



Decision System™

**IMPACTS ON THE
KLAMATH RIVER BASIN CAUSED BY
REMOVING FOUR DAMS**

A PUBLIC IMPACT ASSESSMENT (PIA)

EZ Decision System™ Report No. 16

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NOTICE

The EZ Decision System™ methodology, including question format, data types, quantitative analysis, and data display, used in this Public Impact Assessment (PIA) is protected by Copyright and will be vigorously enforced.

Executive Summary

This is the first Public Impact Assessment (PIA) ever conducted. It is not sanctioned or influenced by a state government, the federal government, or special interest group.

This report concerns the 240-mile long Klamath River, which is located in southwestern Oregon (Klamath County) and northern California (Siskiyou County). The issue is whether to remove four hydroelectric dams on the main-stem of the Klamath River or leave the dams in place. The government's stated reason for removing the dams is to restore the Klamath River and enhance salmon populations, particularly Coho salmon.

This PIA is not an opinion survey. Nothing in this report involves recommending keeping the dams in place or removing them. Likewise, this report is not meant to provide detailed scientific and technical information. Instead, the report gives the affected public a chance to participate in an assessment of the potential impacts on their environment and community caused by a government decision. It uses local knowledge and experience, as well as the knowledge and experience of people familiar with the river, to make an impartial impact assessment.

The EZ Decision System™ methods and software used in this assessment helped to make strategic business and government decisions throughout the United States. It is equally effective in producing a credible Public Impact Assessment.

The results of this PIA contradict the government's evaluation of minimal impact. Removing four dams on the Klamath River would likely cause catastrophic impacts on the people who live in the Klamath River Basin. It would also cause a severe shock to the ecological system. In short, removing four dams on the Klamath River is estimated to create more problems than it solves.

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Introduction

This is the first Public Impact Assessment (PIA) ever conducted. It is not sanctioned or influenced by a state government, the federal government, or special interest group. It provides an opportunity for an informed public to participate in an impact assessment, which is usually the prerogative of the government. An informed and affected public should have an opportunity to assess the potential impacts of a government decision that affects their lives and property.

This PIA is not an opinion survey. It does not advocate that the government make a particular decision. Likewise, this PIA is not meant to provide detailed scientific and technical information. Instead, the report documents the best estimates of an informed public of the potential impacts on their environment and community caused by a government decision. It uses local knowledge and experience, as well as the knowledge and experience of people familiar with the affected area, to make an impartial impact assessment.

The EZ Decision System™ methods and software used in this assessment helps make strategic business decisions as well as resolving policy issues. This and related software have successfully resolved issues throughout the United States, including the Great Lakes, Wisconsin inland lakes and rivers, Mississippi River, Savanna River, Texas Gulf Coast shoreline erosion and wetlands, endangered Northern Spotted Owl, Southern California wildfires, Flathead National Forest, Great Lakes forests, and NASA and related space industries. This software and the methods it uses are equally effective for producing credible PIAs.

A PIA is based on valuing and trusting local knowledge and experience. Local knowledge, especially from people who earn their living from the land, local business owners, professionals of all kinds, scientists, and average citizens who know an area intimately are an important and often overlooked source of information. These people are usually ignored because they are not sanctioned by the government or universities and, unlike the government, they must live with the consequences of the decisions. Nevertheless, they are valuable sources information that is crucial to making informed and socially responsible decisions (see Table 1 for a list of professions represented by participants in this PIA).

Table 1. Professions represented by respondents to the Klamath River Public Impact Assessment (PIA) questionnaire.

Profession	Profession
Biologist	Hydrologist
Business owner	Mayor
Civil engineer	Medical technician
Concerned citizen	Miner
Contractor	Product development
Councilman	Professional forester
County director	Prospector
County supervisor	Publisher
Ecologist	Rancher
Energy expert	Real estate broker
Farmer	Recreation specialist
Firefighter	Scientist
Fish culturist	Speech-language pathologist
Fisherman	Teacher
General engineer	Telecommunications
Hydroelectric operations	Water quality

ISSUE

This assessment involves the Klamath River, which is located in southwestern Oregon (Klamath County) and northern California (Siskiyou County). The river begins in Upper Klamath Lake in southern Oregon and flows 240 miles from Oregon into northern California before emptying into the Pacific Ocean near Requa, California. The river drains an area of about 12,000 square miles.

The issue is whether to remove four Klamath Hydroelectric Project dams owned by PacifiCorp (J.C. Boyle, Copco 1, Copco 2, and Iron Gate) on the main-stem of the Klamath River or leave the dams in place. The government’s stated reason for removing the dams is to restore the Klamath River and enhance salmon populations, particularly Coho salmon.¹

The National Oceanic and Atmospheric Administration (NOAA) listed Southern Oregon/Northern California coastal Coho as Threatened under the Federal Endangered Species Act (ESA) in 1997. The State of California listed Coho as Threatened under the state ESA in 2004. Unfortunately, Coho salmon may or may not be native to the Klamath River. The answer is in dispute and may never be resolved.

Secretary of the Interior Secretary Ken Salazar in 2010 praised the numerous government-supported studies about the environmental and economic impacts of removing four Klamath River hydroelectric dams – fulfilling, as he states, a major condition of the Klamath Hydroelectric Settlement Agreement (KHSA). This agreement included what the government calls “willing [Klamath River] basin stakeholders.” This statement is an admission that the government only considered people who agreed with their decision to remove the four dams and excluded or ignored those who disagree.

¹ See www.klamathrestoration.gov for further information.

Interior Secretary Salazar has yet to make a final decision, which requires Congressional approval. The governors of California and Oregon also must agree with the decision. The problem Secretary Salazar faces is that the science he praises supporting the removal of the dams is suspect.

Almost everyone in the scientific community knows that government scientists, and scientists who depend on government contracts (which includes some university scientists), have a monetary and professional incentive, and sometimes an ideological incentive, to bias research questions and collect or exclude data given the questions asked.

Not only that, these scientists can travel throughout the United States and around the world at government expense. Not surprisingly, sometimes they analyze data in a way that doesn't contradict the answers desired by the government.

This doesn't mean all scientists are willing to bend the truth for personal gain or that all government workers seek self-serving information. I have known many scientists during my 40 years in science who consider pursuing the truth as more important than their personal prejudice, "a few pieces of silver," or advancing their career. Likewise, I have known many honest government workers who try to do what is right and responsible.

One of those scientists who ultimately suffered the consequences of his honesty and scientific integrity is Dr. Paul R. Houser, an internationally recognized expert in hydrometeorology. Dr. Houser's allegations of scientific and scholarly misconduct involving Klamath River dam removal studies include intentional falsification, among others.

As a result, Dr. Houser was fired as Science Advisor and Scientific Integrity Officer for the Bureau of Reclamation, Washington D.C., because he exposed scientific bias in reports that support the government's decision to remove four dams on the Klamath River. This is a serious breach of the public trust. Science is supposed to aid in making decisions and should not be used as a political weapon to advance particular causes or rationalize decisions.

That is why a Public Impact Assessment (PIA) is so important. It is a counterbalance to government science because it uses the knowledge and experience of the people who are affected by decisions rather than scientists who receive their rewards elsewhere and are insulated from the consequences of their information.

Methods

The EZ Decision System™ is an efficient and easy to understand way to obtain data and analyze the potential impacts of decisions. The first step is to describe the no action alternative, or the *status quo*. This provides the initial conditions or baseline for evaluating change. Those changes represent the potential impacts of one or more decisions that deviate from the *status quo*.

In this case, the *status quo* is the no action alternative, or leaving the four dams in place on the Klamath River. The action alternative is to remove the dams. No other alternatives are assessed in this report.

This assessment used a structured questionnaire that only required respondents to answer two questions using one of five alternatives that addressed 32 criteria for evaluating impacts (Table 2). The criteria were selected from among the many scientific reports and communications associated with this issue. Criteria were limited to 32 so that respondents could answer the questions in a reasonable period. A representative sample of Klamath Basin stakeholders provided thousands of pieces of data for this report.

Table 2. Criteria for assessing the impacts of removing four dams on the Klamath River.

No.	Criteria	No.	Criteria
1	Flooding	17	Steelhead population
2	Stream bank erosion	18	Hatchery fish production
3	Agricultural water deliveries	19	Per capita income
4	Community water deliveries	20	Business investments
5	Wildlife refuge water deliveries	21	Commercial fish harvest
6	Toxic algae blooms	22	Tribal fish harvest
7	River water temperature	23	Real estate values
8	Nitrogen and phosphorous in river	24	Employment
9	Dissolved oxygen in river	25	Farm and ranch income
10	Sediment in river	26	Local business income
11	Abundance of stream bank vegetation	27	Local tax revenue
12	Diversity of river life	28	Tourism revenue
13	Fish die-offs	29	Hydropower to generate electricity
14	Waterfowl population	30	Energy cost from replacing hydropower
15	Chinook population	31	CO2 emissions from replacing hydropower
16	Coho population	32	Sport fish harvest

The first question was “What do you think will be the likely impact on the Klamath River Basin caused by removing four dams?” The second question was “How important is the impact within the Klamath River Basin?” Using flooding as an example, each respondent placed an “X” next to the answer or rating they selected. The “No change” option represents the *status quo* or the impact of the “no action” alternative.

LIKELY IMPACT on flooding.	IMPORTANCE of flooding.
Large Decrease	Not Important
Decrease	Low
No Change	Medium
Increase	High
Large Increase	Very Important

Both the likely impact and the importance questions used a 10 point scale for the ratings. This provided a numerical basis for the assessment. The sum of the “importance” ratings for a criterion was normalized as a percent of the maximum possible value so that different criteria could be compared on the same scale. For example, if all respondents rated flooding as “Very Important” the importance of that criterion would be 100 percent of its maximum possible value. Likewise, if they all rated flooding as “Medium” that criterion would be 50 percent of its maximum possible value.

The “likely impact” is also normalized. However, it is divided into two five point scales. For example, if all respondents said that removing the dams would likely cause a “Large Increase” in flooding, then flooding would increase 100 percent of the maximum possible value above the *status quo*. On the other hand, if respondents all agreed that removing the dams would likely cause a “Large Decrease” in flooding then flooding would decline 100 percent of the maximum possible value below the *status quo*. That means flooding would cease.

In addition, if all respondents agreed that the likely impact caused by removing the four dams was “No Change” for all 32 criteria then removing the dams would have no effect on the Klamath Basin. In short, it wouldn’t matter if the dams were removed or not. On the other hand, if the absolute difference in the percent of the maximum change is greater than zero then there is an impact. The greater the percent difference the greater the impact.

In addition, the importance rating for each criterion can be used to weigh an impact, the greater the importance rating the greater the impact. Finally, the direction of change also is important. If the direction of the impact, increase or decrease, is considered undesirable then it can be used to measure the “perceived” impact.

This method considers “No Change” for all 32 criteria, or no impact, as more desirable than any change that occurs in an unwanted direction. However, if the changes are wanted then the impact would be more acceptable than the *status quo*. In short, a zero impact is acceptable, a positive impact is desirable, and a negative impact is undesirable. The size of the difference in the percentage of maximum change (1 to 100%) indicates the magnitude of the benefits of taking action or, if the difference is negative (-1 to -100%), it indicates the magnitude of the adverse consequences of taking action.

Results

The criteria as assessed by respondents show that the Coho salmon population, which is ostensibly the main reason for removing the dams, ranks lowest in importance (Figure 1). This could reflect the disputed claim that Coho are an introduced species that is not native to the Klamath River. Even so, respondents still care enough to rate the importance of Coho salmon at 61.7 percent of the maximum possible. Respondents rate commercial fish harvest, Chinook, Steelhead, waterfowl, and the diversity of river life as intermediate in importance, all above 70 percent of the maximum possible. Therefore, they share the wider public’s concern about wildlife and fisheries.

However, people who live in the Klamath River Basin don’t have the luxury of living hundreds of miles away in the San Francisco Bay Area, and elsewhere in the country, where residents are removed from the economic impacts of destroying four dams that are the source of their hydroelectric or “green” energy. They certainly don’t want to pay more for energy nor do they want to rely on fossil fuels that cause greenhouse gas emissions, especially CO2.

Therefore, respondents rated energy costs, agricultural water deliveries, hydropower, employment, local business income, farm and ranch income, per capita income, community water deliveries, and local tax revenue all over 90 percent of the maximum possible in importance. Almost as important is their concern about flooding if the dams are removed (89 percent of the maximum possible).

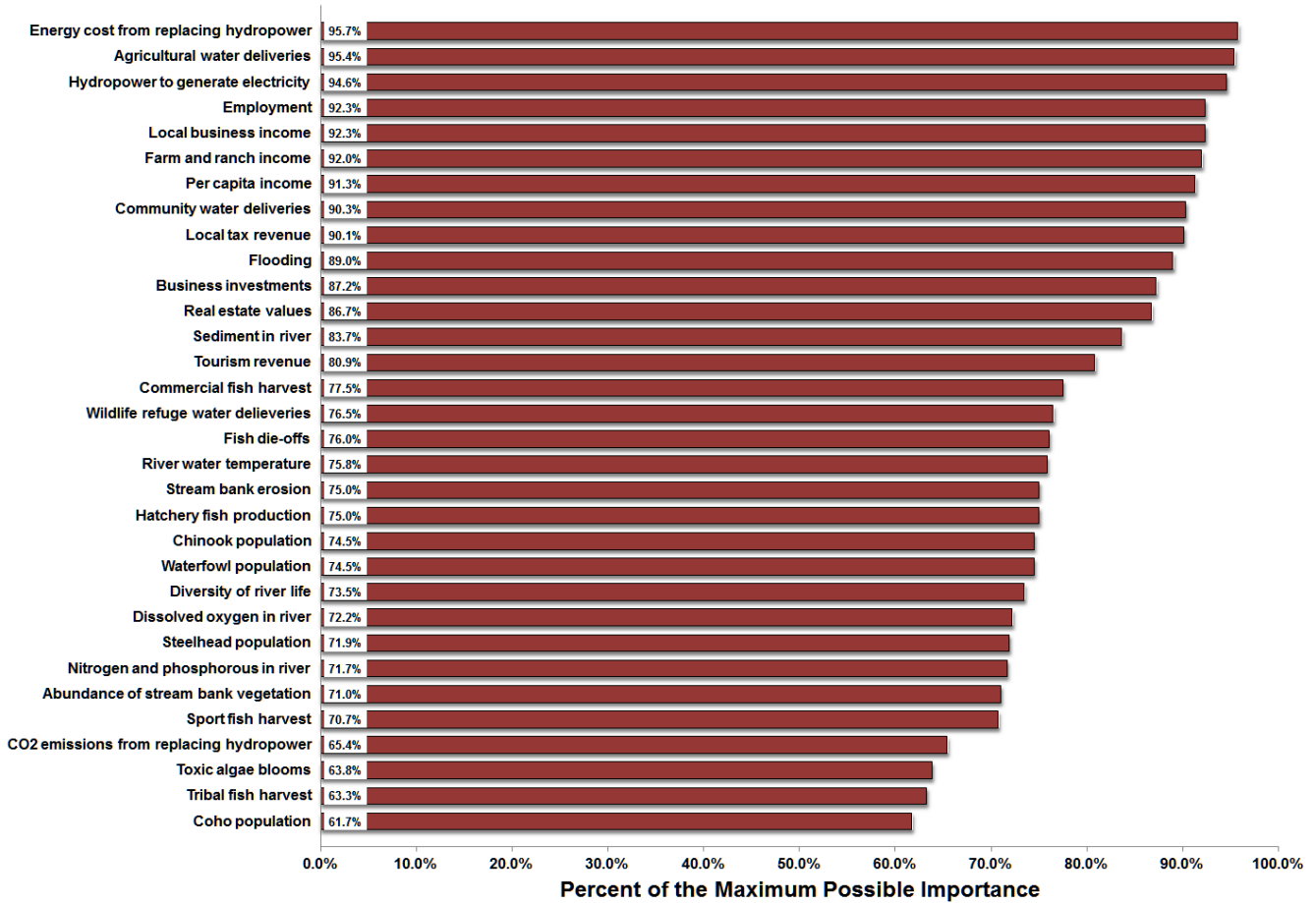


Figure 1. Ranked importance of criteria as rated by respondents.

Figure 2 shows the estimated impact of removing four dams, compared to leaving the dams in place. It shows that respondents estimate that the cost of replacing hydropower with fossil fuels, flooding, stream bank erosion, and sediment in the river will likely increase more than 70 percent of the maximum possible. All of which are undesirable changes.

In addition, Figure 2 shows that respondents estimate that hydropower to generate electricity will be gone, and that per capita income, real estate values, local business income, employment, local tax revenues, and farm and ranch income will decline in the Klamath River Basin by more that 70 percent of the maximum possible. Respondents also estimate that Coho, Chinook, and Steelhead populations will decline by more than 40 percent of the maximum possible. Again, these are not wanted consequences of removing the four dams.

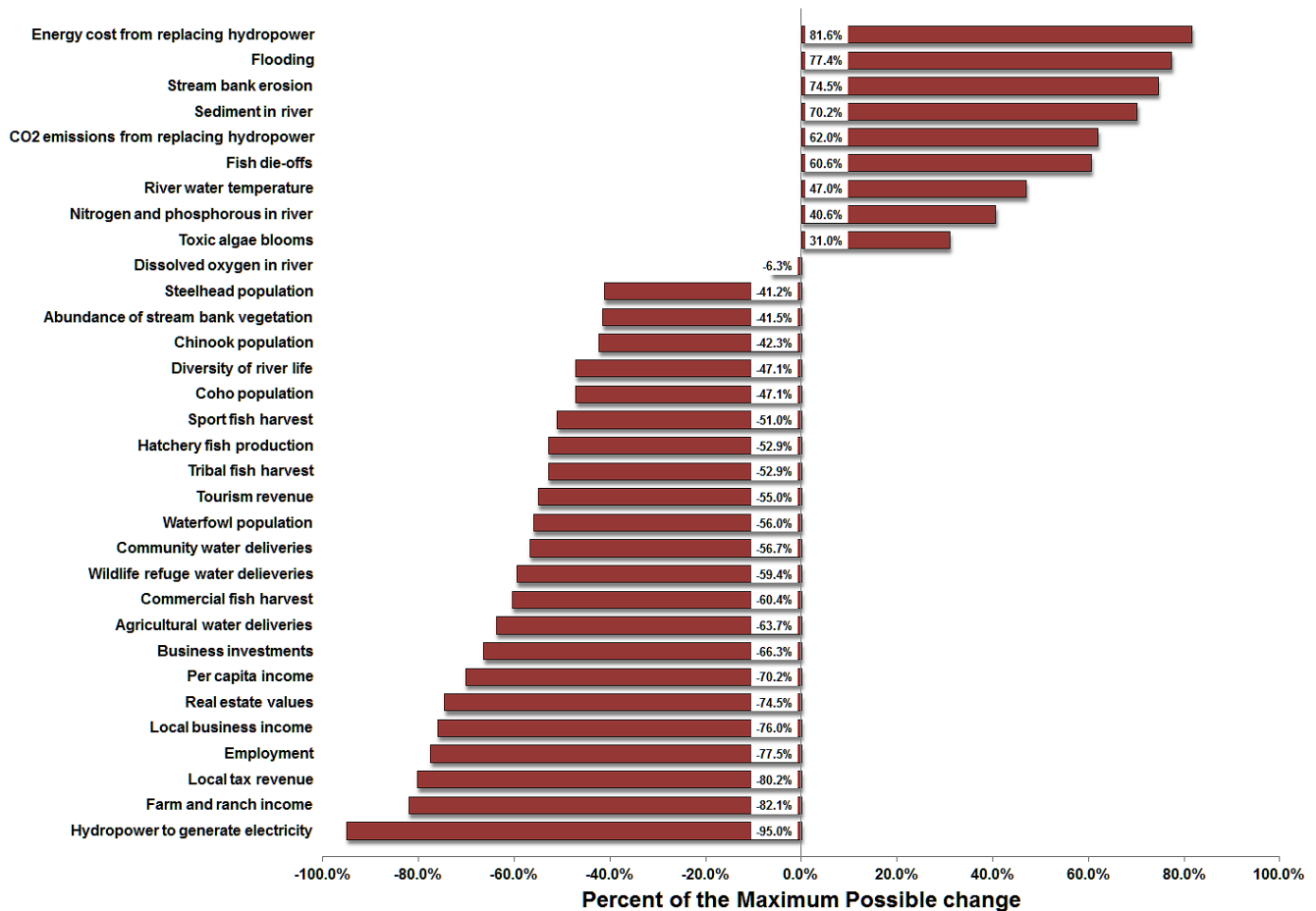


Figure 2. Ranked impacts of removing four dams on the Klamath River as estimated by respondents.

Weighting estimated impacts on each criterion by importance, and considering what are wanted and unwanted impacts, show that the perceived impacts of removing four dams on the Klamath River are universally undesirable.

Not everyone will agree with what is a desirable or an undesirable impact. Fringe groups may prefer using fossil fuels as a substitute for green hydroelectric power. Such groups may also prefer that farmers and ranchers leave the Klamath River Basin so that it can be returned to nature. However, this

report represents the knowledge, experience, and desires of local people rather than those who don't have to live with the consequences of a government decision.

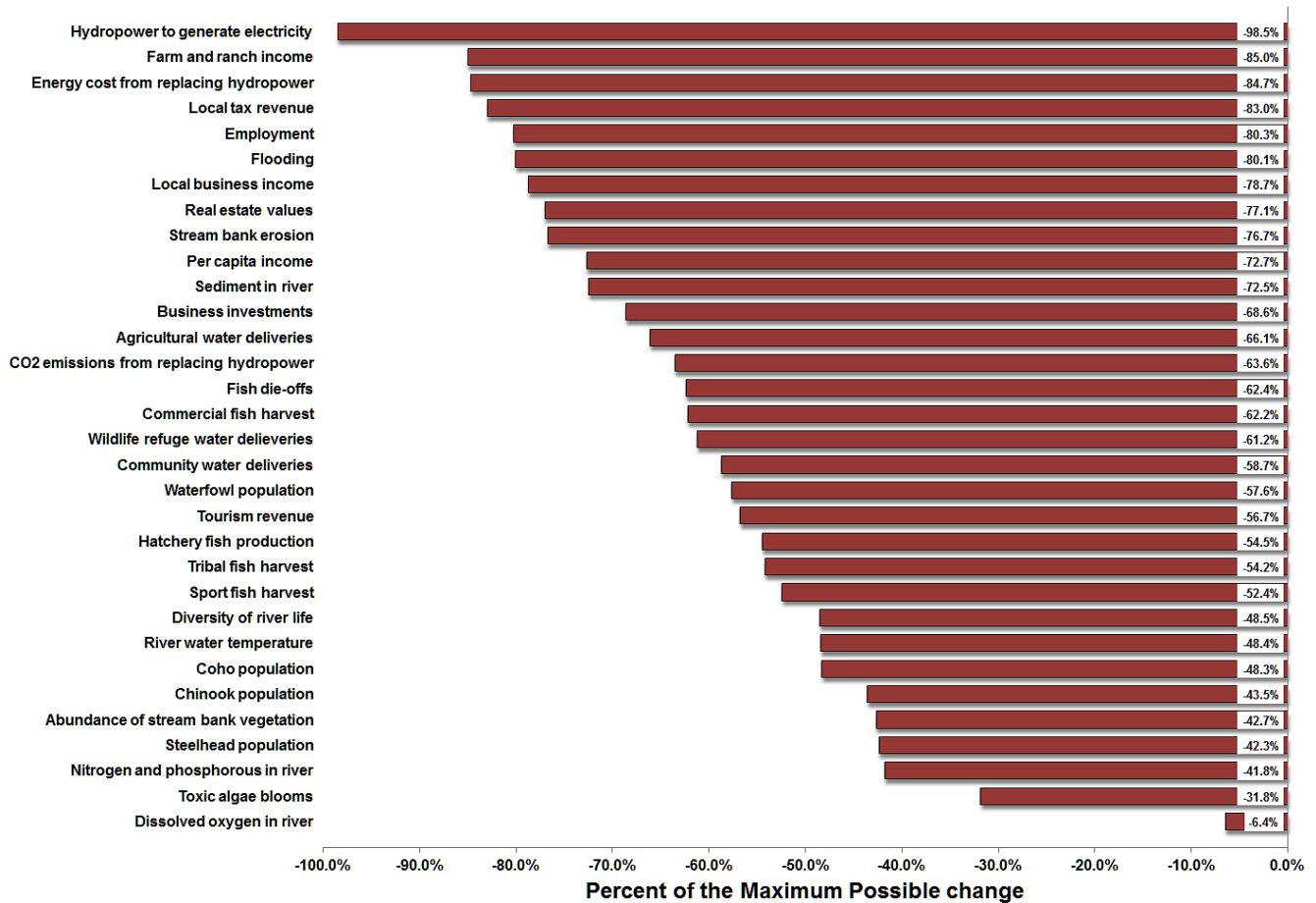


Figure 3. Ranked perceived impacts of removing four dams on the Klamath River as estimated by respondents.

Figure 3 shows that that perceived adverse impacts on hydropower, farm and ranch income, energy costs, local tax revenue, employment, flooding, local business income, real estate values, stream bank erosion, and per capita income are at the forefront of concerns of local residents about removing four dams on the Klamath River. The government has said nothing to indicate they have plans to alleviate or mitigate these impacts or address these concerns.

Conclusion

The results of this Public Impact Assessment (PIA) contradict the government’s evaluation of minimal impact. Table 3 summarizes the final results of this assessment. As pointed out in the methods section, a zero impact is the *status quo*, or no impact. It is only desirable if nothing can be done to enhance the things people care about.

The absolute impact is not weighted by importance. It just uses the percent of the possible as a measure of the difference between the no action and action alternatives. The weighted impact shows the importance of the difference. The perceived impact shows the desirability of the difference. A positive perceived impact indicates that the action alternative is preferable to no action and a negative perceived impact indicates that the action alternative will produce unwanted and undesirable effects. In all three cases, the size of the difference is a measure of the magnitude of the impact.

Table 3. Relative impacts of leaving four dams in place and removing the dams.

Alternative	Absolute Impact* (% of Max.)	Weighted Impact** (% of Max.)	Perceived Impact*** (% of Max.)
Leaving four dams in place (baseline, no action)	0	0	0
Removing four dams (action)	59.4	61.3	-61.3

* Absolute impact (deviation from the *status quo* or leaving the four dams in place; the no action alternative).

** Weighted impact (deviation from the *status quo* weighted by importance of criteria).

*** Perceived impact (weighted impact assessed by the desirability of the impact relative to the *status quo*).

Respondents estimate that removing four dams on the Klamath River will cause impacts that represent a 59.4 percent of the maximum possible change from the *status quo*. When criteria are weighted by importance, this represents a 61.3 percent of the maximum possible change. More important is that all the criteria are estimated to change in an undesirable direction. That means that removing the four dams will cause an undesirable impact of -61.3 percent of the maximum possible.

Removing four dams on the Klamath River would likely cause catastrophic impacts on the people who live in the Klamath River Basin. It would also cause a severe shock to the ecological system. In short, removing four dams on the Klamath River is estimated to create more problems than it solves.