amount of bypass and its cost can be measured	
Electric generation (energy production)	MWh generated/year	Fall HFEs ≤ 45,000 cfs in October or November	Moderate	Negative Effect	High	Bypass	Amount of bypass and its cost can be measured	
Electric generation (energy production)	MWh generated/year	Fall HFEs > 96-hr duration	Strong	Negative Effect	High	Bypasses more water	Amount of bypass and its cost can be measured	Evaluate whether extended duration HFEs result in larger and longer-lasting sandbars in critical reaches
Electric generation (energy production)	MWh generated/year	Trout management flows	Weak	No Effect	High	Does not affect the amount of electrical generation (no bypass)		
Electric generation (energy production)	MWh generated/year	Macroinvertebrate production flows	Weak	No Effect	High	Does not affect the amount of electrical generation (no bypass)		
Electric generation (energy production)	MWh generated/year	Humpback chub translocation	Weak	No Effect	High	No effect to power production		
Electric generation (energy production)	MWh generated/year	Mechanical removal of rainbow trout from LCR reach	Weak	No Effect	High	No effect to power production		
Electric generation (energy production)	MWh generated/year	Mechanical removal of invasive fish species	Weak	No Effect	High	No effect to power production		
Electric generation (energy production)	MWh generated/year	Larval humpback chub head-start program	Weak	No Effect	High	No effect to power production		
Electric generation (energy production)	MWh generated/year	Riparian vegetation restoration	Weak	No Effect	High	No effect to power production		
Electric generation (energy value)	Market Price/MWh generated/year	Spring HFEs ≤ 45,000 cfs in March or April	Weak	No Effect	High	Bypass, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
Electric generation (energy value)	Market Price/MWh generated/year	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	No Effect	High	Bypasses less water, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
Electric generation (energy value)	Market Price/MWh generated/year	Fall HFEs ≤ 45,000 cfs in October or November	Weak	No Effect	High	Bypass, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
Electric generation (energy value)	Market Price/MWh generated/year	Fall HFEs > 96-hr duration	Weak	No Effect	High	Bypasses more water, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	Evaluate whether extended duration HFEs result in larger and longer-lasting sandbars in critical reaches
Electric generation (energy value)	Market Price/MWh generated/year	Trout management flows	Unknown	Unknown	Medium	Depends on how TMFs are designed. Could be done in coincidence to power production or could be deleterious to power production.	Depends on how TMFs are designed.	Design TMFs that are increase power value during the prescribed release.
Electric generation (energy value)	Market Price/MWh generated/year	Macroinvertebrate production flows	Weak	Unknown	Medium	Depends on how experiment is designed. Currently, the design would increase weekday capacity which would increase energy value.	Depends on how Bug Flows are designed.	Design Bug Flows that increase power value during the prescribed release.
Electric generation (energy value)	Market Price/MWh generated/year	Humpback chub translocation	Weak	No Effect	High	No effect to power production		
Electric generation (energy value)	Market Price/MWh generated/year	Mechanical removal of rainbow trout from LCR reach	Weak	No Effect	High	No effect to power production		
Electric generation (energy value)	Market Price/MWh generated/year	Mechanical removal of invasive fish species	Weak	No Effect	High	No effect to power production		
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Electric generation (energy value)	Market Price/MWh generated/year	Riparian vegetation restoration	Weak	No Effect	High	No effect to power production		

Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Spring HFEs ≤ 45,000 cfs in March or April	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Fall HFEs ≤ 45,000 cfs in October or November	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Fall HFEs > 96-hr duration	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Trout management flows	Unknown	Unknown	Low	Depends on how TMFs are designed. Could be done in coincidence to power production or could be deleterious to power production.	Depends on how TMFs are designed.	Design TMFs that are increase power value during the prescribed release.
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Macroinvertebrate production flows	Moderate	Positive Effect	High	Depends on how experiment is designed. Currently, the design would increase weekday capacity.	Depends on how Bug Flows are designed.	Design Bug Flows that increase weekday capacity during the prescribed release.
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Humpback chub translocation	Weak	No Effect	High	No effect to power production		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Mechanical removal of rainbow trout from LCR reach	Weak	No Effect	High	No effect to power production		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Mechanical removal of invasive fish species	Weak	No Effect	High	No effect to power production		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Larval humpback chub head-start program	Weak	No Effect	High	No effect to power production		
Electric generation (capacity)	Marketable Mw/peak power month (Jul/Aug)	Mechanical removal of invasive fish species	Weak	No Effect	High	No effect to power production		
Electric generation (capacity)	Capital investment ($) in new powerplant capacity construction	Spring HFEs ≤ 45,000 cfs in March or April	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
Electric generation (capacity)	Capital investment ($) in new powerplant capacity construction	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	No Effect	High	Water is not moved from peak power months to cover HFEs		
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Electric generation (capacity)	Capital investment ($) in new powerplant capacity construction	Macroinvertebrate production flows	Moderate	Positive Effect	High	Depends on how experiment is designed. Currently, the design would increase weekday capacity.	Depends on how Bug Flows are designed.	Design Bug Flows that increase weekday capacity during the prescribed release.
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Load following capability	Annual MW available above/below WAPA customer demand	Spring HFEs ≤ 45,000 cfs in March or April	Moderate	Negative Effect	High	Bypass, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
Load following capability	Annual MW available above/below WAPA customer demand	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	Negative Effect	High	Bypasses less water, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
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Emissions	Changes in emissions to compensate for energy losses resulting from changes in operations at Glen Canyon Dam (tons of CO2, SO2 and NOX emissions/year)	Spring HFEs ≤ 45,000 cfs in March or April	Weak	Negative Effect	Medium	Bypass, moves water to an off-peak power month	Amount of bypass and water moved between months can be measured	
Emissions	Changes in emissions to compensate for energy losses resulting from changes in operations at Glen Canyon Dam (tons of CO2, SO2 and NOX emissions/year)	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	Negative Effect	Medium	Bypasses less water, moves water to an off-peak power month	Amount of bypass and water moved between months can be measured	
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Emissions	Changes in emissions to compensate for energy losses resulting from changes in operations at Glen Canyon Dam (tons of CO2, SO2 and NOX emissions/year)	Macroinvertebrate production flows	Weak	Positive Effect	High	Depends on how experiment is designed. Currently, the design would increase weekday capacity.	Depends on how Bug Flows are designed.	Design Bug Flows that increase weekday capacity during the prescribed release.
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Net firming purchases	$/year (distinguish between hydrology and operational changes)	Spring HFEs ≤ 45,000 cfs in March or April	Moderate	Negative Effect	High	Bypass, moves water to an off-peak power month	Amount of bypass and costs associated with moving water between months can be measured	
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Net firming purchases	$/year (distinguish between hydrology and operational changes)	Mechanical removal of invasive fish species	Weak	No Effect	High	No effect to power production		
Hydro-mechanical equipment	$/year (O/M and replacement)	Spring HFEs ≤ 45,000 cfs in March or April	Weak	Negative Effect	High	Use of the bypass tubes results in accelerated wear of the bypass tube coatings and valves.		
Hydro-mechanical equipment	$/year (O/M and replacement)	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Weak	Negative Effect	High	Use of the bypass tubes results in accelerated wear of the bypass tube coatings and valves.		
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Hydro-mechanical equipment	$/year (O/M and replacement)	Fall HFEs > 96-hr duration	Weak	Negative Effect	High	Use of the bypass tubes results in accelerated wear of the bypass tube coatings and valves.		Evaluate whether extended duration HFEs result in larger and longer-lasting sandbars in critical reaches
Hydro-mechanical equipment	$/year (O/M and replacement)	Trout management flows	Weak	No Effect	High	No anticipated effect to hydro-mechanical equipment beyond	Flows fall within range of normal power operations, would not require bypass	
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