

Reply Response to the
Filings of
National Oceanographic and Atmospheric Administration,
California Fish and Game, and
US Fish and Wildlife Service

by

Davis Hydro, LLC

August 24, 2009

Table of Contents

Applicability	1
Introduction and Summary	1
Limited Scope of Agency Comments	2
Responsibility	3
Efficiency of the Agencies' Mitigation Measures	4
Natural Conditions Are Best	4
Long-Term Impacts following Facility Removal	5
Prolonged Operation of Fossil Generation	5
Fire	6
Human Response to Community Services Loss from Kilarc	6
Fire Suppression.....	6
Water Supply Replacement.....	6
Recreation Replacement	7
Presumed Benefits to Fish with Demolition of Facilities	8
Bypass Trout Alleles.....	8
Natural Conditions Are Best.....	9
Fire	9
Human Response to Community Services Loss from Kilarc	10
Fire Prevention.....	10
Water Supply Replacement.....	10
Recreation Replacement	11
The Davis Hydro Alternative.....	11
Construction impacts	11
Gravel Placement in the Canal.....	12
Experiments in Fish Screening at Fish Diversions	12
Davis Hydro Alternative Benefits.....	13
Fish Production	13
Anadromous Genetic Concentration.....	13
Numbers.....	13
Release Points	13
Open Access Facility	14
Assessment and Adaptation	14
The South Cow	15
Comments on Specific Agency Filings.....	15
DOI FWS Filing.....	15
DOI Regional Environmental Officer Filing	17
CDFG Filing	17
Conclusion	18

Attachment 1: Kilarc Project Alternative, Research Center White Paper

Attachment 2: CDFG Map, Steelhead Critical Habitat for the Central Valley - NOAA

Applicability

In the following reply response, we reply primarily to the filings of the National Oceanographic and Atmospheric Administration (NOAA), and secondarily to California Department of Fish and Game (CDFG), and the US Fish and Wildlife Service (USFWS), as a composite in that their filings have a common theme. Where the comments of the latter two agencies diverge, we address those distinctions in separate sections at the end of this filing. To facilitate response we will use the terms “Agency” or “Agencies” to represent common themes and issues raised by most or all agencies. We regret that some comments below are partially repetitious, but we are responding to very similar points made by the Agencies.

Applicability: The comments below are directed almost entirely to the comments of the three federal and state resource agencies as they apply to Old Cow Creek and the Kilarc facility. We are making only indirect reference here to issues applicable to the South Cow facility, and thus, almost no comment on the specific enhancements proposed in the Tetrick Alternative for that subwatershed area. KC Hydro (supported by Davis Hydro) has filed a separate narrow reply brief on the Tetrick Alternative.¹

Introduction and Summary

These reply comments are a discussion of the Agency comments on PG&E’s demolition plan as it applies to the Old Cow subwatershed and the Kilarc facilities, and the inadequacy of Agency comments in addressing the comprehensive effects of this alternative on either the immediate or wider environment. Not yet exercised in the Agency comments is their statewide, national, and global responsibility for the atmosphere and oceans of the world. No mention is made of the effect of closing this green power source on the atmosphere, our environment, or for NMFS, fish across the planet. So far, Agencies have only focused on the local short term issue of mud leaking into the currently almost empty stream², with almost no planning or interest in the size,

¹ The following excerpt from the KC Hydro letter characterizes the relationship between each of the two non-demolition proposals and the issues that are addressed in this reply comment to the Agencies’ comments. “The principal difference between the Tetrick Non-Decommissioning Alternative and the Alternative to Demolition advocated by Davis Hydro is that the Tetrick filing identifies proactive fishery enhancement measures that would be located on the private Tetrick Ranch property only, while Davis Hydro has developed a detailed Kilarc Steelhead Project independent of the disposition of facilities in the South Cow Creek watershed. The South Cow has possibilities as excellent Salmon and steelhead habitat while the natural channel of the Old Cow has no Salmon and only limited accessible steelhead habitat leading to completely different enhancement and management opportunities. Given that the project boundaries for each of the hydropower developments encompass and are surrounded by areas with different public access, different fish, and different engineering, the only common feature of both developments is that fish and fishing are a major consideration in the future disposition of the hydropower facilities on each creek.”

² Specifically, we are focusing in this response only on the Kilarc/Old Cow part of P-606.

health, or composition of future populations. Nor do the Agency comments address other affected geographic areas and species.

Finally, not yet discussed in these filings is any alternative to demolition although a discussion of alternatives is required under NEPA when unmitigated potentially adverse effects of a project exist, and such effects and an alternative have been a part of the license surrender process discussion since its inception over two years ago (albeit AFTER the Agencies signed the March 2005 Agreement in support of PG&E's demolition concept). Davis Hydro circulated a detailed Alternative plan to which NOAA returned comments³ on August 1st of 2008. CDFG (and all other extant interveners) also received the plan at that time. CDFG's comments were verbal.

Limited Scope of Agency Comments

The Agency filings to date comment primarily on the protective measures that have to be installed to minimize the impacts from the demolition of engineering works. These measures address almost exclusively the runoff of mud into the stream where it will interfere with fish spawning down the Cow. We agree with these concerns, and believe that many of the provisions suggested make sense insofar as they go. At the same time, in the context of the Kilarc facility, one must question whether it is efficient to have these measures put in place now to protect near non-existent fish while ignoring the long term and widespread effects of the facility removal, its replacement generation, and its operation.

NEPA requires analysis to be cumulative and comprehensive. The incompleteness⁴ of these initial comments starts with the reality that demolishing this existing electric power source will cause, at a minimum, a delay in the retirement of another power source, and eventually the construction or expansion of another power source to replace it. That replacement technology – whether newly constructed hydro, wind, or fossil plant(s) - will also have an environmental burden that will likely⁵ exceed the impacts of removing this facility. Since generation of all types⁶ is being constructed in California, fossil through wind, the new facility will be built or expanded to accommodate the loss of this

³ The NOAA comments continued support for “the agreement” and referred to earlier comments submitted to FERC on an earlier version of our alternative – the earlier NOAA comments were filed with FERC on October 1 2007.

⁴ The incomplete nature of the Agency approach to this project was clearly commented on in the first recommendation of Cramer Fish Science's letter reviewing the Davis Hydro Alternative including proposed improvements for both the Kilarc Facilities and on the South Cow, dated April 29 2008. Fisheries biologists Bradley Cavallo and Joseph Merz state, “Based on our findings, as well as concerns raised previously by other stakeholders, we strongly recommend that PG&E and fishery resource agency staff carefully and objectively review and reconsider current plans to decommission the Project.” (See Document KC0336f on the WWW.Kilarc.info web site).

⁵ Facility construction will exceed the local demolition impact simply because new construction has new materials, additional contractors, etc. far beyond the effects of facility removal alone.

⁶ Unfortunately, the replacement energy will be entirely fossil because every conceivable effort is currently underway to build renewable generation, and what can be built will not meet demand.

generation. It will not be possible to state that any specific new facility will be built or expanded as the result of the demolition, but it is clear that such an impact will exist, either in a specific or diffuse form, and as such it will likely have an impact far in excess of this simple site removal. Thus, the concern for the runoff from the deconstruction, so exhaustively addressed by the Agencies for the local effects, misses completely the larger consequences of building alternative generation.

Regrettably, the environmental damage from construction that the Agencies ignore does not stop there. The economic multipliers through support industries that go with any demolition project ripple through our economy like any other economic stimulus and cause an incremental change in the whole of the economic and therefore environmental fabric⁷.

Responsibility

NOAA⁸ as a national agency is responsible for national effects of deconstruction. Its focus should extend far beyond the effects on the Cow Creek, or even the Sacramento River. NOAA's perspective is national – if not global effects – just as CDFG's purview and authority is derived from its California level portfolio. Until the Agencies consider the plenary geographic effects of the deconstruction on which they are commenting, they are acting like any other NIMBY entity focusing on a single narrow location and issue – the impending flows of mud from the demolition. NOAA is charged with protecting the Oceans⁹ and Atmosphere. There is no analysis, or call for analysis, of the effects of the proposed plan, much less any alternative(s), on the atmosphere, or on the Oceans (although anadromous fish require that habitat as well).

NOAA cites in extensive detail in their filing its authority to act representing these larger interests. But in the comments submitted, NOAA ignores their primary responsibility of addressing these direct and indirect impacts of the demolition of generation resources and their replacement. These impacts are amplified from the immediate construction (which is partially addressed) by the economic multipliers as the national and world economy responds to the economic activity derived from the deconstruction activities and the construction activities resulting from the demolition. Simply put, if we ignore the off-site impacts and environmental degradation, we ignore most of the deconstruction activity's impact within the responsibility of the commenting Agencies.

As suggested above, the economic multipliers and thus the environmental degradation multipliers are higher on construction than demolition. Thus, construction for replacing

⁷ These multipliers were revealed by the macro-economist Leontief almost 100 years ago, and they are currently popular in Washington as the “stimulus” effect. See any economics text for exposition of Leontief input/output tables.

⁸ NOAA is being focused on due to its primary responsibility for the recovery of Steelhead listed under the Endangered Species Act,. USFWS has a similar caretaker role for the fish across the US and should be addressing the impacts not only through acid rains and heavy metals pollution, but through the indirect effects of the construction and operation stimuli.

⁹ Also, through the National Marine Fisheries Service, the fish in the oceans.

the green power will have a larger global impact in addition to the unmitigated local impact than demolishing the facilities. How much larger will vary according to many factors including economic conditions, but the concept of stimulus – expansion is clearly within the national lexicon rather than only within that of environmental and macro economists.

Efficiency of the Agencies' Mitigation Measures

The Agencies have failed to show (against strong evidence to the contrary) that there are any anadromous fish to protect with their elaborate protection measures, and have so far avoided dealing with the future effects and discussing alternative plans (for example, by Davis Hydro) to instill and enhance fish worthy of protection. In summary, it is the long term and wide spread impacts of projects that give Agencies authority in this little backwater, yet these Agencies have not yet addressed the temporal and geographic domain that gives them authority.

The elaborate precautions suggested by the Agencies to keep the construction runoff from harming the fish in the Old Cow have to be questioned given that there is extensive evidence that there are few fish of any type in this area. In particular, given the basis for the Agencies' authority here, no anadromous fish have ever been seen (or cited as existing) here due to natural and man-made downstream barriers to migration upstream. One might then question why it is useful to expend quite so much effort¹⁰ to reduce *temporary* runoff without engaging in an equally strong effort for the continued protection of the population of fish that presumably will establish itself upon demolition of the project. As will be expanded on below, since the facility protects the area from fire, and fire runoff will increase over the long run with the removal of the Kilarc facility, fire induced erosion and habitat destruction impacts need to be addressed especially under the idea that there will be more fish in the future in the area to protect.

Natural Conditions Are Best

It is a tenet of the Agencies that Natural Conditions Are Best (NCAB). In general, we agree. Nonetheless, as identified in the report Recommendations (page 4) by Cramer Fish Sciences (Document KC0336 on www.kilarc.info), “While ‘natural conditions’ generally are best for fish, this is a case where the benefits of Project removal may be small relative to the loss of existing fish habitats (Kilarc Forebay, Kilarc Canal, South Cow Canal, South Cow Forebay, Hooten Gulch), loss of a significant green energy source, loss of existing diversion waters and structure (Abbot Ditch canal and diversion dam) and the related need to construct replacement diversion structures elsewhere on

¹⁰ We recognize that Agency time and local knowledge is limited and that many of the regulations are general requirements for this type of activity. We mean no disrespect as to the intent of the regulations, but suggest that some familiarity with the area would be useful. For example, there is no appreciable storage behind the Kilarc diversion dam.

South Cow Creek. Available information suggests that these factors have not been given due consideration.”

Furthermore, the NCAB tenet requires that other environmental conditions would not be altered as the result of a NCAB choice. Specifically, for the NCAB tenet to be true generally, it is necessary to inhibit humans from responding. To suggest that a local project can be allowed to find a “natural” state without including man’s response in the picture is unrealistic.

For example, removing the Kilarc Recreation facility will make fishermen move to other streams such as the South Cow, and lower on the Cow. There they will angle for endangered salmon and other fish, rather than the put-and-take fish of the Kilarc. The “natural condition” of removing the Kilarc facility can have a negative effect through the actions of man on the more valuable and possibly more endangered fish nearby and downstream

Similarly, if the forebay were to be removed fire damage likely would be greater. This would increase water pollution and negatively impact the local and downstream fish. With humans involved with the forebay and in helicopter fire fighting, the streams are protected. Thus, because humans can better protect against fire with the forebay in place, it is not clear that removing the forebay is best for the local or downstream fish habitat.

Finally, removing this hydropower source engenders other construction and operation impacts from replacement power sources to meet man’s need for power. Natural conditions¹¹ here again are distorted by man. Thus, the statement “Natural Conditions are Best” is possibly only true only under the condition that man does not exist, or at a minimum does not act in response to changing local conditions.

Long-Term Impacts following Facility Removal

Prolonged Operation of Fossil Generation

The removal of this green generation will set back the development of green energy in California slightly, thereby incrementally prolonging fossil generation. This incremental change in fossil generation has a minute, but widespread effect on the downstream winds, waters, and oceans. While the effect is small on any one fish, or even any body of water, the enormous area over which it acts suggests that the effect on fish generally, and on any temperature sensitive species in particular, may easily be significant in the aggregate.

Increasing the fish in the Old Cow bypass (with its resultant effects on downstream populations) must be balanced against the realization that the same decision will have a decreasing effect on target fish, and fish generally, across a much wider area. This

¹¹ Even the “natural condition” of the rainbow found now in the bypass is distorted. 40 years of stocking upstream by man has distorted any natural *O. mykiss*.

balance, again, for a state agency should be at least California-wide, and for a National Agency it should be at least national in scope, according to the national authorities and the Federal mandates cited in their filing.

Fire

The Agencies' comments have not yet addressed the effects of fires on the environment. The Kilarc forebay is a very important high-elevation local source of water to fight fires, and as such the presence of this water is essential for helicopter fighting of fires in the area. Its altitude and proximity make it invaluable as a fire-fighting asset covering the upper South Cow (excellent steelhead habitat) as well as much of the Old Cow.

If the Kilarc forebay is lost, there will be a reduced fire-fighting capability (or at a minimum an increase in the cost and/or response time to deliver water from another source) and thus a small increase in fire damage in the area. These fires have the effect of polluting streams with both fire byproducts and mud from the resulting ash and increased erosion of soils. Cover is denuded, habitat lost, spawning beds filled with mud, and the food supply interrupted until the forest recovers. While this effect is intermittent, the effects will be not only on the local bypass reach of the Old Cow, but further downstream to the larger habitat areas of the lower Cow, and, depending on where the fires occur, potentially into the upper reaches of the South Cow with their extensive steelhead and lesser salmon habitats.

Human Response to Community Services Loss from Kilarc

Fire Suppression

The effects of the loss of the Kilarc reservoir on the fire in the area were not addressed in the Agency comments. To compensate for the loss of the Kilarc facility, the community may choose to increase fire protection in other ways – for example increase the number and type of fire-trucks, pumps, and trained staff. These measures would have stimulus/multiplier effects and in turn would cause environmental damage both directly in their creation and long term in their maintenance. While it will be difficult for the Agencies concerned with widespread impact to calculate these effects, they are certainly not zero and must be included in the evaluation of the alternatives. The widespread diffuse effects are at the core of the Agencies' mission and as is with the case with global warming, we cannot divorce ourselves for convenience from effects on the closed ecosystem in which we live and with the care of which these Agencies are charged.

Water Supply Replacement

The effects on the local water supply for homes and businesses were not addressed. The direct effects of these water supply impacts are straightforward, but the indirect effects

may again be the major effect. In the case of water supply, it is likely that the water needed for homes, farms and small businesses can be made up by pumping¹² creek and/or well water. This pumping will require electricity and may easily become the largest energy consuming activity at these locations. This increase in demand for electricity will have direct and indirect consequences throughout the economy and environment so that the overall stimulus effect, while very small at any one location, will have a combined effect on the environment far in excess of the local effect.

PG&E will maintain that they are in the hydropower business, not in the water supply business and that they have no legal requirement to supply water. That is likely true, but in the evaluation of alternatives by the Agencies, the onus of the resultant indirect effects cannot be left out of the incremental calculus of the environmental destruction resulting from removing these facilities.

Recreation Replacement

Finally, many of the local people living in this area live here because of the recreation – primarily fishing at the Kilarc Reservoir. If this reservoir is removed local people will fish elsewhere. The fishing in the reservoir is artificial, catching primarily the planted trout put there from local fish hatcheries and a few brown from the headrace or upstream spawning. If this fishing place is demolished, the fishermen will migrate downstream to fish – say in the main stem of the Cow or along the Sacramento where they will impact the very fish which the Agencies and Davis Hydro are trying to enhance. Attention to this change in fishing pressure is not included by the Agencies.

In evaluating the effect of removing this facility, the Agencies have focused on the silt and mud released during demolition of the few fish extant in the stream, while ignoring the potentially larger impacts¹³ of displacing the fishermen to injure existing and future fish populations we are trying to enhance. Since the Kilarc facility is heavily used – PG&E cites¹⁴ 11,000 annual visitors - the displaced fish pressure on the target natural resource downstream may be substantial.

¹² A likely increase in unscreened pumping from the Creek will follow the demise of gravity fed water from the Kilarc facility. These diversions should be included in the evaluation of alternatives.

¹³ Simply driving the increased distance to the new recreation sites directly and indirectly increases global pollution. This calculation would be complicated by the decrease in travel to the Kilarc facility by out of area residents who now will have to drive further to a substitute location. (It will be further away for if it were shorter, they would not have driven originally the distance to the Kilarc facility). None of this discussion is relevant for the South Cow in that it is all on private fenced land.

This same argument can be made for employment at the site, in addition to the picnicking and other activities that are local to the community. By removing these community services, the resulting impacts are derived only in part from the removal and in part by what is substituted for its loss. The substituted activities are hidden – but may easily represent the major economic and therefore environmental impacts.

¹⁴ PG&E 2009 Recreation Report. While this source is on file with the FERC, what was less clear from this report was that the Kilarc Reservoir is the best-known handicapped fishing in Northern California. There is no substitute or anything that comes close.

Presumed Benefits to Fish with Demolition of Facilities

Bypass Trout Alleles

If it is true that there will be a significant increase in fish in the bypass with an increase in water releases, one has to ask, "What fish?" The upstream migration of anadromous fish into this area has never been recorded, and there are large downstream natural and man-made impediments to migration into the project. Therefore, the predominant increase in fish in the bypass will be nearly entirely derived similarly to the juveniles currently observed in the bypass. These are resident¹⁵ rainbow trout which have been in this area for many years. These resident rainbow are well established above the project and emit juveniles down the Old Cow¹⁶. They are fairly well protected from human predation by remoteness, terrain, and private property. Thus, with no or little upstream migration, the increase in *O. mykiss* and other stocks will be from "resident adapted" rainbow. This is a fairly unimportant fish goal given the huge stocks of these fish prevalent throughout the world. Resident rainbow production is a sport-fishing objective, not an endangered species issue. Thus, if there is a substantive difference in fish between the anadromous allele of *O. mykiss* and the resident expression, the resident form will predominate in this area if there is habitat expansion¹⁷.

The expansion of a resident adapted population will emit downstream fry of similar resident proclivity competing for resources with any anadromous fish in the much larger habitat areas downstream. In effect, increasing fish habitat above significant return barriers (a consistent, stated objective of the agencies) will probably have the effect of increasing negative pressures on any anadromous phenotypes competing for resources downstream.

If, rather, there is no difference between the two forms (anadromous and resident) of *O. mykiss*, and we are just encouraging/enabling anadromy, then little is endangered at this site in that millions of these fish exist. Our collective effort is to encourage the prevalence of the geographically local expression of anadromy. If it is the case that there is no anadromy role in the evaluation of alternatives, the oceans and atmosphere of the nation are the appropriate scope of analysis when evaluating projects to remove green power from the generation mix.

In summary, whether or not there is a difference between the resident form of *O. mykiss*, (rainbow) or the anadromous form, because of the difficulty of upstream migration it may be difficult to show that any habitat improvement in the upper reaches on the bypass will produce anything other than more resident fish with consequential pressure on the

¹⁵ For discussion, (suspend any disbelief and) assume that there are two types of *O. mykiss*, "resident and anadromous. The Cramer Fish Science Report (cited elsewhere) addresses this issue.

¹⁶ These are observable in the Old Cow bypass reach as juveniles and are documented in PG&E's Aquatic Habitat and Fisheries Resources Report (see Document KC0328 at www.kilarc.info). Very sparse juvenile trout are the only age class casually observed in the bypass.

¹⁷ This is true even if the bypass were stocked by USFWS or CDFG with known anadromous adults because the very low return rate would make the resident form predominate over time.

anadromous form. In contrast to enhancing anadromy as a goal, it is a reasonable goal of all concerned to increase the natural “wild” fish in the area reproducing by natural means. However, even this goal must be tempered by the near complete inaccessibility of the area to fishermen.

Natural Conditions Are Best

It is a tenet of the Agencies that Natural Conditions Are Best (NCAB). In general, we agree. However, this tenet requires that other environmental conditions would not be altered as the result of a NCAB choice. Specifically, for the NCAB tenet to be true generally, it is necessary to inhibit humans from responding. To suggest that a local project can be allowed to find a “natural” state without including man’s response in the picture is unrealistic.

For example, if the forebay were to be removed fire would be more common. This would increase water pollution and negatively impact the local and downstream fish. With humans involved and in helicopter fire fighting with the forebay, the streams are protected. Thus humans can protect against fire so it is not clear that removing the forebay is best for the local or downstream fish habitat.

Another example (discussed below) is that removing the Kilarc Recreation facility will make fishermen move to other streams such as the South Cow, and lower on the Cow. There they will angle for endangered salmon and other fish, rather than the put-and-take fish of the Kilarc. The “natural condition” of removing the Kilarc facility can have a negative effect through the actions of man on the more valuable and possibly more endangered fish nearby and downstream

Finally, removing this hydropower source engenders other construction and operation impacts from replacement power sources to meet man’s need for power. Natural conditions¹⁸ here again are distorted by man. Thus, the statement “Natural Conditions are Best” is possibly only true only under the condition that man does not exist, or at a minimum does not act in response to changing local conditions.

Fire

The Agencies’ comments have not yet addressed the effects of fires on the environment. The Kilarc forebay is an important high local source of water to fight fires, and as such, along with careful forestry practices by all concerned, the presence of this water is essential for helicopter fighting of fires in the area. Its altitude and proximity make it invaluable as a fire-fighting asset covering the upper South Cow (excellent steelhead habitat) as well as much of the Old Cow.

¹⁸ Even the “natural condition” of the rainbow found now in the bypass is distorted. 40 years of stocking upstream by man has distorted any natural mykiss than may have originally migrated across Russia.

If the Kilarc forebay is lost, there will be a small increase in fire prevalence in the area. These fires have the effect of polluting streams with both fire byproducts and mud from the resulting ash and increased erosion of soils. Cover is denuded, habitat lost, spawning beds filled with mud, and the food supply interrupted until the forest recovers. While this effect is intermittent, the effects will be not only on the local bypass reach of the Old Cow, but further downstream to the larger habitat areas of the lower Cow, and into the upper reaches of the South Cow with their extensive steelhead and lesser salmon habitats.

Human Response to Community Services Loss from Kilarc

Fire Prevention

The effects of the loss of the Kilarc reservoir on the fire in the area were not addressed in the Agency comments. To compensate for the loss of the Kilarc facility, the residences may increase fire protection in other ways – for example increase the number and type of fire-trucks, pumps, and trained staff. All of these measures would have stimulus/multiplier effects and all will cause environmental damage both directly in their creation and long term in their maintenance. While it will be difficult for the Agencies concerned with widespread impact to calculate these effects, they are certainly not zero and must be included in the evaluation of the alternatives. The widespread diffuse effects are at the core of the Agencies' mission and as is with the case with global warming, we cannot divorce ourselves for convenience from effects on the closed eco-system in which we live and with the care of which these Agencies are charged.

Water Supply Replacement

The effects on the local water supply for homes and businesses were not addressed. The direct effects of these water supply impacts are straightforward, but the indirect effects may again be the major effect. In the case of water supply, it is likely that the water needed for homes, farms and small businesses can be made up by pumping¹⁹ creek and/or well water. This pumping will require electricity and may easily become the largest energy consuming activity at these locations. This increase in demand for electricity will have direct and indirect consequences throughout the economy and environment so that the oval stimulus effect, while very small at any one location, will have a combined effect on the environment far in excess of the local effect.

PG&E will maintain that they are in the hydropower business, not in the water supply business and that they have no legal requirement to supply water. That is likely true, but in the evaluation of alternatives by the Agencies, the onus of the resultant indirect effects

¹⁹ It is likely than an increase in unscreened pumping from the Creek will follow the demise of gravity fed water from the Kilarc facility. These diversions may exist and might best be included in the evaluation of alternatives.

cannot be left out of the incremental calculus of the environmental destruction resulting from removing these facilities.

Recreation Replacement

Finally, many of the local people living in this area live here because of the recreation – primarily fishing at the Kilarc Reservoir. If this reservoir is removed local people will fish elsewhere. The fishing in the reservoir is artificial, catching primarily the planted trout put there from local fish hatcheries and a few brown from the headrace or upstream spawning. If this fishing place is demolished, the fishermen will migrate downstream to fish – say in the main stem of the Cow or along the Sacramento where they will impact the very fish which the Agencies and Davis Hydro are trying to enhance. Attention to this change in fishing pressure is not included by the Agencies.

In evaluating the effect of removing this facility, the Agencies have focused on the silt and mud released during demolition of the few fish extant in the stream, while ignoring the potentially larger impacts²⁰ of displacing the fishermen to injure existing and future fish populations we are trying to enhance. Since the Kilarc facility is heavily used – PG&E cites²¹ 11,000 annual visitors - the displaced fish pressure on the target natural resource downstream may be substantial.

The Davis Hydro Alternative

Construction impacts

The Davis Hydro Alternative is discussed here not to interject any new ideas, but to focus the reviewer's attention on impacts and benefits not being addressed by the Agencies in this alternative²². It is appropriate to address Davis Hydro's alternative plan here since it

²⁰ Simply driving the increased distance to the new recreation sites directly and indirectly increases global pollution. This calculation would be complicated by the decrease in travel to the Kilarc facility by out of area residents who now will have to drive further to a substitute location. (It will be further away for if it were shorter, they would not have driven originally the distance to the Kilarc facility). None of this discussion is relevant for the South Cow in that it is all on private fenced land.

This same argument can be made for employment at the site, camping, and other activities that are local to the community. By removing these community services, the resulting impacts are derived only in part from the removal and in part by what is substituted for its loss. The substituted activities are hidden – but may easily represent the major economic and therefore environmental impacts.

²¹ PG&E 2009 Recreation Report. While this source is on file with the FERC, its numbers may be slightly high from our observations; however, what was less clear from this report was that the Kilarc Reservoir is the best-known handicapped fishing in Northern California. There is no substitute or anything that comes close.

²² This Alternative to PG&E's plan has been widely circulated and available on the WWW.Kilarc.info website for discussion for over a year. It grew out of an earlier proposal that was distributed for discussion and now forms the basis of the proposal adopted by Tetric et al. (See for example, page 13 of Davis Hydro's Document [KC0235 Davis Hydro Scoping Study Plan Draft II.pdf](#) dated July, 2007. The Davis

is an alternative that has not yet been discussed by the Agency comments to date. Finally, it is appropriate to discuss it in this response because many benefits of this alternative were inappropriately not considered by the Agencies, and thus warrant attention by their absence.

Gravel Placement in the Canal

In the primary spawning beds, coarse river gravel will have to be added. Since there is no suitable gravel in the immediate area, these gravels will have to be brought in from Pleistocene riverbanks on the existing roads. The amount that will have to be brought in will be directly related to how extensive the new spawning beds will be, as there is little presently in the headrace. The general characteristics of the needed gravels are well known, and there are extensive suitable banks of river gravel along Deschutes road. The exact amount and types will be determined by the consulting biologists supervising the construction of the starter sets of spawning gravels.

The impact therefore will be an increase in truck traffic along the existing maintenance roads.

Experiments in Fish Screening at Fish Diversions

One of the possible research subjects that the Kilarc Trust or trustee²³ might undertake would address off-project experiments in screening water diversions from the Creeks. This will be in cooperation with the diversion water right holders. Water diversions have significant impacts on fish. Some of these impacts can be reduced by screening. One of the research topics to be considered is how to informally screen diversions in a manner that can be easily maintained by the diverter, with or without the help from the hydropower operations staff.

Construction of these diversions, both experimental and quasi-permanent, will have a stream impact as the bed and possibly banks of the streams will be entered upon. The ability to use these facilities for funding these activities was not addressed by the Agencies, even though the Davis Hydro Alternative has been available and circulated for over a year to all interested parties²⁴.

Hydro Alternative's ideas were also put forth at that time (see page 9 Alternative K-1). These ideas have been under discussion for two years.

²³ Recall from the Davis Hydro Alternative that a Kilarc trust (or trustee) will be created whose mission (simply put) is to produce fish (as a representatives of an ecosystem), restore anadromy of *O. mykiss*, address community goals, and conduct research in support of those goals.

²⁴ The idea of spawning fish in the headrace, and in ditch screens and returns was introduced and circulated for comment in an early draft of the Davis Alternative in September 2007. See the Documents section of www.kilarc.info.

Davis Hydro Alternative Benefits

Since there have been multiple spawning bed failures in the area for salmon, the focus on the Kilarc Project will be flexibility and adaptability of spawning beds to local conditions. The beds will be modified or extended in response to what is observed onsite. The initial beds (with associated hydraulic and cover features) will be built in accord with observed best practices, however the plan is to have continuous monitoring of the efficacy of the beds and to incorporate changes in design over time, as we learn what is the most productive design and operation. In this setting we intend to institute under “research” an active monitoring and adaptive production management program, driven by the monitoring research whereby we all learn the most effective design.

Fish Production

Anadromous Genetic Concentration

The emphasis of the Kilarc anadromous fish production facility will be on serving as a source of non-hatchery juveniles derived from known anadromous genetic content. This will be done by injecting into the area, in various ways, as pure an anadromous allele stock of *O. mykiss* as can be found. Every effort will be made to produce natural spawning and natural emission of juveniles to avoid the worst of the hatchery effects.

Numbers

No significant effort will be made to artificially produce many more fish than the Cow ecosystem can support. However, experiments may test current theories on increasing straying²⁵ through off-season releases. These experiments – as with all others – will be under the direction and funding of the Kilarc Trust or trustee²⁶ and will be aimed at restoring anadromy throughout the Sacramento River. While research cannot be used as a substitute either for recreation or environmental enhancement under the FERC process, we point out here that such research is necessary as part of the performance testing and evaluation of the production. It is integral to building optimal productive beds since current knowledge is limited and there have been other spawning bed failures.

Release Points

There are three fish screens and three returns for fish to return to the main stem of the Old Cow. The largest one is near the existing trash rack and is intended to return the bulk of

²⁵ Since an important objective of this exercise is to enhance the restoration of anadromy in steelhead throughout the Sacramento River (if not further), it will be necessary to explore how to increase the dispersion of the returning fish. The Old Cow above Whitmore is unsuitable as a returning place for anadromous fish due to natural barriers and limited natural habitat, especially spawning habitat.

²⁶ As noted elsewhere the Kilarc Trust (or trustee), or other non-profit entity, will have the mission of fish enhancement, and will include members of NMFS, CDFG, and consulting fish biologists.

the small fish from the spawning beds. The next upstream return is at the end of the first spawning bed and is intended to provide anadromous stock juveniles to the upper reaches of the bypass region. These will have to compete with resident adapted juveniles moving downstream from the Buckhorn Lake area above the project.

The uppermost fish return is intended to return any incoming juveniles from upstream to the Old Cow rather than entering the new spawning facility. This is to reduce the invasion of resident-type genetic stock from upstream²⁷. The secondary purpose of the first and second returns is to return most of the silt and fines to the Old Cow. This will reduce the rate of sediment pollution and needed maintenance of the gravel beds in the headrace.

Open Access Facility

The design and operation of all returns will be subject to ongoing management. It is expected that the operation of various components will be imperfect allowing for occurrence and observation of irregular behaviors. We expect “leakages” of some juveniles through screens so that a resident population might be formed. We are aware of the need for food promotion, predation, and macro-invertebrate production as part of the operation, and are aware of the foibles of human predation and interference. The facility is open to the public and as such is intended to operate in an exposed imperfect manner so as to facilitate both its teaching role and that as an experimental facility that will allow testing of engineering features that can be transferred to other open/public sites as needed.

Assessment and Adaptation

A key component of any aggressive fish enhancement program, not available in either the Tetrick or PGE demolition proposal, is a monitoring and assessment and adaptive fish production management plan based on ongoing data with an independent management entity that will oversee this vital component.

We have asked an independent fish biologist, Dr. Sophia Unger to review the research and its relationship to fish production possibilities at the Kilarc facility. Dr. Unger’s paper is Attachment I to this reply brief²⁸. It addresses opportunities that this alternative provides to the Kilarc Trustees. The Trust or trustee can spend resources on production

²⁷ Other reasons include predation control. Not discussed here are efforts to reduce the predation of anadromous juveniles in various areas by brown trout, and a related effort to reduce spawning of browns in the headrace, as they are now. Brown trout, while encouraged for sport in the forebay, currently spawn in the headrace and are present in small numbers throughout the canal year round.

²⁸ Other Biologists have reviewed our proposed works on the South Cow, and downstream, and the feasibility of spawning production in the headrace. Their papers are available in the document section of WWW.Kilarc.info. Different formats are available in our Documents (KC0336a-h). See the Cramer paper for the evaluation of spawning in the Hooten Gulch area.

fish related research at the facility, or if deemed advisable, spend resources for off-project fish enhancements and projects such as those identified in 2007 on the South Cow.

The South Cow

In contrast to the Old Cow, the South Cow has some salmon and steelhead habitat enhancement opportunities below the Tetrick Ranch, and excellent steelhead habitat above Wagner Canyon. This area is an excellent candidate for habitat improvement projects funded from the Kilarc Project. Davis Hydro has worked with ranchers on the South Cow on a series of fish enhancement ideas, suggestions and work areas that we might implement through the Kilarc Project. These were discussed with ranchers including Mr. Poole and Mr. Tetrick in the summer of 2007 and distributed as a discussion document in September of that year. The measures are extensive, and are based on our biological studies of the area. Both the proposed works and the studies are available in the Document section of the WWW.Kilarc.info website²⁹. The alternative proposal by Mr. Tetrick includes some of these measures.

Comments on Specific Agency Filings

Note that the main body of this reply addresses mutual concerns and is somewhat tailored to NMFS comments and NOAA's general responsibility. The following comments by various Agencies have a significantly different focus and need separate comment.

DOI FWS Filing

FWS: The Service's goal is to conserve and restore the essential attributes of the watershed ecosystem affected by the Project. Decommissioning the Project would result in the return of Project-diverted water to the streams which will significantly contribute to maintaining valuable habitat for anadromous and resident fish and other aquatic resources.

Davis Hydro (DH): There is little evidence of this. Any area of habitat gained by the incremental increase in flows in the bypass has to be offset by the areas of habitat lost through the rise in temperature downstream in the Cow. This is because the hydropower delivers colder water than would be delivered through the natural channel³⁰. This cold water incrementally expands the large habitat areas in the main stem of the Cow which are currently limited principally by summer temperatures. Note that the habitat

²⁹ See for example, An Alternative Proposal to Facilities Removal, Kilarc – South Cow Hydropower Project consisting of KC-I, An Alternative for the Kilarc Facilities and KC-II, An Alternative for the South Cow Facilities. (Doc: KC0275 at http://kilarc.info/Docs_Maps_Drawings/Documents/docs.htm).

³⁰ See the Whitmore data or PG&E's Aquatic Habitat and Fisheries Resources Report (KC0328) on WWW.Kilarc.info in the Documents section.

downstream for all life stages is far larger than that in the bypass which is partly an incised “U” or “V” shaped valley³¹ cut into angular volcanic sediments.

FWS: Resource goal: Protect, conserve, enhance, and recover native anadromous salmonids and other resident native fish and their habitats by providing access to historic habitats and by restoring fully functioning habitat conditions.

DH: (Kilarc only) While we agree that there may be some new “natural” habitat created in the bypass channel, it is a severe challenge³² for any significant anadromy to occur in the bypass region due to numerous “in” and “below project” obstacles. It might be granted that occasionally some upward migration might occur in storm/flood situations³³, but the predominant allele in this area will be the far more numerous upstream fish which are genetically adapted to residency as evidenced by their multi-decade isolation and persistence. Resident-adapted fish are not what is wanted. The emission of residence-adapted juveniles will compete in downstream habitats with any anadromous fish thereby decreasing any aggregate statistical expression of anadromy.

The Davis Hydro Alternative is designed to enhance and recover native anadromous salmonids by maintaining a far superior spawning ground than is available within the historic channel. Little if any of the Old Cow bypass channel is natural or historic as it was heavily modified hydraulically by gold prospectors³⁴, and has not been “historic” for over a hundred years when the hydropower diversions commenced. There is little or no natural historic channel to recover.

FWS: Resource goal: Identify and implement measures to protect, mitigate or minimize direct, indirect, and cumulative impacts to, and enhance native anadromous salmonid and other resident native fish resources, including related spawning, rearing, and migration habitats and adjoining riparian habitats.

We describe a clear mitigation plan that will produce anadromous spawning in a channel that can be modified and closely monitored to support this activity. Because of the limited return potential for any anadromy to this region,³⁵ its best use is to enhance

³¹ PG&E’s biological assessment makes this clear. Parts of the created habitat in the bypassed reach are expected to be “blown-out” fairly regularly in spring floods due to the narrowness and incised nature of parts of the bypassed channel. This is clear from the flood lines in the ravine where whole trees are washed down the valley and deposited high on the canyon banks.

³² See page 7 of DOI’s Office of Environmental Policy and compliance letter, 10 July 2009.

³³ See Mike Berry’s (CDFG) photo of the Whitmore Falls in flood in the Pictures section of www.Kilarc.info. The frequency of these floods is unclear.

³⁴ Remains of hydraulic mining in the bypass gorge have been observed during field visits by Davis Hydro personnel. We surmise that the first sections of the Kilarc canal were probably constructed for hydraulic mining of gold in the Old Cow gorge.

³⁵ See the comments in the CDFG filing (p. 7) that identify that only recently did CDFG’s management objectives change based on a new opinion that “the current extent of anadromy in Old Cow Creek is unknown at this time” while there is only a presumption that the Kilarc Project is a critical habitat area for steelhead (see also NMFS p. 28) when in fact it lies outside the designated boundary (see Attachment 2 to this report).

DOI Regional Environmental Officer Filing

REO: Decommissioning the Project would result in the return of project-diverted water to the streams which will significantly contribute to maintaining valuable habitat for anadromous and resident fish and other aquatic resources³⁶.

DH: For the Kilarc bypassed reach, this statement, which forms the core of this office's review, is not yet supported by field evidence. Much of the bypass habitat is bounded by boulder/rock bottom, intermixed with pyroclastic angular unwashed substrate, and is confined in a narrow flood-prone channel. There are few resident fish and no known anadromous ones. Limited acceptable spawning gravel exists that is not infused with mud from the proximate canyon walls, and over the central section juvenile habitat is limited. If some successful spawning did occur, any anadromy is likely to be genetically overwhelmed by the flow of juveniles from upstream resident rainbow.

CDFG Filing

CDFG: [The California State Steelhead policy] directs CDFG to manage steelhead in a manner that protects and maintains the populations and genetic integrity of all identifiable stocks and identifies naturally spawned steelhead as the foundation of CDFG's management program.

D.H: That is exactly our policy for the Kilarc project. We would like to produce optimal conditions to spawn and mature in as natural an environment as possible. Furthermore, the hydropower operations would underwrite the cost of undertaking and monitoring the results of using known anadromous stock. Due to the physical conditions limiting return anadromy and saturation of the area with resident rainbow, we will do our best to help choose stocks of high genetic integrity with populations that have expressed anadromy. To the extent possible, we will help them to spawn naturally and to emit these juveniles into as fertile a downstream environment as possible. We will use part of the profits from this hydropower to improve conditions where most efficient throughout the Cow. The poor conditions for spawning in the Kilarc bypass channel allow, if not dictate, that to fulfill the goals of the CDFG Steelhead Policy the spawning³⁷ must be done in a headrace rather than a natural channel. This is because *in this case* the natural channel contains fairly hostile conditions as the water pours down the bypass in an

³⁶ Page 5 of DOI OEPC filing, July 10, 2009.

³⁷ There is currently spawning in the headrace, primarily by brown trout. Our intent is to redesign portions of the headrace and create the conditions for spawning by steelhead. Others have suggested that we also experiment with naturally growing and releasing salmon in a manner to encourage straying. This option falls under "future research" at the Project.

incised valley in a high pyroclastic³⁸ outflow, unlike the fertile riffles and pools of a normal bypassed stream.

The only modulation of this plan will be to study and if possible encourage straying in the production of steelhead migrants so that the return will be random to other streams. This both increases the range of the intended steelhead diaspora, and steers them away from the Old Cow with its limited habitat and difficult, to nearly impossible, return and propagation potential.

The CDFG paper discusses the fish passage at the Whitmore Falls. Their conclusions appear to contrast with the observation of the Cramer Fish Science Paper (KC0336f on www.kilarc.info website). This may be a matter of statistical interpretation and need for study³⁹.

Conclusion

Sanctioning local actions while ignoring their global consequences is at the core of the environmental destruction of most species on the planet in the next few decades⁴⁰. It is convenient to ignore externalities. The construction and operation of the electric generation that will replace the Kilarc facility will pollute our air and adversely affect streams at some remote locations. In the incremental calculus of environmental degradation, destruction of habitat and contribution to global warming, these incremental decisions to demolish green power and to destroy community services should not disregard off-site stimulated impacts. There has been an incomplete response by the Agencies charged to address and protect a broad constituency within their mandates.

The loss of the Kilarc facility will have environmental consequences far beyond the project site. Each of these has externalities. Many of the Agency concerns that are not addressed in their filings, such as recreation, information, and education (see for example CDFG p. 11, item 10) are part of our goal structure. Using National and State mandates

³⁸ The source of the material in the Old Cow gorge is important because this type of material comes from the immediate banks into which the Old Cow is rapidly cutting. This bedding material is generally not well sorted or rounded and creates small beds of nearly impermeable substrate. The resulting heterogeneous matrix often lacks permeability and is uniquely unsuited for spawning.

³⁹ It may take years of observation to get sufficient flow to generate the proper conditions, thus hydraulic modeling may be warranted. There are claims and counter claims on this; CDFG suggests that these flows occur 3-4 times a year, others claim these flows are only seen every 3-4 years or longer. In any event, fish passage will be uncommon. The "Impassable Falls" upstream within the bypass area are even higher than the downstream Whitmore Falls, with a shallower pool.

⁴⁰ See publications by E. O. Wilson and colleagues such as "The Diversity of Life", and "The Creation". The contribution to current massive species extinction is driven by global warming and its handmaiden, habitat destruction. One has to ask, why destroy Green power sources such as the Kilarc for preservation of a possible allele of *O. mykiss* when, as a consequence of this action, many other species assuredly will be destroyed. The destruction of any Green power facility leads to species destruction. Perhaps not the franchised, beautiful steelhead, but other complex life forms for which we should be responsible.

to protect our global resources, then conveniently ignoring the effects of local actions on these resources, is an incomplete response.

Please note that in the case of the Kilarc Project, we have complete agreement between the Agencies and Davis Hydro on the environmental fish related goals. The difference is that Davis Hydro, arriving relatively late on the scene 2 years after the initial agreement, has worked to find a better way to accomplish these goals. The Davis Hydro Alternative asks the reviewers of these proposals to examine whether small hydro, can be allowed to work in concert with the Agencies rather than against them, to accomplish goals we hold in common. Davis Hydro sincerely extends its hand to the Agencies requesting their help to restore steelhead to the Sacramento.

Attachment 1

Kilarc Project Alternative, Research Center White Paper

By

 **Water Wise** Consulting, Colfax, CA, August 24, 2009

Attachment 2

CDFG Map, Steelhead Critical Habitat for the Central Valley - NOAA

