

July 9, 2009

The Honorable Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 – 1st Street, N.E.  
Washington, DC 20426-0001

*filed electronically*

Ref: P-606-027-CA, Kilarc-Cow Creek Hydroelectric Project  
Application for Surrender of License by Licensee Pacific Gas and Electric Company

Re: Certificate of Service of MOTION TO INTERVENE and Supplement to  
COMMENTS and RECOMMENDATIONS for TERMS AND CONDITIONS  
for Kilarc Development reflecting Alternative to Facility Dismantling


Dear Ms. Bose:

KC LLC (dba KC Hydro, and supported by Davis Hydro LLC) filed its Motion to Intervene and associated documentation, including a June 2009 paper by Davis Hydro entitled “The Kilarc Steelhead Project, An Alternative To the Demolition of the Kilarc Hydropower Project (An Alternative Surrender Path addressing the Kilarc (Old Cow Creek) Portion of PG&E’s FERC P-606, Kilarc – Cow Creek Project)” that was assigned FERC Accession Number 20090619-5008.

Attached hereto is the Davis Hydro Working Paper K-4, Project Scope and Studies, providing a discussion of the scope of studies necessary for determining the preferable alternative for the Kilarc hydroelectric facilities. These documents, that incorporate by reference all filings made since the license surrender process was formally initiated in February 2007, are submitted for consideration as part of the FERC’s environmental analysis under NEPA.

Both documents are being forwarded today to the FERC service list and additional parties, as identified in the enclosed documents, via e-mail or U.S. mail, respectively.

Sincerely,

  
Kelly W. Sackheim, Principal  
KC Hydro

Attachments  
Enclosures

# Project Scope and Studies

## Davis Hydro Working Paper

K - 4

July 12<sup>th</sup> 2009

A discussion of the scope of studies necessary for determining the preferable alternative for the Kilarc hydroelectric facilities near Whitmore, California.

July 12<sup>th</sup> 2009

Davis California  
Davis Hydro

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## Project Scope and Studies

For Recommissioning FERC Project 606

### Summary

The National Marine Fisheries Service has suggested that evaluating the alternatives for decommissioning FERC Project 606 requires extensive study. Since several alternatives are possible, these all need to be studied. In this paper we focus only on the Kilarc part of the Kilarc-Cow Creek hydropower facility. The question at hand is the correct project scope for alternative evaluation and which studies might be appropriate.

This paper shows that the community, environmental, and social concerns of the project extend far beyond the bypass region of the Old Cow. The actions of humans on the environment will also have a significant continuing effect. As examples, people recreating, fishing, or using power will continue to do so but elsewhere, placing new burdens on the environment. Fishing in the Kilarc reservoir will be moved downstream into the salmon and steelhead habitats with predictable consequences. People will use the same electricity, but less green, have to pump water using more electricity, and over time suffer an increase in fires from loss of the protection from the Kilarc Reservoir.

If more fish are produced in the bypass, the increase will have to be balanced against the loss of fish from the downstream habitats, due to warmer water resulting from the loss of the hydropower facility. Because of the difficulty of upstream migration, and the prevalence of a large resident eco-type population upstream, the population of any steelhead produced in the Kilarc bypass will genetically be overwhelmingly of a resident eco-type. The emission of these fish downstream will put pressure on any downstream anadromous eco-types, thus interfering with steelhead restoration. These substitution and competitive effects extend the scope further than the narrow scope of the Old Cow bypass area. The negative effects of increasing fish production include not only the direct effects on the fish, but the indirect effects on downstream fish habitats and populations, and the indirect effects of closing a recreational facility that is currently providing recreational and environmental services.

The environmental effects start locally with the delivery of cold water from the headrace to large Salmon and steelhead habitats. The facility provides renewable power to California. Since every renewable project possible is being developed due to the favorable political conditions, the loss of this facility will cause continuing construction of fossil generation in California, causing environmental damage wherever the winds take the pollution and emissions from the power plants. As one example, this will incrementally affect steelhead across the Midwest, and the same species across Europe and Asia. While the effects on any one fish will be infinitesimal, the geographical impacts across the whole of planetary fish habitat is exacerbated by the effect of this environmental insult across all species. These effects, even if confined to endangered species, are potentially very large and will extend for many years, as we are discovering in the context of global warming.

Finally, one has to consider that the local transient effects of the destruction of these facilities are added to similar widespread, multi-species, and long term environmental effects of constructed replacement facilities. For example, if this plant is replaced with another hydro project, the environmental effects of the replacement plant have to be included when calculating the environmental burden of removing this project. This transient effect is not confined to the generation industry, since through economic multipliers the loss of the facilities and recreation will cause economic and environmental damage throughout the economy through economic multipliers. While it is appropriate to look at the fish in the by-passed section of the Old Cow, the real effects of the demolition and reconstruction of replacement power sources are widespread, and will have long-term effects on many thousands of fish and millions of other species.

## ***Introduction***

Davis Hydro is committed to a fruitful synergy between small hydro and environmental and fish enhancement. This paper is intended to foster discussion of the scope of studies that might be useful to evaluate the best balance at the Kilarc Hydro site. Davis Hydro is working to acquire a new FERC license that would permit the continued operation of the Kilarc powerhouse and provide operation and maintenance services for the fish production facilities. Other interested parties see conflict between small hydro and the fish enhancement at this facility, as occurs at some other hydro facilities. Davis Hydro suggests, however, that this facility can be rebuilt and operated in a manner that will produce hydropower while also enhancing fish and the environment generally.

We discuss below the environmental impact of various alternatives, and suggest a set of studies to flesh out a more complete environmental analysis. The reader will note immediately the contrast between the suggested scope of analysis below and what has been undertaken in the past at this site. The unique aspect of the arguments that follow is not the position that “natural conditions” are always best, but rather that natural conditions must include the full spectrum of effects that are changed by a project. One of the unique thrusts of the broader scope of our analysis is that the major effects may be widespread, if not global, and should be evaluated on that basis.

## ***Exemplar Species***

To simplify and shorten the discussion, we will usually use only one target animal as an analog for its entire ecosystem and the myriad of species that constitute that ecosystem. For example, we will discuss “fish”; however, except in the particular case of steelhead trout, we will not look at all fish or residents of their surrounding ecosystem and related wider ecosystems. Fish are clearly not the only species affected by these investigations, but they are chosen as the focus for four reasons.

First, the Sacramento steelhead (*Oncorhynchus mykiss*) is potentially a listed species under State and Federal Endangered Species Legislation as a Distinct Population Segment and therefore

deserves special attention. Second, if we can maximize the contribution to fish conservation and restoration efforts, other environmental concerns will probably be met. As seen by Davis Hydro and concerned agencies alike, fish – specifically steelhead trout - constitute the largest opportunity for environmental improvement by facility modification or removal. Third, fish more generally are the center of the recreational resource in the area; they provide recreation<sup>1</sup>, income, and perhaps the best handicapped recreational experience in California. Fourth, it was a tenant of the prior agreement to remove the facilities that operational changes to accommodate fish water releases would make the project more uneconomical for PG&E to operate.

Therefore, while there may be other species and environmental effects of concern outside the fish food chain, for brevity, we will use fish here to focus discussion on the affected areas in a general sense. Administratively, we assume that local landowners are the smallest political entity – they are concerned about their resources. Town groups are concerned about regional effects. State level offices and state level interveners are concerned about the state level effects of their decisions, and federal agencies are concerned about national and global effects. The next part of this paper looks at the geographical effects.

## **Geography**

At Kilarc, the project is at first glance a simple choice between returning summer low water to a historic water channel and a more artificial fish spawning program put forth by Davis Hydro. This looks like a local project with alternatives that, among other issues, may produce more fish in one way or another. If this were a local issue of producing steelhead where none exist now, no agent from beyond Shasta County would have standing at the table. Clearly this is not the case, so just as interveners and agencies come from beyond the horizon for reasons of State and National impacts, we must consider the implications of the local action of facility removal with similar geographic and temporal scope.

This project is not a simple choice of differential habitats; it is also a choice of the effects of destroying this green power source and constructing and operating its replacement. With this in mind, we suggest a larger scope is appropriate to the impacts of this decision. By all accounts, efforts are being made to increase renewable energy as fast as possible in this state and nation, so destroying this existing renewable energy source will have local as well as global effects. These effects are not only in the creation and destruction of the energy generation facilities but also in the fuels consumed and pollution engendered for as long as fossil energy is still used for power generation. The benefit and detriment of any effects extend far beyond the local project boundaries. It is the global and national scope that franchises the entry of the National Oceanographic and Atmospheric Administration into a local decision. It is national impact on wildlife that gives credence the concerns of the United States Fish and Wild Life Service, and likewise California Fish and Game, our representative for California. Likewise, other interveners are not as interested in the local effects of a decision in Whitmore, but as exemplars and incremental determinants of their broader environmental and fish concerns. Failure to consider these wider effects makes light of the State, national and global mandates and reduces a project evaluation to the worst form of stakeholder and agency NIMBYism.

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<sup>1</sup> PG&E's FERC filing cites 11,000 recreation visitor days last year.

FERC itself is a national agency, charged with balancing power and environmental concerns. FERC's authority is derived from the Federal Power Act that was in turn derived from the Interstate Commerce Act, which recognized the national – if not global - impacts of local decisions. FERC itself, with its national agenda, recently was eclipsed in the environmental evaluation process, because it had historically made many local decisions that were not conscious of the breadth of the environmental impacts. These decisions led congress to create mandatory 4(e) and other conditions by environmental agencies. These agency conditions now govern the environmental review of FERC projects by agencies that take a wider and stronger view of their more global concern. Thus, just as for this scoping discussion we suggest that exemplar species be used where warranted, here we suggest that wider geographic effects be considered at the onset in the evaluation.

### ***Local Environmental Impacts***

**Community Services:** The community of Whitmore is bound to the site by the services that the Kilarc project provides. Demolition of the Kilarc facility will entail considerable expenditure of fossil energy adding to the local environmental load in several ways. For many years the streams will suffer increased runoff and silt intrusion into the downstream spawning beds when facilities and roads are removed. The siltation will be complimented with a decrease in forest dwelling insects used for food by fish. These effects are directly on the stream environment that is the major subject of discussion.

Scoping Question: What will be the annual fish loss due to the impacts on water quality and siltation from demolishing the project?

**Fire:** The forebay is a high water source immediately adjacent to the community of Whitmore. The altitude and proximity of the Kilarc reservoir provides protection not only to the town, but for a wide reach north and south covering much of the Old Cow and South Cow. To remove this facility condemns the area to a slight increase in the frequency and extent of fires. Each fire will cause years of toxic discharge into the streams that are of concern for the fish. The increased toxic runoff will affect all fish habitat downstream.

Scoping Question: In a probabilistic sense what will be the annual fish loss down the whole Cow due to the long-term fire water quality and siltation impacts from decommissioning the project?

The increased number of fires will reduce the cover over the streams leading to a statistical increase in water temperature for years after each fire. The primary determinant of habitat in the Cow Creek area is water temperature. While this effect may be small, it is unlikely to be zero. For example, about 4/5ths of the headrace, and a similar amount of the bypass is protected by the terminal foliage of over a 100 years of growth. Removing significant parts of this cover by occasional fire (not to mention a change in the water regimen) will have a statistical effect on downstream water temperature – especially in the summer.

Scoping Question: Since large areas of downstream prime fish habitat are limited by temperature, what statistical effect will an increase in fire denuded lands cause to the fish trying to survive in the area?

**Water Supply:** The community has grown up with the water leaking from the forebay. At least one house, without question, gets its water from the headrace/forebay leakage (the Todd Wroe house). There may be others that are at least partially affected. Assuming the project is demolished, some water supply currently gravity-fed will need to be pumped, with pumping costs and consequential degradation from the effects of the energy use. In normal houses using wells up to 30% of household energy is used for water pumping. Without question, Mr. Wroe and possibly others can get water to their house by pumping it, but this new load on the system will be fossil energy, and have other larger effects discussed below.

Scoping Question: What will be the incremental increase in aggregate generation pollution from the makeup power for water pumping, and how will it impact fish and other species?

## ***Fish***

### **Fish increase from increasing water in the bypass**

Removing the Kilarc facility will allow more water to flow down the bypass channel with the effect being most noticeable in the summer and early fall. This may increase the annual habitat and thereby increase fish in this area. Since the public has almost no access to the area, the bypass region serves as habitat and a source of fish to potentially migrate downstream. Factors that would modulate the value of the habitat for this purpose include:

- V-shaped valley: the bypass channel over much of its length is highly incised into the pyroclastic outflows and increasing the flow will have only a small net effect on habitat.
- Channel composition: most of the material in the bypass beds is locally eroded angular fines and gravels from the immediate walls over a boulder and barren rock bottom, compromising the value of habitat substrate and matrix composition.
- Velocities: As a result of the large elevated rain catchment area and the small channel, the bypass reach is subject to common high flooding events that removes most usable gravels and destroys any existing populations or redds.

Scoping Question: What increase in fish production numbers would be observed as the result of putting the diverted water back into the bypass? This is essentially the question asked repeatedly by NMFS for this area.



## **Type of fish that would populate the bypass**

The local source of fish for the bypass is upstream of the project where a resident population of fish exists. These fish are completely adapted<sup>2</sup> to residency since no significant upstream migration is possible. Thus, it might be concluded that the only fish produced from this breeding stock would be rainbow trout adapted to residency. This would not change with the increased flow since the first major barrier is below the project, and the second (of many) is within the bypass. The only upward migration possible would be during the rare flood events. When a few individuals do make it upstream, they would be genetically overwhelmed by the existing healthy upstream population that is adapted to residency.

Scoping Question: Do the physical barriers of this stream favor long term resident or anadromous fish production?

Scoping Question: What would be the expected composition of the fish (anadromous or non-anadromous) passing downstream from an augmented flow in the bypass?

Davis Hydro has proposed to turn the headrace into an actively managed fish spawning ground. Selected anadromous fish would be used to inseminate the upper and lower areas of the bypass section because these areas provide the best juvenile habitat areas.

Scoping Question: Addressing the Davis Hydro alternative, if all stock used in the Davis Hydro headrace insemination are from known migratory stock, would the resulting juveniles likely have migratory or non-migratory predilections?

## **Effects of cold water**

The current hydropower arrangement and dispatch takes cold water from an altitude of about 4,000 feet and releases it downstream about 1,700 feet lower, thereby lowering the temperature of the habitat for steelhead and endangered salmon downstream. This practice slightly cools the very large spawning and juvenile habitat for steelhead and salmon of the Cow Creek down to the Sacramento River. The use of this fish habitat is limited by the high temperatures seen in summer<sup>3</sup>. If the summer cool water flows in the Kilarc facility were removed, the temperature would rise slightly in the Cow and fewer fish would survive.

Scoping Question: What are the consequences for the number of target fish emitted from this area fish including both steelhead and endangered salmon species?

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<sup>2</sup> The use of the word “adapted” or “adapted to residency” refers to the hypothesized differential predilection to migrate or exhibit anadromous tendencies.

<sup>3</sup> See Thompson, L. L. Forero, *et al* Impact of environmental factors on fish distribution assessed in rangeland stream, California Ag. 60(4) October-December 2006.  
[http://kilarc.info/Docs\\_Maps\\_Drawings/Documents/KC0090%20Lisa%20Thompson\\_Paper\\_Impact%20on%20Fish.pdf](http://kilarc.info/Docs_Maps_Drawings/Documents/KC0090%20Lisa%20Thompson_Paper_Impact%20on%20Fish.pdf)

The Davis Hydro Alternative plan will use profits from the site operation to facilitate diversion improvements, fencing, and similar works in the area. This work will be under the direction of a non-profit trust that will have as its objective the protection and enhancement of fish in the area.

Scoping Question: Based on fish habitat estimates contained in proposals made by the Western Shasta Resource Conservation District, and from experience in the area, what would be the expected fish protection provided assuming a budget of \$50,000-\$100,000 per year and assistance with monitoring and maintenance from hydro operation personnel?

## ***Regional Effects – Cow Creek and Down the Sacramento***

### **Recreation substitution**

Currently, the Kilarc forebay is heavily used for fishing. Because of the geometry of the hydropower facilities, this fishing has no detrimental effect on downstream fish habitat, and no known effect on downstream populations as the fish are contained within the forebay and to some extent the headrace. If this facility were removed, the fishermen would migrate to streams where there are fish connected with the population that we are trying to restore. There would be increased fishing pressure on downstream fish and particularly on migratory fish that are the very targets of the current restoration efforts under discussion.

In some cases, the substituted fish are in catch and release areas. This rule is often overlooked in the prevalent private lands, and the effects on the target fish population will be real and negative. Estimates of illicit catch and release fish being kept can be made. Increased fishing pressure in wild, possibly migrating, populations will cause a negative effect on the net potential migratory population.

Scoping Question: Given usage at the Kilarc reservoir, what will be the statistical effect on the migrating and resident populations of moving these fishermen to other trout locations.

A secondary recreation effect would be increased travel: The loci of fishing recreation are highly dependent on distance and access difficulty. Removing this recreational opportunity and pushing fishermen to drive further will incrementally increase driving and polluting emissions from automobiles. These gaseous emissions will, to a small extent, increase atmospheric acid rains and decrease fish population over a very wide area. Since a percentage of the affected fish (and other animals) will be of interest, the impact of this environmental destruction should be included in the calculation.

Scoping Issue: The change in driving by fishermen and others using the recreation at the Kilarc facility will have a minute, but significant environmental effect on fish not only in the northern California environment, but through the acid rains that carry across the county incrementally impacting fish and other species.

**Population Effects:** Upstream of the project are resident adapted<sup>2</sup> rainbow. These fish release fry downstream, some of whom might take up residence in the Old Cow and produce more residence-adapted fish. If the conditions were improved in the summer by removing the summer hydropower diversion, more of these residence adapted fish would be produced. Thus, the major effect of removing the hydropower facility might be to produce more fish in and from the bypass, but these fish would be resident-adapted and contribute nothing to anadromy.

Due to barriers in the Old Cow, no steelhead has ever been recorded above or below the project. Since any upstream migration would only be under severe flood conditions, the amount of non-anadromous predisposed fish will be overwhelmed by the resident adapted fish coming downstream. Thus, injecting large numbers of residence-adapted rainbow from the bypass region into the limited downstream habitats of the Cow and Sacramento may not contribute positively to anadromy of the area. The effects of the analysis of the injection of non-anadromous fish into a limited habitat will be to limit food, cover and other habitat features to potential migrants.

Scoping Question: Using a dynamic model, what will be the long term population impacts on the Sacramento River steelhead of increasing the emission of resident-adapted trout from a creek that is rarely accessible to upstream migrants?

## ***Northern California***

### **Short term impact**

The demolition of the Kilarc Facility will have another effect far beyond the silt and water quality impacts in the local creeks and Sacramento River. The renewable power will have to be replaced by power plant expansion or construction that will have environmental impacts that may be estimated as more extensive than the demolition of the Kilarc facility. Since the creation of the replacement power is a direct result of the elimination of the Kilarc power, these transient environmental effects have to be included in the additive calculus of the demolition of the Kilarc facility.

### **The environmental multiplier**

The footprints of the effects of both the demolition of the facility and construction of the replacement facility are not confined to their local sites and their downstream impact zones. Leontief type analysis shows that every dollar spent on construction has a stimulus effect through its supply chains that produces an overall change in economic activity about 2.5 times greater than the effect of the local economic activity<sup>4</sup>.

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<sup>4</sup> At the current time, California and the nation have extensive efforts in place and expanding to create renewable energy. Since this activity is underway and at capacity for any economics comparable to those of the Kilarc, and make-up power will require the multipliers used in the fossil plant construction industry. Because this is a mature industry, these multipliers will be smaller than if the replacement generation were renewable which requires far greater industrial activity per kWh generated.

For example, the demolition or construction will need heavy construction equipment. The factory that builds this equipment has an environmental impact as production incrementally changes. The mines and factories that supply the parts will have an impact and all the change in activity by suppliers will have impacts on both the economy and the environment. The production of heavy machinery is not environmentally friendly, yet will occur if the site is destroyed. In summary, a simplified calculation of impacts from the transient effects of the Kilarc demolition has to include at a minimum:

- the direct local transient impacts of the demolition,
- the direct impacts of the construction of the replacement power facilities, and
- the tiny but ubiquitous indirect environmental impacts across the global economy from the change in construction and demolition activity.

It is probable that the local environmental impacts will be dwarfed by the incremental effects of the construction replacement impacts as this activity arcs through the economy. These impacts are directly in the portfolio of state and national agencies and the concern of any environmental organization.

Scoping Issue: The required study of the transient effects should include all incremental effects of the alternatives.

#### **Long term effects: loss of green generation**

- Northeastern California has a large number of fertile, small, clean lakes unencumbered by much fishing pressure. These lakes are characterized by cold water, poor buffering, and good numbers of fish. The impact of the fossil-power generation emissions from alternative power on rivers and streams that are poorly buffered is amplified by the large stocks of fish often found in them. Specifically, if a balanced eco-system is close to its saturation in carrying capacity of a particular species, very small changes in the environment will have a significant effect on the numbers of the species present. So even though the change in pH from the fossil fuel generation emissions will be a small increase in acidity, this minute change will affect the number of fish in these populations by a proportionately much larger amount. When added across the state or larger region, the numbers affected could be huge. (This is identical to the incremental thermal contributions to global warming of many thousand of sources.)

Because of the sensitivity of trout to pH and other fossil fuel generated pollutants, this downwind effect may be significant at the state level.

The research question is: on a state level, what will be the estimated number of fish affected by the heat and acidification caused by the increased pollution due to the demolition of this green energy source, when integrated over all the affected fish areas in California?

## **National Effects**

To extend the analysis of the destruction of this green power source further, the fossil replacement generation will blow across much of North America, increasing the temperatures and decreasing pH across the vast areas of North America where fish proliferate, such as the steelhead around the Great Lakes. This species has adapted to the Great Lakes to engender a river/lake-return pattern rather than a river/sea-return pattern, but it is the same species. The tiny incremental effects from fossil generation will sweep across this whole area with the prevailing winds incrementally decreasing the habitat for steelhead there. While the effect on any one fish, or any body of water, will be minute, the overall effect when multiplied by the numbers of steelhead, salmon, and other target fish involved may be large.

A scoping question here, as in global warming, is the effect on all fish, endangered and non-endangered alike.

All salmon and steelhead would be affected by a minute amount from this decision and by other similar “small,” “local” decisions. Global warming from delayed conversion to renewable energy sources is destroying salmon and steelhead habitat around the globe far faster than any actions on the Kilarc. The removal of this green source of energy accelerates this destruction. Failure of an actor to view these questions globally is a disregard of our State, national, and global responsibilities. We are confident that the FERC and related agents are not bound by the vertebrate-only ESA criteria in this evaluation, but are charged not only with the environment of Whitmore and this vertebrate species, but all similar situations and species that are under duress from the excesses of man’s destruction and industry.

## **Planet-Wide Effects**

*“If habitat and other conversion and other destructive activities continue at their present rates, half the species of plants and animals on Earth could either be gone or at least for early extinction by the end of the century.” A full quarter will drop to this level as a result of climate change alone. The ongoing extinction rate is calculated in the most conservative estimates to be a hundred times that prevailing before humans appeared on Earth and is expected to rise to at least a thousand times greater or more in the next few decades.<sup>5</sup>”*

The Kilarc preservation question goes far beyond Whitmore. The same fish species, *O. mykiss*, is present and expresses the same ecotropic behavior across Europe and northern Asia. Over a wider geographic span the same species is not driven to the same behavior, and is known simply as rainbow trout. This analysis is really of the actions typical of those engendering the general destruction of the species through global warming. Decisions against green power, such as those before us now, speed or retard the thermal destruction of most of our cold water species.

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<sup>5</sup> Wilson, E. O., *The creation: A call for help and an invitation to visit the embattled natural world in the company of a biologist*. W. W. Norton, New York 2006

Davis Hydro understands that the State and Federal Government are considering listing the steelhead as an endangered species - as a Discrete Population Segment. It may be endangered. There may be some local adaptation – some local genetic allele that makes the Sacramento River steelhead different from all other steelhead. Since any population that is geographically isolated will suffer a genetic drift, the resident rainbow will change slightly over time. As a consequence, in those rainbow that choose to migrate to sea and return to the Northern Sacramento, it is probable that there are differences between the resulting Sacramento River steelhead and other steelhead. There are many many other steelhead. There are steelhead all up the Pacific Coast and in the Midwest. In England, they are called sea trout, and exist extensively as the same species on the Asian continent<sup>6</sup>. The lake-river, as in Ohio<sup>7</sup>, or sea-river, behavior that gives them the name steelhead is superfluous and suggests that this behavior is differentiable from the same behavior in thousands of other populations of the same species. The ecotropic migration is a common feature of all these fish, and cannot in itself be used to separate one group of *O. mykiss* from another. This being the case, the question of preserving Sacramento steelhead behavior reduces to a balance of questionable species preservation against the contribution to widespread non-ESA species destruction that we are party to through the alternative.

## Are Sacramento Steelhead a Distinct Population Segment?

Three elements are considered in a decision regarding the status of a possible Distinct Population Segment (DPS) as endangered or threatened under the Endangered Species Act<sup>8</sup>. *We have placed the Service's text in italics for reader convenience.* The purpose of this section is to challenge whether these fish even qualify as a DSP.

*1<sup>st</sup> Condition: Discreteness of the population segment in relation to the remainder of the species to which it belongs;*

*2. The significance of the population segment to the species to which it belongs; and*

*3. The population segment's conservation status in relation to the Act's standards for listing (i.e., is the population segment, when treated as if it were a species, endangered or threatened?).*

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<sup>6</sup> Light, J. T., C. K. Harris, and R. L. Burgner. 1989. Ocean distribution and migration of steelhead (*Oncorhynchus mykiss*, formerly *Salmo gairdneri*)

<sup>7</sup> Annual value of the Lake Erie tributary steelhead fishery in Ohio could be as high as \$12 to \$14 million. Journal of Great Lakes Research Volume 32, Issue 3, 2006, Pages 424-433

<sup>8</sup> This section is adapted from National Oceanic and Atmospheric Administration Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act, Federal Register February 7, 1996 (Vol. 61), p. 4722

***Discreteness:*** *A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following two conditions:*

*A. It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.*

In this case, the Sacramento steelhead go to sea for one or more years, pass over wide areas of the North Pacific<sup>6</sup> and may, or may not, return to their native stream. Straying is common, and the decline of the Sacramento steelhead is complemented and probably highly related to the dramatic decline of the same species in all the California Rivers. While this decline is tragic and needs to be addressed, because of their peripatetic nature, there is nothing to suggest that steelhead from the Sacramento are markedly separated from other populations from the same taxon. Rather the opposite - their wide migration patterns and straying negates meeting this criterion.

At the same time, this straying behavior, which might be enhanced by slightly off season emission of juveniles, is one of our restoration research efforts and may provide a powerful mechanism for spreading the results of our juvenile production across the steelhead Diaspora. Simply put, we do not want the steelhead to try to come back up the Old Cow due to the difficulty and lack of accessible spawning habitat, so part of our efforts will be to maximize their geographic dissemination.

The Research Question is: What mechanisms can the Davis Hydro alternative fish production effort do to maximize straying within an active production environment? Or if this is too narrow a question, "Which alternative, and within each alternative, what actions could be taken to maximize dissemination of the steelhead behavior?"

*B: It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.*

(We do not address this condition)

**2. *Significance:*** *It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.*

*Significance: If a population segment is considered discrete under one or more of the above conditions, its biological and ecological significance will then be considered in light of Congressional guidance (see Senate Report 151, 96th Congress, 1st Session) that the authority to list DPS's be used "...sparingly" while encouraging the conservation of genetic diversity. In carrying out this examination, the Services will consider available scientific evidence of the discrete population segment's importance to the taxon to which it belongs. This consideration may include, but is not limited to, the following:*

*1. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon,*

Since this behavior of rainbow trout is common in the many watersheds across the globe, it is difficult to suggest that the setting is either unusual or unique.

*2. Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon,*

Since there is little evidence that this behavior is different from the same behavior elsewhere, no gap exists.

*3. Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or*

There is no evidence that this behavior is different from the same behavior all across Russia and Europe. There is no evidence that this is the only surviving natural occurrence of a taxon in the limited downstream habitats of the Cow and Sacramento.

*4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. Because precise circumstances are likely to vary considerably from case to case, it is not possible to describe prospectively all the classes of information that might bear on the biological and ecological importance of a discrete population segment.*

While we agree that the loss of steelhead is an excellent visible symbol of the tragedy of the destruction of the anadromous fish and fish habitat in California, this does not mean that this species is in any sense, endangered.

*Status: If a population segment is discrete and significant (i.e., it is a distinct population segment) its evaluation for endangered or threatened status will be based on the Act's definitions of those terms and a review of the factors enumerated in section 4(a). It may be appropriate to assign different classifications to different DPS's of the same vertebrate taxon.*

We suggest that there is serious question whether the Sacramento steelhead could be designated as a DSP given the significant straying and connected populations with similar behaviors around the globe. Having this fish being considered for listing casts a pall over the evaluation of alternatives for the Kilarc section of the P-606. Under the Congressional guidance that the authority to list DSP be used *sparingly*, its use here might interfere with judgment of alternatives. One cannot compare decommissioning alternatives or consider license conditions without prejudice with this designation in doubt.

We applaud and agree with NMFS that this fish, as well as all fish in these rivers are important and worthy of serious consideration for preservation and if possible restoration. However, it is a serious thing that the ESA does by ignoring the destruction of all other species on the planet except vertebrates – a quarter of which will be gone in the reader's lifetime.



Research Question: Do these steelhead have the qualification to be qualified as a DSP? This study is important because if they do not, there is no ESA imperative here, and much of the impetus for the removal of the Kilarc facility is removed.

Since almost the entire Old Cow is on private land (with a few road-crossing exceptions) this is arguably not a public fishing area, and since upstream migration is extremely difficult (irrespective of any increase in low flows), it is not clear what the best fish population role for the area is, except as a downstream feeder of juveniles. This being the case, Davis Hydro has emphasized this function in its proposed alternative.

### ***Summing Up***

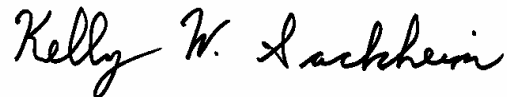
The final research question is that at the incremental rate of demolition of species diversity by man's activities, such as destroying renewable energy facilities, how do we value the preservation of the supposed uniqueness of the steelhead behavior in light of the incremental consequences on millions of other non-ESA species in mortal peril? The Kilarc question is an example, do we protect a politically connected vertebrate by taking actions to reduce renewable energy? To do so will inhibit renewable projects around the planet and hasten the collapse of many thousands of less franchised species. It is worth questioning whether destroying green renewable energy sources to protect the (supposed) speciation of a single fish is worth the incremental widespread consequences of the many truly endangered true species on the planet.

A preferable alternative, and a proactive one, is to use this green energy source in the creation of an example of how to collaboratively involve small hydro as a fish enhancement tool as well as a tiny incremental step toward a sustainable future.

**CERTIFICATE OF SERVICE**

I hereby certify that I have on this day served the foregoing documents by first class mail postage prepaid or email upon each person designated on the official service list compiled by the Secretary of the Commission in this proceeding.

Dated at Fair Oaks, CA this 13<sup>th</sup> day of July 2009.



Kelly W. Sackheim, Principal  
Sackheim Consulting, a member of  
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**Subject:** July 13, 2009 e-mail Service List for FERC P-606

**From:** "Kelly W. Sackheim" <kws@sackheimconsult.com>

**Date:** Mon, 13 Jul 2009 08:24:34 -0700

**To:** "Kelly W. Sackheim" <kws@sackheimconsult.com>, lki1@pge.com, spuccini@dfg.ca.gov, jparks@waterboards.ca.gov

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Consistent with Official Commission on-line records as Revised per Motions to Intervene filed to date

On 11/8/2008 5:07 PM, Kelly W. Sackheim wrote:

Please find attached the Comments of Davis Hydro on the PG&E Draft License Surrender Application - September 2008, FERC Project 606, Submitted November 2008

On 5/1/2008 6:43 AM, Kelly W. Sackheim wrote:

The attached letter was filed with the FERC. It is provided herewith as copies to the FERC service list and other parties with whom Davis Hydro is already consulting, as noted.

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