


CITY OF JACKSON

MEMORANDUM

TO: Honorable Mayor and Members of the City Council

FROM: Michael Daly, City Manager 

DATE: November 10, 2008

SUBJECT: Wastewater Permit Compliance Update

RECOMMENDATION

That the City Council accept a presentation regarding issues currently being studied in order to comply with the provisions of the City's National Pollution Discharge Elimination System (NPDES) wastewater permit.

DISCUSSION

In October 2007, the City's NPDES wastewater discharge permit was adopted by the California Regional Water Quality Control Board. In addition to the tightening of water quality regulations related to the treatment of wastewater, the permit included some critical provisions that have significant implications for the future discharge of the City's treated effluent.

Since the City first began treating wastewater in 1936, the treated effluent has been discharged into Jackson Creek. In 1985, the City upgraded the wastewater treatment plant to an advanced secondary/tertiary treatment level to meet the water quality concerns of the State regulatory agency in charge of protecting potable water sources. While these improvements helped to remove a cease and desist order, it did not eliminate the concerns of the Department of Health Services (recently renamed as the Department of Public Health) regarding the downstream use of Jackson Creek as a potable water source after it enters Lake Amador.

The City's previous NPDES permit issued in 2000 required the City to study the assimilative capacity of Jackson Creek and determine how often the City's wastewater discharge was more than five percent of the volume of water flowing down the creek. The City's analysis found that during ten of the previous thirty-five years, wastewater effluent was greater than five percent. During the NPDES permit renewal process, the Department of Public Health (DPH) commented that it was concerned with the site-specific impact of the City of Jackson discharge on the beneficial use of the surface water as a domestic water supply source, particularly when the flow in Jackson Creek does not provide 20:1 dilution.

The 2007 NPDES permit addressed the concerns of DPH by including the following requirement: "Five years following the adoption date of this Order, the Discharger is prohibited

from discharging wastewater into Jackson Creek in amounts that cause the downstream Lake Amador water to exceed greater than five percent volume of wastewater in Lake Amador (one part wastewater in 20 parts of Lake water, or 20:1 dilution).”

Complicating the City’s future discharge issue, however, the Department of Fish and Game also commented during the permit renewal and expressed concerns that “unless concentrations of contaminants increase, continued discharges of treated wastewater will benefit the fish and wildlife of the creek and associated habitat.” In other words, it had concerns that if the City reduced or eliminated its effluent discharge from Jackson Creek, it could negatively affect the fish and wildlife habitat dependent on the creek. This concern created an additional requirement in the City’s 2007 NPDES permit:

Jackson Creek Beneficial Use Attainment Study. This Order requires the Discharger to conduct a Beneficial Use Attainment Study for Jackson Creek, downstream of the discharge location. Based on a review of the findings of this study, and information pertaining the protection of downstream water rights and the feasibility of State Water Board Division of Water Rights approval for a decrease in discharge to the receiving water, this Order may be reopened for additional and/or modification of effluent limitations, prohibitions, and other requirements.

The Beneficial Use Attainment Study began in late spring and is coming to a conclusion. The study was conducted by the City’s wastewater engineer consulting firm, ECO:LOGIC, which teamed with biologists from Jones & Stokes for the field work and analysis. A preliminary report of the findings was presented to the Department of Fish and Game a few weeks ago and this presentation will be provided at the City Council meeting. The initial review by DFG staff was favorable, as even during the very dry conditions that existed this summer, pools of water along the creek appeared sufficient to sustain the species of concern habitat.

With the creek study in the final stages, the City’s attention is now turning to the effluent disposal options to address the NPDES permit dilution requirements. A copy of the memorandum recently prepared by ECO:LOGIC outlining the three plans currently envisioned as alternatives to be considered is attached. The three plans identified are not necessarily the only options available at this time, but given the stringent water quality regulation compliance requirements and sensitive issues surrounding Jackson Creek, these are the plans that could resolve the regulatory agency concerns identified in the City’s discharge permit.

This report is being provided for informational purposes and is not intended to be a decision making point. As the Beneficial Use Attainment Study is completed and the Department of Fish and Game finalizes its opinion about the City removing some or all of its discharge from the creek, the City will provide more detailed analysis of the costs and feasibility of the plans that have been identified to date. Additional information and an opportunity for questions will be provided at the City Council meeting.

/attachments

City of Jackson

Clean Water Act NPDES Permit

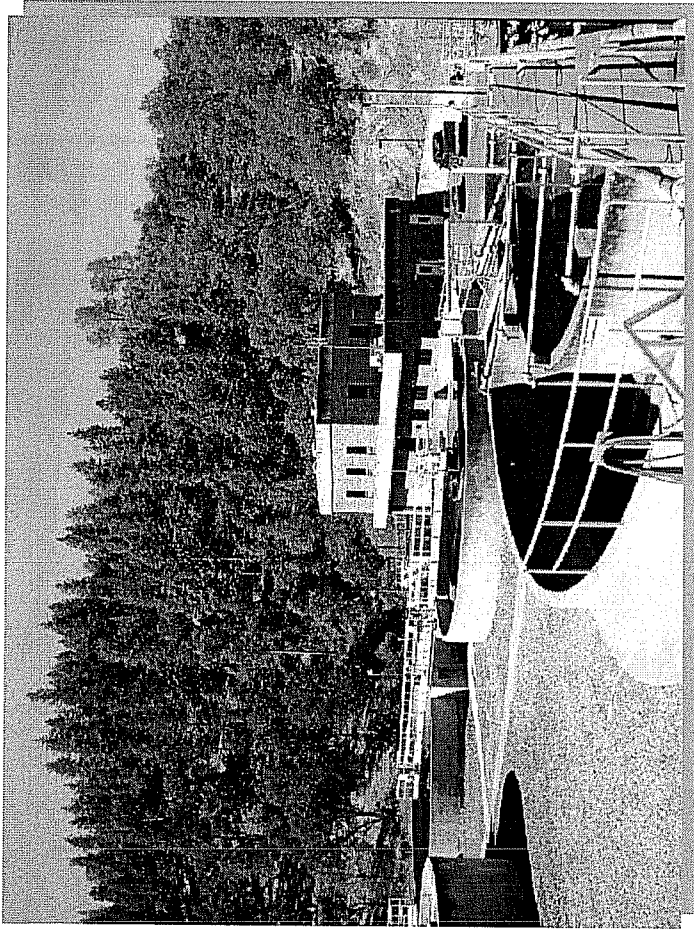


**Jackson Creek Beneficial Use Assessment Study –
Preliminary Findings and Proposed Analysis Approach**



Topics

- ❖ Site Orientation
- ❖ Jackson Creek
Beneficial Uses
- ❖ The Conundrum
(Conflicting
Agencies)
- ❖ BUAS Preliminary
Findings
- ❖ Next Steps



City of Jackson

Effluent Disposal – NPDES Compliance

The City of Jackson (City) NPDES permit adopted in October 2007 states, “Five years following the adoption date of this Order, the Discharger (City) is prohibited from discharging wastewater into Jackson Creek in amounts that cause the downstream Lake Amador water to exceed greater than five percent volume of wastewater in Lake Amador (one part wastewater in 20 parts Lake water, or 20:1 dilution).”

The City has several competing interests relative to the disposal of its effluent flow into Jackson Creek, particularly in summer and autumn:

1. The California Department of Public Health (DPH) and Regional Water Board want the City to reduce its discharge to Jackson Creek such that Lake Amador, a potable water supply, does not contain more than 5 percent effluent, per DPH guidance policy. Providing an alternative water supply to virtually all people using Lake Amador as a potable water supply would eliminate the effluent concerns of DPH; however, this does not appear to be a feasible option because of the number of remote residences using lake water as a potable water supply via the JVID irrigation water distribution system. In the absence of this option achieving the 5 percent effluent objective would require reducing the effluent discharge to Jackson Creek in drier than normal rainfall years either seasonally or year-round. Compliance with the 5 percent criterion is currently based on average monthly conditions. This represents some special problems, as will be discussed, relative to the desires of the Department of Fish and Game, and downstream property owners.
2. The California Department of Fish and Game (DFG) may want some to all effluent to remain in Jackson Creek in drier than normal summers and autumns so as to sustain a base flow in this stream that is likely to go dry under such conditions in the absence of the effluent.
3. The City of Jackson, with other cities in Amador County and the Amador Water Agency (AWA) are researching effluent reclamation which would conserve the Amador Water Agency’s limited water supply (15,000 ac-ft per year) for potable water purposes. This desire is based on:
 - a. The interest of nearby property owners (ranchers and developers) in obtaining treated wastewater for irrigation demands.
 - b. State policy to offset non-potable raw water uses with reclaimed water so as to maximize potable water use of a limited supply of raw water.
4. Some downstream property owners claim to use the water in the creek, particularly in dry summer/autumn conditions, and may have concerns if the effluent were removed from the creek under such conditions.

It is our understanding of California water law that the City cannot remove all or a major portion of its historically discharged effluent from Jackson Creek without a permit from the State Water

Board. Obtaining a permit is increasingly complicated when removing the effluent is expected to result in portions of the creek drying up in late summer and fall during dryer than normal rainfall years. As examples, EID was not permitted to remove all of its year-round effluent discharge from Deer Creek because that would have resulted in portions of Deer Creek drying up at times. San Andreas Sanitary District was permitted to remove its winter only effluent discharge from San Andreas Creek because San Andreas Creek would not dry up in winter as a result of this act.

No effluent disposal plan can fulfill all desires of all parties involved.

PLAN A

A simple, reliable plan to meet DPH and Regional Water Board needs would be to limit the monthly effluent discharge to Jackson Creek to no more than 5 percent of the total flow into Lake Amador. A sub option would allow more than 5 percent effluent in Jackson Creek if the reservoir is less than 5 percent effluent at the start of the month, but in no case would effluent be allowed to make up more than 5 percent of the reservoir volume at the end of the month. In essence, this is the plan envisioned by the Regional Water Board in response to DPH concerns about the health of people using Lake Amador as a drinking water supply. With Plan A:

- The lake would never be more than 5 percent effluent.
- Jackson Valley Irrigation District (JVID) management of its reservoir would not impact the City's compliance status
- The City would qualify for substantial dilution credits "D" (up to D=19) in the calculation of its effluent limitations,
- Wastewater treatment improvement costs could be substantially reduced compared to alternative plans under which the City would get no dilution credits.

Plan A requires the City to have a means to store and/or dispose of all effluent that cannot be discharged to Jackson creek under the 5 percent limit. Options for handling this effluent include discharge to a larger volume surface water (e.g., the Mokelumne River) or effluent storage and/or reclamation. Effluent would need to be diverted to these other effluent disposal options to a greater extent during drier water years. In critically dry years, all effluent may need to be diverted from Jackson Creek in late summer and early autumn. Some to most of the effluent may need to be diverted from the creek in the remainder of the months of a critically dry water year.

Because the effluent diversions would occur mostly in summer/autumn (the dry seasons), much of the diverted effluent could go directly to reclamation uses, thus potentially reducing storage needs and/or discharges to the Mokelumne River. Possible locations for effluent storage/reclamation facilities include area ranches desiring summer/autumn effluent for pasture irrigation, possible future reclamation sites in Jackson Hills, lands west of Martell, or other regional areas.

A problem with Plan A is that it reduces flow in Jackson Creek from the City to Lake Amador in summer/autumn, especially in drier than normal years. A solution to the problem would be to acquire "drought-proof" water rights so that water could be released to Jackson Creek in droughts

to sustain the creek's flow. This solution is unlikely because if such water rights were readily available, AWA should already have acquired them to meet their forecasts of future water needs.

If water rights are not available, and the City needs to implement Plan A, then the City would simply stop summer/autumn effluent discharges to comply with DPH policy and Regional Water Board regulation and allow a court to decide the matter if challenged by other stakeholders (i.e., DFG or landowners). If the effluent discharge is to be stopped without the benefit of replacement water, then the summer/autumn effluent discharge should be reduced to zero in a phased manner over several summers. This phased approach allows the waterway and the associated ecology to revert to a more natural state over an extended period of time that is longer than the generation time of most species, and the lifetimes of many species living on the watershed and dependant on the water. This approach allows wildlife to migrate and/or adjust its population to changing environmental conditions in smaller, less dramatic steps.

PLAN B

A plan to meet nearly all DPH, Regional Water Board, DFG, and downstream users' needs would be for the City to build a diversion dam and pump station on Jackson Creek just upstream of Lake Amador. All City effluent would be discharged to Jackson Creek. At the diversion dam, all blended effluent/creek flow that would not cause Lake Amador to exceed 5 percent effluent would pass into the lake. Any effluent/creek flow that would cause Lake Amador to exceed 5 percent effluent would be diverted to seasonal storage, and/or direct reclamation use.

With Plan B, less water reaches Lake Amador in droughts because on receding stream hydrographs in droughts that do not provide adequate dilution to the effluent (maybe April through June), both the effluent and the stream water are removed at the diversion dam. A mitigation to this problem would be for the City to acquire "drought-proof" water rights for the needed water during the required delivery period, and have that water added to Lake Amador via Lake Pardee. Again, acquiring such water rights appears to be problematic.

With Plan B, all Jackson Creek interests are made whole as long as there is no "downside" to stopping creek flow at the lake in dry spring through autumn periods, i.e., there is no spawning run that needs hydraulic continuity between Lake Amador and Jackson Creek under these critical conditions.

Under Plan B, effluent would make up 100 percent of the creek flow in dry summers and autumns; thus, the City would receive no dilution credits "D" in the calculation of its effluent limits. This could require the City to make expensive improvements to its treatment process if the effluent quality problems cannot be addressed by source control and/or Water Effect Ratio (WER) studies, or other means more cost effective than treatment.

PLAN C

Plan C would meet nearly all of DPH, Regional Board, DFG and downstream user's needs using effluent storage. Plan C is different from Plans A and B insofar as its primary focus is on maintaining flow in Jackson Creek in dry summer/autumn periods without relying on the City acquiring drought-proof water rights and without there being more than 5 percent effluent in Lake Amador on a long-term basis, a longer term basis than the one month specified in the

current waste discharge permit. An averaging period longer than one month may be appropriate based on the 70-year exposure period used to develop many water quality objectives protecting public health.

With Plan C, in drier than normal winter/spring periods, some to all effluent could be diverted from Jackson Creek to either the Mokelumne River or an effluent storage reservoir (nearby ranches, Jackson Hills, Martell or other regional possibilities). All to most summer/autumn effluent would continue to be discharged to an otherwise near-dry Jackson Creek. Thus, Jackson Creek would continue to have flow on a year-round basis even in severe droughts (runoff in winter/spring and effluent in summer/autumn); and the amount of effluent in Lake Amador under severe drought conditions would be reduced. A simplified hypothetical example of this concept is as follows. If it were calculated that 365 days of 0.5 Mgal/d effluent discharges to Jackson Creek would constitute 10 percent of the entire quantity of water reaching Lake Amador in a dry water year, then under Plan C, the strategy would be to discharge 0.5 Mgal/d of effluent to Jackson Creek in only 182 days of that dry water year. The 182 days when Jackson Creek would receive effluent would occur in summer/autumn when Jackson Creek is least likely to have a natural base flow under dry conditions. In essence, the City creates summer/autumn effluent assimilative capacity in Lake Amador by controlling its effluent discharge to Jackson Creek in the preceding winter/spring period. Because rainfall/creek flow during the winter/spring period is a strong indicator of Jackson Creek flow and Lake Amador volume during the following summer/autumn period, winter/spring rainfall and creek flow can be used as real-time indicators of whether winter/spring effluent should be diverted from Jackson Creek so as to create (or “bank”) some effluent assimilative capacity in Lake Amador to be used the following summer/autumn period. However, this operating methodology will require that the storage be greater than Plan A because it will be necessary to store winter flows that are considerably higher than summer flows.

Now that it is known that the Regional Water Board desires to regulate effluent percentage in Lake Amador based on a one-month averaging period, Plan C does not work well. This is because much of the effluent assimilative capacity created in Lake Amador by the City by reducing or stopping its effluent discharge during dry winter/spring conditions would be discharged by JVID to its irrigation customers in spring/summer such that little to no effluent assimilative capacity would be left in summer/autumn to be used by the City when Jackson Creek flows would be low to zero without the effluent. As a hypothetical example of this phenomenon under Plan C the Lake Amador potable water supply may be 2 percent effluent in winter, 1 percent effluent in spring, 5 percent effluent in summer, and 15 percent effluent in autumn as a result of releases of low effluent percentage waters by JVID for agricultural uses in the March through June period. Clearly, Plan C is not viable unless the 5 percent criterion is applied over an averaging period of at least one year, preferably longer, which is a reasonable compromise considering SIP protocol for assigning dilution credits for carcinogens, and the 70-year exposure period used to develop many water quality objectives protecting human health.

SUMMARY

A synopsis of some of the more critical aspects of the foregoing plans is presented in Table 1. Additional plans and/or variations of these plans are possible. Which of the plans is best cannot be determined until the City knows:

- Viable storage locations.
- The life cycle cost difference between treating the wastewater with 0 dilution credits, and treating the wastewater with up to 19 dilution credits. Inclusion of the cost and potential benefit of WERs needs to be considered along with the feasibility of source control for contaminants of concern. Regional Water Board policies relative to setting effluent limitations have changed recently such that review of past and possibly additional City effluent and receiving water CTR data is warranted.
- The availability/cost of delivery of out-of-basin water to Jackson Creek (Plan A) or to Lake Amador (Plan B) under severe drought conditions.
- The receptiveness of the Regional Water Board and DPH to:
 - At least one year averaging for 5 percent compliance determination purposes based on the new information regarding the uncontrollable impact of JVID reservoir operations on City compliance under Plan C; and/or
 - The 5 percent criterion not applying under specific drought conditions, e.g., 1-in-10 year or greater droughts.
- The life cycle cost of diverting, pumping, conveying, storing, and reclaiming effluent that either is not discharged to Jackson Creek, or is discharged to Jackson Creek but is diverted at a downstream location. This cost, which is different for each plan, needs to be considered in light of:
 - AWA planning for effluent treatment, storage, and reclamation in Martell (just north of the City's WWTP) and along Highway 88. If joint use of regional facilities with AWA is feasible, interim use of unused City WWTP treatment capacity by AWA may be cost effective for both parties.
 - City planning for continued City growth. All City growth needs effluent reclamation and/or discharge to the Mokelumne River. This is because there is no remaining effluent assimilative capacity in surface waters on the Lake Amador watershed.
 - The cost of diverting this effluent to the Mokelumne River rather than to storage and/or reclamation facilities, especially in winter/spring.

Regarding the beneficial use study of Jackson Creek, it appears there is sufficient loss of water from the creek (by evaporation, percolation, diversion, etc.) between the WWTP and Lake Amador that little effluent flow reaches Lake Amador in dry summers and autumns. This is important for two reasons. First, if the effluent continues to be discharged to Jackson Creek in summer/autumn periods, then less effluent actually reaches the lake than estimated in previous, simplistic water balance models. As an example, a 0.5 Mgal/d effluent discharge to the creek in summer at Jackson may result in only 0.1 Mgal/d of effluent reaching Lake Amador and needing dilution capacity there. Second, , reducing effluent discharges to Jackson Creek in summer/autumn reduces or eliminates creek flows in the lower reaches of the creek. This loss of water reduces or eliminates beneficial uses dependent on either water being present, or creek flow rate. Though there could be some loss of beneficial uses, this is not to say that some form

of negotiated settlement between the City, DFG, and downstream property owners is not possible that allows the City to reduce or stop its summer/autumn effluent discharges to Jackson Creek.

The best alternative in this matter appears to be Plan A based on it:

- Complying with DPH guidance for protecting public health from effluent discharges to surface waters.
- Stopping effluent discharges that dominate a stream. This is an objective of the Basin Plan.
- Encouraging effluent reclamation. This is an objective of AWA, the Water Code and the Basin Plan.
- Returning Jackson Creek to a more natural condition. This more natural condition could be achieved over a five-year period (or longer) in which the amount of effluent discharged to Jackson Creek would be reduced each summer/autumn period to allow wildlife to transition back into a more natural state.

Therefore, if City resources are limited to where all plans cannot be studied, then it appears appropriate to focus those resources on Plan A, then Plan C, then Plan B. With Plan A, the critical issues are costs, locating specific storage areas and water rights (which includes studies that may reduce the summer/autumn water rights needs to less than 0.5 Mgal/d).

**Table 1
City of Jackson Effluent Disposal Plans**

Plan	Dilution Credits	Additional Treatment Costs	Storage Needs/Costs*	Reclamation Land Needs*	Water Rights "Needed"	Influenced by JVID Operations	Diversion, Pumping, and Conveyance Costs	In Concert with City Growth Plans?	Biggest Obstacles*
A: Divert effluent at WWTP when 5% effluent monthly criterion for Lake Amador would not be met.	≤19	Probably none	Relatively minor because effluent diversions occur when direct reclamation is largely feasible. Any water stored is only effluent.	Sites and uses needing about 0.5 Mgal/d in summer/autumn.	≤0.5 Mgal/d in the creek for summer/autumn period to satisfy DFG and downstream property owners.	No	Pumping and conveyance costs depend on where effluent storage and reclamation are to occur. No diversion dam.	Yes, in a very simple and direct way. The City adds no more effluent to Jackson Creek except under high rainfall conditions when the creek and lake have assimilative capacity.	Cost and acquiring water rights.
B: Divert effluent/creek water blend at Lake Amador when 5% effluent monthly criterion for Lake Amador would not be met.	0	Possibly substantial. WER studies may reduce costs.	Greater than with Plan A because there is no control over the effluent/creek blend at the WWTP. Therefore, stored water is both effluent and creek water.	Unknown compared to Plan A because of the greater amount of effluent/creek blend water in storage, the lesser amount of effluent arriving at the diversion dam in summer/autumn because of in-stream losses between WWTP and the diversion dam.	Unknown flow from Pardee to Lake Amador in spring/summer to make JVID whole in droughts, exclusive of the effluent lost to their use, which they have said informally they will not protest.	No	Diversion dam plus pumping and piping to wherever effluent and creek water storage and reclamation are to occur.	Possibly. The City adds more effluent to an effluent dominated stream (contrary to the Regional Water Board's Basin Plan), but takes it out down stream for reclamation to meet the 5% criterion. The higher the City's base effluent flow the earlier the effluent/creek blend goes to storage. This results in increased storage needs (and costs) and increased Pardee water needs to keep JVID whole.	Treatment cost, water rights, and dam issues. City growth may also become an issue.
C: Store effluent in dry winter/spring periods to create effluent assimilative capacity in Lake Amador that would be used by effluent discharged to Jackson Creek in summer/autumn to sustain its flow without need for drought-proof water rights.	0	Possibly substantial. WER studies may reduce costs.	Greater than Plan A – unknown relative to Plan B. With Plan C, more effluent is stored than with Plan B, but no creek water is stored.	Unknown compared to Plans A and B	Less than Plans A and B, possibly zero as part of a negotiated settlement.	Yes, JVID could use the winter/spring water in storage before the City could use the assimilative capacity created by storing winter/spring effluent. There could be no assimilative capacity remaining in late summer/autumn when the City planned to use it to sustain creek flows.	Similar to Plan A	Similar to Plan A.	Not realistic unless at least annual averaging is allowed. Treatment level and cost are also issues.

* Storage and reclamation land needs could be reduced or eliminated by discharging the effluent to the Mokelumne River. This option under these various plans creates another obstacle to implementation.