May 25, 2007

To: Ms. Pamela Creedon
Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive
Rancho Cordova, CA 95670-6114

Dear Ms. Creedon,

The Department of Fish and Game respectfully submits the following comments on the Tentative Order for the National Pollutant Discharge Elimination System (NPDES) permit for the Lake Davis Pike Eradication Project (Project) that will be considered at the June 21 and 22, 2007 meeting of the Central Valley Regional Water Quality Control Board (Regional Board). The NPDES permit has been identified as a requirement for the Project by the Regional Board staff. The DFG has identified the northern pike as a detrimental invasive species. It is currently confined to Lake Davis, California. Northern pike have degraded the trout fishery at Lake Davis, as well as the associated local economy. Pike present a serious threat to aquatic ecosystems and sport and commercial fisheries in other parts of the state and region. This was recognized by the CALFED Bay-Delta Ecosystem Restoration Program, which identified as a strategic objective halting the unauthorized introduction and spread of potentially harmful non-native introduced species of fish, such as pike in Lake Davis, in the Bay-Delta and Central Valley. The Project was approved on January 23, 2007 after consideration of potential environmental impacts and public input, which is reflected in the Lake Davis Pike Eradication Project Environmental Impact Report/Environmental Impact Statement (EIR/EIS). The Project is scheduled to occur sometime after Labor Day and no later than October 31, 2007. The details of the approved project can be found in DFG's CEQA Findings of Fact and Overriding Considerations (CEQA Findings) at http://www.dfg.ca.gov/northernpike/.

The DFG submitted an application for a NPDES permit to the Regional Board on November 11, 2006, which was deemed complete by Regional Board staff on December 27, 2006. The Regional Board advised the DFG that the permit is needed to allow the rotenone-treated water to be neutralized and discharged. The DFG has proposed four neutralization options, which are described in the application. The DFG prefers Neutralization Option 1, which allows the water to be neutralized naturally without any chemicals by shutting off the dam outlet. However, for contingency purposes, the DFG is seeking to have all four options permitted, so that if unforeseen circumstances arise, the DFG will have options to implement the Project. This is a cautionary approach that is intended to minimize the risk of delay from any unforeseen circumstances that could delay implementation of the Project to a point in time when seasonal conditions are not ideal, as was the case in 1997, or

in another year when reservoir levels and seasonal conditions are optimal for an effective treatment (assuming pike have not escaped Lake Davis in the meantime, and the DFG has the ability and opportunity to implement an eradication project in a future year). Given the ever-increasing pike population, the increasing incidence of anglers catching pike, recent known incidents of anglers moving live pike, and the potential for spilling of the dam in extremely wet years such as last winter, the DFG believes it is critical to minimize the risk of delay in implementing the Project.

It is in this context that we respectfully submit the following comments on the Tentative Order, which was Publicly Noticed on April 25, 2007:

1. Number B5 of Page 3 of the Tentative Order initially describes Neutralization Options 3 and 4, then continues to state that variabilities in the residual concentrations of either rotenone or potassium permanganate could be outside of the target range which could "result in the death of fish and other aquatic life for a significant distance downstream." This is not expected to occur. As such, this statement is unnecessary and may bias the reader to believe that the DFG would likely be in violation of receiving water limits should Neutralization Options 3 or 4 be necessary. Similar logic could be used to prevent issuance of a discharge permit to any wastewater treatment plant, for the possibility that there may be a plant upset resulting in an exceedance of receiving water quality criteria, even though Best Management Practices are implemented. The neutralization methods proposed for this treatment of Lake Davis are superior to those in 1997 for several reasons, including the fact that water will be retained in the Lake for at least 5 days, allowing mixing before any discharge would occur, and because methods developed for application of potassium permanganate are superior than in the past. Ultimately, if the DFG were to exceed receiving water limits, we would be in violation of the discharge permit, so the statement is unnecessary. We request that the last sentence of item B5 on Page 3 be removed.

2. The Tentative Order states that the Regional Board is not able to prepare a permit including DFG's proposed Neutralization Options 3 and 4 because the options would result in an acutely toxic mixing zone in Big Grizzly Creek downstream of Grizzly Valley Dam. Specifically, the Tentative Order states on page 3, item B6, "Allowing for acute in-stream toxicity and 100 percent mortality within and beyond the mixing zone of a permitted discharge as proposed in Neutralization options 3 and 4 is against the policy of the Regional Water Board as explained in detail in the Fact Sheet (Attachment F) and is not authorized by this Order." However, the neutralization reach was identified as part of the project area in the EIR/EIS which states on page 2-1, "The EIR/EIS project area comprises the area directly affected by the project alternatives, including treatment and neutralization activities: Lake Davis, waters draining into Lake Davis that may contain pike, and a portion of Big Grizzly Creek below Grizzly Valley Dam. The project area is represented by the watershed of Lake Davis and the portion of Big Grizzly Creek below the dam that flows to the Middle Fork Feather River, as shown on Figure 2-3, Project Area." Page 7-51 of the EIR/EIS considered several impacts that would result from in-stream Neutralization Options 3 and 4, including:

- The impact to desirable fish species from rotenone or potassium permanganate under Options 3 and 4 would be less than significant, since the area affected would be relatively small and the fishery would quickly re-establish. No mitigation is required.
- There would be no impact to special status macroinvertebrate species from neutralization, as none of these species have been found in Big Grizzly Creek downstream of Lake Davis. No mitigation is required.
- The impact to macroinvertebrate communities from rotenone or potassium permanganate with Options 3 and 4 would be less than significant as the neutralization zone is short. Areas below this point and tributary springs would serve as sources of recolonization. As a result, no taxa are expected to be lost, and reestablishment is expected to occur with[in] a few months. No mitigation is required.

These impacts are identified in the CEQA Findings for the Project. (See page 39, Exhibit A, CEQA Findings.)

To help ensure that pike do not escape Lake Davis, the Project must be implemented. Therefore, it is critical that Neutralization Options 3 and 4 be included in a NPDES permit as a contingency if for some reason, beyond the control of the DFG, Options 1 or 2 are not able to be implemented. The DFG requests the Regional Board permit all four options notwithstanding the Regional Board staff's decision to not prepare an Order that includes Neutralization Options 3 and 4. Attached are technical plans for implementation of Neutralization Options 3 and 4 that we believe are consistent with Best Management Practices and should be included in this permit.

In the event the Regional Board decides not to permit Options 3 and 4, the DFG has requested preparation of a separate NPDES permit by the State Water Resources Control Board to allow neutralization of the rotenone by Options 3 and 4. We request concurrence from the Regional Board that this is a necessary process.

3. The Fact Sheet includes statements regarding Options 3 and 4 that raise the same issue as described above. Modifications to page F-7 should be consistent with the recommendations above.

4. Page F-7, sixth sentence regarding the description for Neutralization Option 2 includes the incomplete phrase, "Regional Water Board agrees this option" which should be removed.

5. Implementation of the Project will include application of rotenone in the tributary streams to Lake Davis approximately 15 days prior to application in the reservoir. Based on current dry hydrologic conditions, we estimate that approximately 5.1 gallons of CFT Legumine or Noxfish (the rotenone formulations that may be used) could feasibly enter Lake Davis reservoir from the tributaries flowing into Lake Davis (Big Grizzly Creek, Cow Creek, and Freeman Creek). The other tributary streams to Lake Davis are anticipated to

be dry in fall 2007 or contain minimal water that does not flow into the reservoir at the time of year when the treatment will occur. The concentration of any formulation constituent has been calculated to be well below the detection limits (Table 1) due to the considerable dilution from the untreated water in Lake Davis. The dilution calculations are based on the anticipated Lake Davis volume in September 2007 of 41,500 acre-feet. The calculated concentration of methyl pyrrolidone in Lake Davis is 0.03173 ppb following the stream treatment and mixing of the chemical in the lake. The diethylene glycol ethyl ether calculated dilution concentration at the anticipated 2007 tributary treatment level would be 0.21004 ppb.
In addition to the considerable dilution in Lake Davis, we also expect degradation of the rotenone formulation as it travels downstream by dilution, sunlight, vegetation and organic matter. The three flowing tributary streams are at the opposite end of the lake from the dam. The chemical would have to be transported the entire length of the lake to reach the outlet structure. Therefore, there should be no need to shut off the dam to contain rotenone from the stream treatments until just prior to the treatment of the reservoir begins. While the chemical calculations provided here are not a complete model of hydrologic conditions between the tributaries and the reservoir, they also do not account for any expected significant amount of degradation of all formulation constituents as they pass through the reservoir. Due to the inherent uncertainty with predicting stream flows, water temperature, hydrologic functions, and chemical degradation, the DFG will implement monitoring for the formulation constituents of concern at the INF-001 location as directed by the Regional Board. If any formulation constituents are detected at Grizzly Valley Dam (monitoring location INF-001), the DFG will implement monitoring at sites downstream in Big Grizzly Creek to ensure that receiving water limits are not exceeded and take appropriate measures should they be needed.

6. Section IV of the Findings on page 10 of the Tentative Order, Item D states, “Potassium permanganate shall be used, as per label instructions, to detoxify rotenone before it escapes the treatment area.” The item should be in reference to escape from the neutralization area instead of the treatment area.

7. Tables 6a and 6b on page 12 include numeric receiving water limits in Big Grizzly Creek for two constituents in the CFT Legumine rotenone formulation proposed for use in Lake Davis that are overly conservative and focus on beneficial use criteria that are not applicable due to elements implicit in the project action that already address the concerns. We request consideration of alternative receiving water limits for this permit.

    - Methyl pyrrolidone (MP; CAS 872504) is anticipated to achieve concentrations in Lake Davis waters immediately after treatment of approximately 88 µg/l (*see* Final EIS, Table J-15), based on past lot analyses of the formulation, and proposed treatment concentration.

The receiving water limit of 30 µg/l for methyl pyrrolidone in the Tentative Order is not reflective of the inherent low toxicity of the compound, its ready degradability in aquatic systems, or language identified elsewhere in the permit. Specifically, the permit states the intent of the Regional Board to assure residual formulation components "do not escape Lake Davis and enter Big Grizzly Creek where they may be toxic to fish and other aquatic life or otherwise impact beneficial uses" (Attachment F, page 6). Even at the maximum treatment concentration that would be realized in the reservoir, toxic concentrations of methyl pyrrolidone will not be approached. Following the five day degradation in the reservoir before discharging to Big Grizzly Creek, any residual concentrations of methyl pyrrolidone would be below toxic concentrations. It will be readily oxidized by sunlight, and is hygroscopic (readily degrades in contact with water). Thus, the receiving water limit of 30 µg/l methyl pyrrolidone in Big Grizzly Creek does not reflect a scientific basis for impact to narrative aquatic life standards and ignores the recognition in the permit that any potential degradation (pursuant to Resolution 68-16) will be transitory (*see* pg 8 of Order).

A search of the AQUIRE database identified only one other toxicity metric for the compound: a 48 hour LC_{50} of 1,230 µg/l in daphnia[1] (Lan et al. 2004), which would rank the compound as moderately toxic to pelagic aquatic invertebrates. Table F-3 in the Fact Sheet (Page F19) of the Tentative Order, footnote number 3, describes that 1/10th of the calculated 96 hour LC_{50} was used to develop the criteria. A multiplier of 0.10 to the LC_{50} is a very conservative safety margin. Extrapolation from the 48 hour LC_{50} to a 96 hour LC_{50} further reduced the receiving water limit. This method of calculation resulted in a criterion that is unnecessarily low. A 48 hour acute toxicity test is standard for a short-lived invertebrate so a safety factor is not necessary. Based on established aquatic life criteria[2], and the aquatic toxicity information available for this compound, methyl pyrrolidone would be considered *not acutely toxic* based on a NOEL of 5 g/L (i.e., 5,000,000 µg/l) in freshwater algae, bacteria and protozoa, as reported in the EIS (*see* Table J-15). No aquatic toxicity information has been identified in fish; however, the MSDS sheet of one manufacturer, BHS Marketing[3], states, "this material is expected to be non-hazardous to aquatic

[1] Lan, C.H., C.Y. Peng, and T.S. Lin. 2004. Acute Aquatic Toxicity of N-Methyl-2-Pyrrolidinone to Daphnia magna Bull.Environ.Contam.Toxicol. 73(2):392-397

[2] Very highly toxic = LC50 < 100 ug/L
Highly toxic = 100-1,000
Moderately toxic = 1,000-10,000
Slightly toxic = 10,000-100,000
Not acutely toxic = >100,000
Source: Narrative descriptions of toxicity were assigned based on LC_{50}, values according to the guidelines in M. A. Kamrin, *Pesticide Profiles: Toxicity, Environmental Impact, and Fate,* Lewis Publishers (Boca Raton, FL, 1997), p. 8

[3] www.bhsmarketing.com/msds/nmp.pdf

species." Since a 48 hour toxicity test is standard for daphnids and limited other data is available, the DFG recommends that the receiving water limit be set at not less than $1/10^{th}$ of the 48 hour LC_{50} for *Daphnia magna*, or 123 µg/l.

- The receiving water criteria applied to the Tentative Order for diethylene glycol ethyl ether (DEGEE) were for taste and odor (21 µg/l). The expected treatment concentration will be 581.1 µg/l (*see* Final EIS, Table J-15). Since the taste and odor criteria are a secondary drinking water standard, we request that long-term averaging be applied to the receiving water criteria. Other beneficial uses of Lake Davis waters that enter Big Grizzly Creek (i.e., drinking water supply) are not relevant because the DFG will be providing drinking water for all residents until all constituents are repeatedly undetectable. Impact PS-5, on page 13-8 of the Final EIR/EIS states, "On a temporary basis, downstream water users would be adversely affected during treatment and neutralization period as a result of reduced water flows from Grizzly Valley Dam under the Proposed Project/Proposed Action. This represents a significant, but mitigable, adverse water supply impact." Mitigation PS-5 includes the requirement that the DFG shall survey Big Grizzly Creek (downstream from the dam) to identify all riparian diversions potentially affected by the project. To implement this mitigation, DFG is contacting affected water users to determine the nature and amount of their water diversion. The DFG shall, in coordination with the land holders, temporarily provide alternative water sources to all water users along Big Grizzly Creek to meet their existing water demands until residues of *all* rotenone formulation constituents are repeatedly undetectable (See pages 76-79, Exhibit A, CEQA Findings). It is our understanding that none of these permitted water uses include domestic water use or drinking water. It is with this understanding, we believe, that the permit recognizes elsewhere that there will be "no effect on drinking water from the project" (*see* pg 3, number 8, of the Tentative Order).

  Because the DFG will mitigate for impacts to downstream water users on Big Grizzly Creek as a result of any of the Neutralization Options, other criteria, such as toxicity, may be considered as an alternative if long-term averaging is not approved. Table 1 appended to this letter demonstrates the summation of aquatic toxicity metrics catalogued in AQUIRE, that document the 'not acutely toxic' nature of DEGEE, in a broad variety of fish and other aquatic life.

- The receiving water limit for naphthalene is set at 21 µg/l based on a taste and odor threshold for domestic water. The DFG requests that long-term averaging be applied to this limit since it is a secondary drinking water standard.

8. Page 12 of the Tentative Order, Table 6a, includes a footnote that states that the numeric limits are protective of aquatic life. Rather, the receiving water limit of 1.8 mg/L potassium permanganate would not be protective of aquatic life. Since the DFG will be conducting toxicological monitoring with live cars and sentinel fish, we request the numeric limit for potassium permanganate be removed, but monitoring and reporting of potassium permanganate concentrations in the discharge will be conducted, along with the toxicity criteria based on live-car monitoring.

9. Page 19, item 3b states that the neutralization system shall be capable of removing rotenone formulation constituents to meet receiving water limits in Big Grizzly Creek at the point of discharge. This is inconsistent with the point of compliance established at BGC1.5b. We recommend that adding, "or downstream as provided in Section IX in the Monitoring and Reporting Program (Attachment E)" would resolve the inconsistency. Page F-14, A.3 should be similarly modified for accuracy.

10. The map on page C-1 should include the location for EFF-001.

11. Page E1, Item E states that EPA Method 8015b allows for the analysis of n-methyl-2pyrrolidone and diethylene glycol ethyl ether via a non-standard method. We request that the method reference for these compounds be revised to direct injection and analysis by LCMS, which the DFG laboratory is capable of performing. Validation of the method is ongoing. Currently, sample recovery using the method is superior to the recovery using EPA Method 8015b.

12. Page E-5 to E-7: We request that the sampling location for potassium permanganate be required for two sites instead of three. The Tentative Order requires monitoring at EFF-001, BGC1.5a, and BGC 1.5b. Since BGC 1.5a is the compliance point, we recommend retaining that site for potassium permanganate monitoring but removal of site BGC1.5b.

13. Page E-10, Item C, states that the applications of rotenone "must be conducted by under the supervision of a licensed applicator…". This should read "under the supervision of a licensed applicator" (remove "by").

14. Page F-6, at the top of the page, describes the tributary and lake application of rotenone formulation. The volume of rotenone formulation expected to be applied to the tributaries that will likely be flowing into Lake Davis during September 2007 is approximately 5.1 gallons rather than 200 gallons, provided the treatment occurs in 2007 which is a dry water-year. The total volume of rotenone formulation applied to all tributary waterbodies to Lake Davis may be about 100 gallons. This is a reduction from the anticipated volume identified in the FEIR/EIS because we wanted to be conservative in the FEIR/EIS regarding the amount of chemical that might be applied. We took this approach because the amount of precipitation that would be

received during the wet season of 2007 was unknown when the EIR/EIS was being drafted and finalized..

15. The second paragraph of Part A, Description of Treatment or Controls on Page F-6, states that Options 3 and 4 are prohibited. We request that the language be modified to state that the Options are "not authorized", which would be consistent with the current language in the Findings section of the Tentative Order.

16. Page F-7, first two sentences includes a reference to legal and practical considerations for water rights and downstream water users. The DFG is mitigating impacts to downstream water users as identified in DFG's CEQA Findings. Evidence of this is being provided to the State Water Resources Control Board, Division of Water Rights, and the Department of Water Resources. Since the water rights issue is not a subject of this Tentative Order, we request that the language be removed.

17. Page F-17, Item 3 has a reference to an ND Receiving Water Limit for methyl pyrrolidone. The Receiving Water Limit cited in the Tentative Order is not ND.

18. Page F-24, Item B.3 includes the assertion that residual rotenone will continue to be neutralized by potassium permanganate during shipment of the sample to the lab, resulting in false negative results. DFG requests that the assertion be removed due to lack of evidence that this has occurred in the past or that this may occur with the discharge for this Project. According to the labels for the rotenone formulations that may be used for the treatment, rotenone is oxidized by potassium permanganate in 15 to 30 minutes. Since sample collection for compliance monitoring would occur after at least a 30 minute contact time with potassium permanganate, there would not be any residual rotenone expected in the sample. However, DFG concurs with the remainder of the justification for Whole Effluent Toxicity Testing Requirements. The numbering of the justifications needs to be corrected as number 3 appears twice.

We are very close to being able to eradicate pike from Lake Davis. The pike have been detrimental to the local trout fishery and the associated local economy. Pike pose a threat to the rest of the state and region, and particularly the Bay-Delta. At the moment, pike are contained in Lake Davis. However, the pike population is ever-increasing, the incidence of anglers catching pike is on the rise, there are recent known incidents of anglers moving live pike, and there is the potential for the dam to spill in extremely wet years such as last winter. Therefore, the DFG believes it is critical to minimize the risk of delay in implementing this important Project. We request your assistance in this effort for the benefit of the local area as well as the State.

Please feel free to contact Ed Pert at (916) 653-7889 or Janna Rinderneck at (916) 826-9729 if you have any questions or would like to discuss this matter.

Sincerely,

L. Ryan Broddrick
Director

Cc: Ed Pert
Stephanie Tom Coupe
Janna Rinderneck
Dept. Fish and Game

James Pedri
Phil Woodward
Central Valley Regional Water Quality Control Board
415 Knollcrest Dr., Ste. 100
Redding, CA 96002

Attachments:
Draft Plans for Neutralization Options 3 and 4
Calculation of formulation constituents potentially discharging to Lake Davis during tributary treatment
AQUIRE toxicity data

Table 1 – Application of piscicide to 1 cfs from 30 drip station with no constituent degradation

				Diluted concentration in Lake (ppb)					
				CFT Legumine				Noxfish	
Gallon of Chemical	**Acre-feet of water treated**	**Lake volume (acre-feet)**	**Dilution Factor**	**rotenone concentration**	**Rotenolone concentration**	**Methyl pyrrolidone concentration**	**Diethylene glycol ethyl ether concentration**	**rotenone concentration**	**Rotenolone concentrati**
Formula Concentration (*u*g/L) (* 30 drip stations)				1263	156	2634	17433	1464	4
5.1	0.5	41,500	1.20482E-05	0.01522	0.00188	0.03173	0.21004	0.01764	0.0052771
Detection Limits				**2.00**	**2.00**	**5.00**	**5.00**	**2.00**	

*For this table, it is assumed that 1 ppm of the formulation is being applied at 30 drip stations treating 1 cfs and there is no degradation of any constit

Table 2:

AQUIRE Toxicity Database for Methyl Pyrrolidone

Species Group	Endpoint	Effect	Exposure Duration (Days)	Conc (ug/L)	Author	Title	Source
Crustaceans	LC50	MOR	1	2500	Lan, C.H., C.Y. Peng, and T.S. Lin	Acute Aquatic Toxicity of N-Methyl-2-Pyrrolidinone to Daphnia magna	Bull.Environ.Contam.Toxicol. 73(2):39 397
Crustaceans	LC50	MOR	2	1230	Lan, C.H., C.Y. Peng, and T.S. Lin	Acute Aquatic Toxicity of N-Methyl-2-Pyrrolidinone to Daphnia magna	Bull.Environ.Contam.Toxicol. 73(2):39 397

Table 3: AQUIRE Toxicity data
FRESHWATER AQUATIC TOXICITY DATA FOR DIETHYLENE GLYCOL ETHYL ETHER
2-(2-Ethoxyethoxy)ethanol (CAS 111900)

Species Scientific Name	Species Common Name	Species Group	Endpoint	Effect	Exposure Duration (Days)	Conc	Conc Units	Author	Title
Rana catesbeiana	Bullfrog	Amphibians	LC50	MOR	4	20900000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Rana catesbeiana	Bullfrog	Amphibians	LC50	MOR	4	156	mmol/L	Bottger, A.	Belastung Reinigungs
Daphnia magna	Water flea	Crustaceans	EC50	BEH	2	29.785	mmol/L	Bottger, A.	Belastung Reinigungs
Daphnia magna	Water flea	Crustaceans	LC50	MOR	2	3340000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Daphnia magna	Water flea	Crustaceans	LC50	MOR	2	4670000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Orconectes immunis	Crayfish	Crustaceans	LC50	MOR	4	34700000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Orconectes immunis	Crayfish	Crustaceans	LC50	MOR	4	386.3	mmol/L	Bottger, A.	Belastung Reinigungs
Carassius auratus	Goldfish	Fish	LC50	MOR	1	>5000000	ug/L	Bridie, A.L., C.J.M. Wolff, and M. Winter	The Acute Goldfish
Carassius auratus	Goldfish	Fish	LC50	MOR	4	20800000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Carassius auratus	Goldfish	Fish	LC50	MOR	4	154.9	mmol/L	Bottger, A.	Belastung Reinigungs
Gambusia affinis	Western mosquitofish	Fish	LC50	MOR	4	12900000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Gambusia affinis	Western mosquitofish	Fish	LC50	MOR	4	15200000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Gambusia affinis	Western mosquitofish	Fish	LC50	MOR	4	104.5	mmol/L	Bottger, A.	Belastung Reinigungs
Ictalurus punctatus	Channel catfish	Fish	LC50	MOR	4	6010000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm

Ictalurus punctatus	Channel catfish	Fish	LC50	MOR	4	44.8	mmol/L	Bottger, A.	Belastung
Lepomis macrochirus	Bluegill	Fish	LC50	MOR	4	21400000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparati
Lepomis macrochirus	Bluegill	Fish	LC50	MOR	4	159	mmol/L	Bottger, A.	Belastung
Lepomis macrochirus	Bluegill	Fish	LC50	MOR	4	>10000000	ug/L	Dawson, G.W., A.L. Jennings, D. Drozdowski, and E. Rider	The Acute
Menidia beryllina	Inland silverside	Fish	LC50	MOR	4	>10000000	ug/L	Dawson, G.W., A.L. Jennings, D. Drozdowski, and E. Rider	The Acute
Oncorhynchus mykiss	Rainbow trout,donaldson trout	Fish	LC50	MOR	4	13400000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparati
Oncorhynchus mykiss	Rainbow trout,donaldson trout	Fish	LC50	MOR	4	100	mmol/L	Bottger, A.	Belastung
Pimephales promelas	Fathead minnow	Fish	LC50	MOR	4	13900000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparati
Pimephales promelas	Fathead minnow	Fish	LC50	MOR	4	26500000	ug/L	Geiger, D.L., D.J. Call, and L.T. Brooke	Acute Toxi
Pimephales promelas	Fathead minnow	Fish	LC50	MOR	4	9650000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparati
Pimephales promelas	Fathead minnow	Fish	LC50	MOR	4	87.9	mmol/L	Bottger, A.	Belastung
Cyprinus carpio	common carp	Fish	NR	MOR	4	NR	ug/L	Loeb, H.A., and W.H. Kelly	Acute Oral
Lepomis macrochirus	Bluegill	Fish	NR	NOC	1	5000	ug/L	Applegate, V.C., J.H. Howell, A.E. Hall Jr., and M.A. Smith	Toxicity of
Oncorhynchus kisutch	Coho salmon,silver salmon	Fish	NR	MOR	1	10000	ug/L	MacPhee, C., and R. Ruelle	Lethal Effe
Oncorhynchus mykiss	Rainbow trout,donaldson trout	Fish	NR	NOC	1	5000	ug/L	Applegate, V.C., J.H. Howell, A.E. Hall Jr., and M.A. Smith	Toxicity of
Oncorhynchus tshawytscha	Chinook salmon	Fish	NR	MOR	1	10000	ug/L	MacPhee, C., and R. Ruelle	Lethal Effe
Petromyzon marinus	Sea lamprey	Fish	NR	NOC	1	5000	ug/L	Applegate, V.C., J.H. Howell, A.E. Hall Jr., and M.A. Smith	Toxicity of
Ptychocheilus oregonensis	Northern squawfish	Fish	NR	MOR	1	10000	ug/L	MacPhee, C., and R. Ruelle	Lethal Effe

Tanytarsus dissimilis	Midge	Insects/Spiders	LC50	MOR	2	18800000	ug/L	Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.L. Aoki, and G.D. Veith	Comparativ Ten Comm
Tanytarsus dissimilis	Midge	Insects/Spiders	LC50	MOR	2	140	mmol/L	Bottger, A.	Belastung Reinigungs

Notes:
Data search results from AQUIRE database search performed April 17, 2007
MOR = mortality
NOC = multiple effects or endpoint lacking a specific effect.
NR = not reported
BEH = behavior