

Y O L O C O U N T Y

January 30, 2004

FLOOD CONTROL &
WATER CONSERVATION
DISTRICT



Philip S. Isorena, Senior Engineer
State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento, CA 95814

RE: Mitigated Negative Declaration for Use Of Copper To Control Aquatic Weeds In
Irrigation and Stormwater Canals and Ditches

Dear Mr. Isorena:

The Yolo County Flood Control and Water Conservation District (District) plans to use copper in our canals and ditches this spring and summer. Therefore, we have elected to obtain a SIP Section 5.3 exception. The completed the CEQA documentation is hereby submitted it in compliance with your deadline of February 2, 2004.

The District has completed the CEQA process for the use of copper to control aquatic weeds in the District's irrigation and stormwater canals and ditches. The District's Board of Directors adopted a Mitigated Negative Declaration for the project at a special Board meeting held on January 29, 2004.

The attached binder contains a copies of the Notice of Determination, and signed originals of the District Resolution 04.02 adopting the Mitigated Negative Declaration, the State Implementation Plan Section 5.3 Exception Information Sheet, and the Initial Study with the adopted Mitigated Negative Declaration.

The District respectfully requests an NPDES permit by issued for the use of copper as provided for in this Mitigated Negative Declaration. Please inform us as soon as possible regarding the permit issuance process. In particular, we need clarification of the role of the local Regional Water Quality Control Board and the requirements of the new general permit for permittees that have a SIP exception.

If you have questions, please call. Thank you for your assistance in this matter.

Sincerely yours,

Christy Barton
Assistant General Manager

Enclosure

34274 State Highway 16
Woodland, CA 95695-9371
(530) 662-0265
FAX (530) 662-4982
www.ycfwcwd.org

Tim O'Halloran
General Manager



Notice of Determination

To: Governor's Office Planning and Research
California State Clearinghouse and Planning Unit
1400 Tenth Street
P.O. Box 3044
Sacramento, CA 95812-3044

From: Yolo County Flood Control & Water Conservation District

Subject: FILING OF NOTICE OF DETERMINATION IN COMPLIANCE WITH SECTION 21108 OF THE PUBLIC RESOURCES CODE

Project Title: Use of Copper to Control Aquatic Weeds in Irrigation and Stormwater Canals and Ditches

Contact Person: Mrs. Christy Barton, Yolo County Flood Control & Water Conservation District,
34274 State Highway 16, Woodland, CA 95695, (530) 662-0265.

A copy of the Mitigated Negative Declaration adopted for this project and related documents are available for public examination at the District office at the above address and telephone number.

- Project Location: Within the Yolo County Flood Control And Water Conservation District, within Yolo County
- Project Description: Application of copper-based aquatic pesticides to canals and ditches under the District's jurisdiction in order to control a variety of aquatic weeds for the purpose of maintaining adequate water conveyance system capacity.

Determination: This notice is to advise that the Yolo County Flood Control and Water Conservation District approved the above-described project on January 29, 2004, and has made the following determinations:

1. The project will have a significant effect on the environment.
 will not have a significant effect on the environment.
2. An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
 A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures were, were not, made a condition of the approval of this project.
4. A statement of Overriding Considerations was, was not, adopted for this project.
5. California State Department of Fish & Game fees (AB 3158)
 - a) The project has been found to be de minimis thus not subject to the provisions of AB 3158
 - b) The project is not de minimis and is, therefore, subject to the following fees:
 - \$1,250 for review of a Negative Declaration
 - \$850 for review of an Environmental Impact Report
 - \$25 for County Fish and Game program processing fees


Christy Barton, Assistant General Manager

February 2, 2004
Date



Notice of Determination

To: Yolo County Clerk-Recorder
625 Court Street, Room 105
Woodland, CA 95695

From: Yolo County Flood Control & Water Conservation District

Subject: FILING OF NOTICE OF DETERMINATION IN COMPLIANCE WITH SECTION 21108 OF THE PUBLIC RESOURCES CODE

Project Title: Use of Copper to Control Aquatic Weeds in Irrigation and Stormwater Canals and Ditches

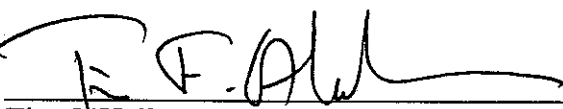
Contact Person: Mrs. Christy Barton, Yolo County Flood Control & Water Conservation District,
34274 State Highway 16, Woodland, CA 95695, (530) 662-0265.

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 - \$850 for review of an Environmental Impact Report
 - \$25 for County Fish and Game program processing fees



Tim O'Halloran, General Manager

January 30, 2004
Date



**RESOLUTION NO. 04.02
OF THE YOLO COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
ADOPTING CEQA MITIGATED NEGATIVE DECLARATION
FOR USE OF COPPER TO CONTROL AQUATIC WEEDS
IN IRRIGATION AND STORMWATER CANALS AND DITCHES**

WHEREAS, the District proposes to apply copper-based aquatic pesticides to canals and ditches under the District's jurisdiction in order to control a variety of aquatic weeds for the purpose of maintaining adequate water conveyance system capacity (the "Project");

WHEREAS, the District has prepared the *Initial Study and Mitigated Negative Declaration for Use of Copper to Control Aquatic Weeds in Irrigation and Stormwater Canals and Ditches*, dated December 29, 2003 (the "Initial Study"), for the Project pursuant to the California Environmental Quality Act and CEQA Guidelines (collectively "CEQA");

WHEREAS, the Initial Study concluded that the Project, with the implementation of mitigation measures identified in the Initial Study, will not have a significant effect on the environment;

WHEREAS, the District therefore has proposed to adopt a CEQA Mitigated Negative Declaration for the Project, and a notice of intent to adopt the mitigated negative declaration was circulated for public review and comment in accordance with CEQA requirements;

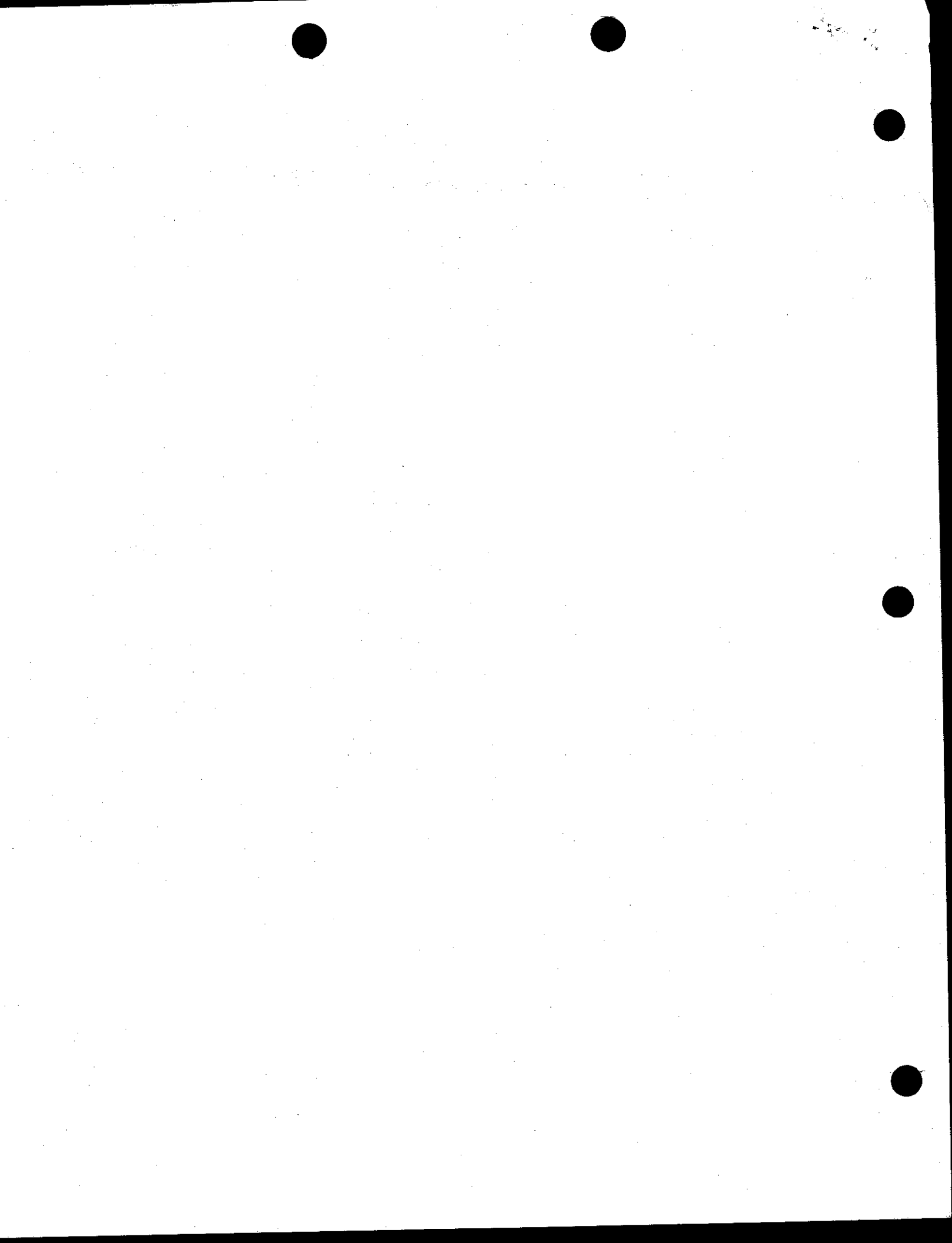
WHEREAS, the District has received one written comment concerning the notice of intent; and

WHEREAS, the District General Manager and staff have recommended that the Board of Directors adopt the Mitigated Negative Declaration and authorize the filing of a CEQA Notice of Determination;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Yolo County Flood Control & Water Conservation District as follows:

1. Mitigated Negative Declaration. The District hereby adopts this Mitigated Negative Declaration for the Project pursuant to CEQA:

a. Name of Project: Use of Copper to Control Aquatic Weeds in Irrigation and Stormwater Canals and Ditches.



b. **Project Proponent and Lead Agency:** Yolo County Flood Control & Water Conservation District, 34274 State Highway 16, Woodland, CA 95695, (530) 662-0265. Contact person: Mrs. Christy Barton, Assistant General Manager.

c. **Project Description:** See Exhibit A. For more information concerning the Project, see the Initial Study, which is available for review and copying during regular business hours at the District office at the above address, and on-line at www.ycfcwcd.org.

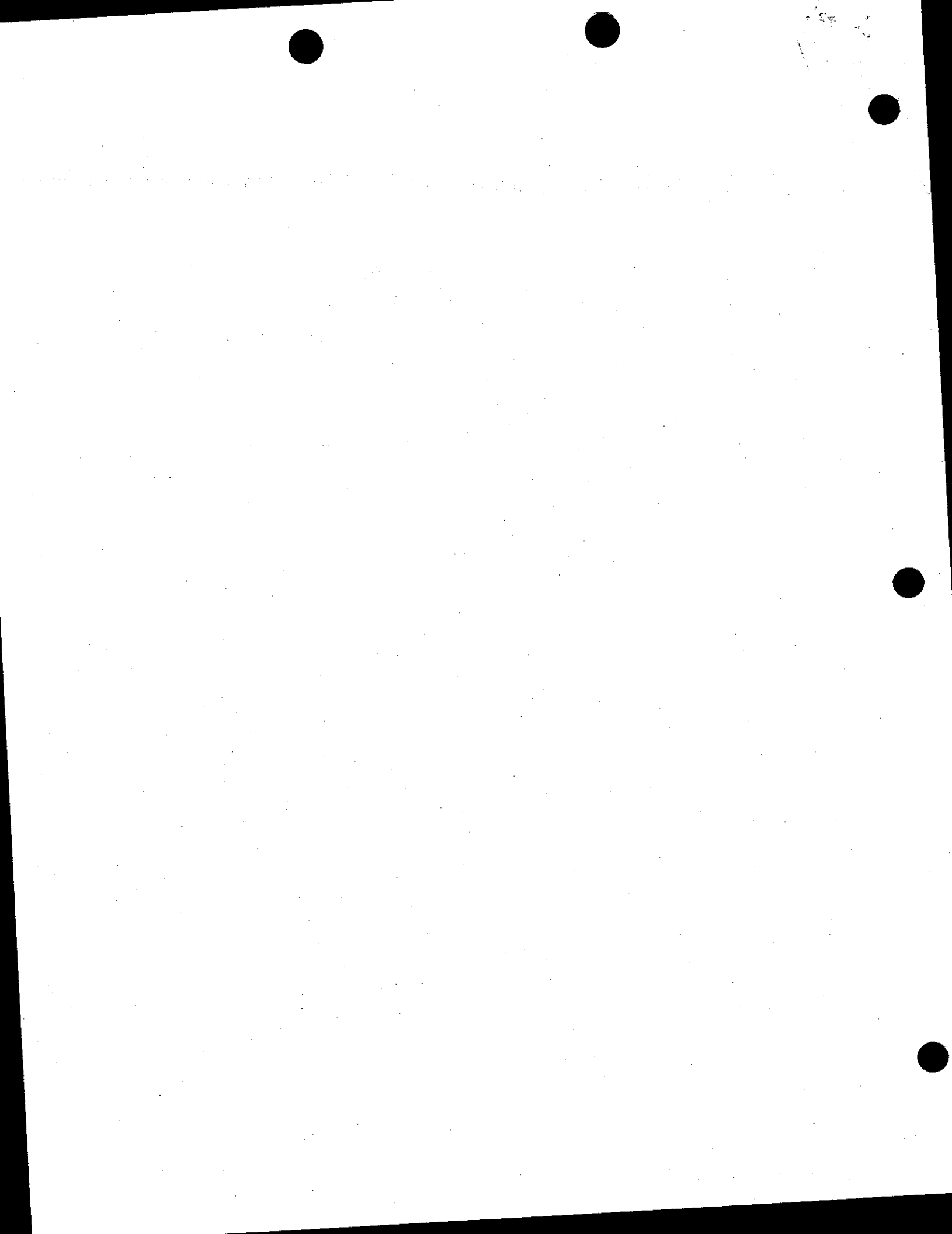
d. **Project Location:** Within the Yolo County Flood Control and Water Conservation District, within Yolo County

e. **Findings:** The Board has reviewed the proposed Project, Initial Study, public comments received, staff report and other documents and information received from District staff. On the basis of this information and the whole record before the District, the Board hereby finds and determines as follows:

- i) The Initial Study and Mitigated Negative Declaration reflect the District's independent judgment and analysis;
- ii) Although the Project could have a significant effect on the environment without mitigation, there will not be a significant effect because the District has put appropriate mitigation measures in place; and
- iii) There is no substantial evidence, in light of the whole record before the District, that the Project may have a significant effect on the environment.

f. **Location and Custodian of Documents:** The Initial Study, documents referred to in the Initial Study, notice of intent to adopt a mitigated negative declaration, and other documents concerning the Project are on file and available for public review at the District office at the above address. The Assistant General Manager at the above address is the custodian of the documents that constitute the record of proceedings upon which the decision in this matter is based.

2. Project Approval. The District Board hereby approves the Project (as described in the Initial Study) and authorizes the General Manager to proceed with Project implementation in accordance with District policies and budget, and applicable public bidding and procurement requirements.



3. **Notice of Determination.** The District Board hereby authorizes and directs the General Manager or his designee to prepare, sign and file a CEQA Notice of Determination with the Yolo County Clerk and the State Clearinghouse within five days from the date of this Mitigated Negative Declaration, and to pay the California Department of Fish and Game fee for review of a mitigated negative declaration in accordance with Fish and Game Code section 711.4.

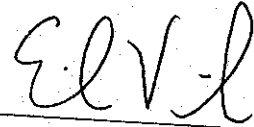
PASSED AND ADOPTED by the Board of Directors of the Yolo County Flood Control & Water Conservation District at a special meeting thereof held on January 29, 2004 by the following roll call vote:

AYES: DIRECTORS BRICE, ROMINGER, SCHEURING AND VINK

NOES: NONE

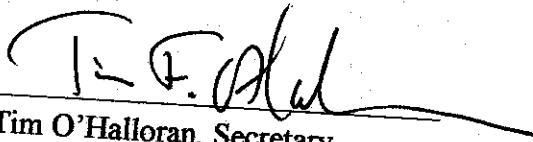
ABSENT: DIRECTOR EOFF

Signed by me after its passage this 29th day of January 2004.



Erik Vink, Chairman

ATTEST:



Tim O'Halloran, Secretary

Attachment

Exhibit A - Project Description

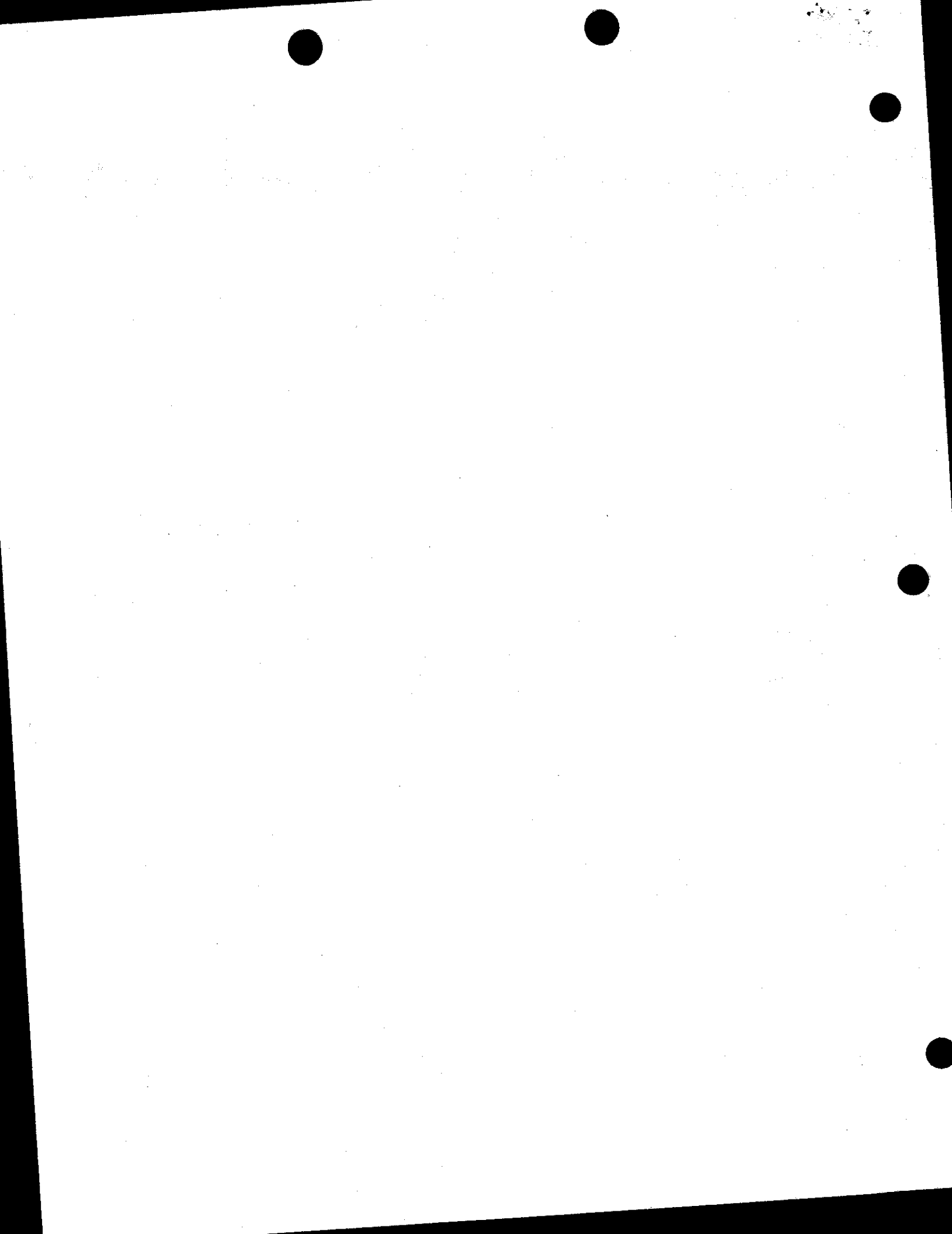


EXHIBIT A - PROJECT DESCRIPTION

The Yolo County Flood Control and Water Conservation District (YCFC&WCD, herein referred to as the "District") operates over 150 miles of irrigation ditches and canals within its 195,000 acre jurisdiction. The District is located in western Yolo County and is bordered by Solano County to the south. The District includes the cities of Woodland, Davis, Winters, and the towns of Capay, Esparto, and Madison.

The District gets water from Clear Lake and Indian Valley Reservoir, both of which are upstream of Yolo County and store water for irrigation use. There is a small dam 5 miles downstream of Clear Lake that stores winter water for downstream uses during the summer. Indian Valley Reservoir was constructed by the District and is located on the North Fork of Cache Creek. Stored waters in Clear Lake and Indian Valley Reservoir are released down Cache Creek and the North Fork of Cache Creek, respectively, and diverted into the West Adams and Winters canal systems at the Capay Diversion Dam, an inflatable dam just upstream of the town of Capay. The District then distributes this water typically to Yolo County farms to grow a variety of crops including tomatoes, grapes, rice, corn, and alfalfa. However, industrial uses of water are also made such as uses during construction. In the winter, the District's canals and ditches capture some stormwater that is diverted into the first downstream slough providing some flood control.

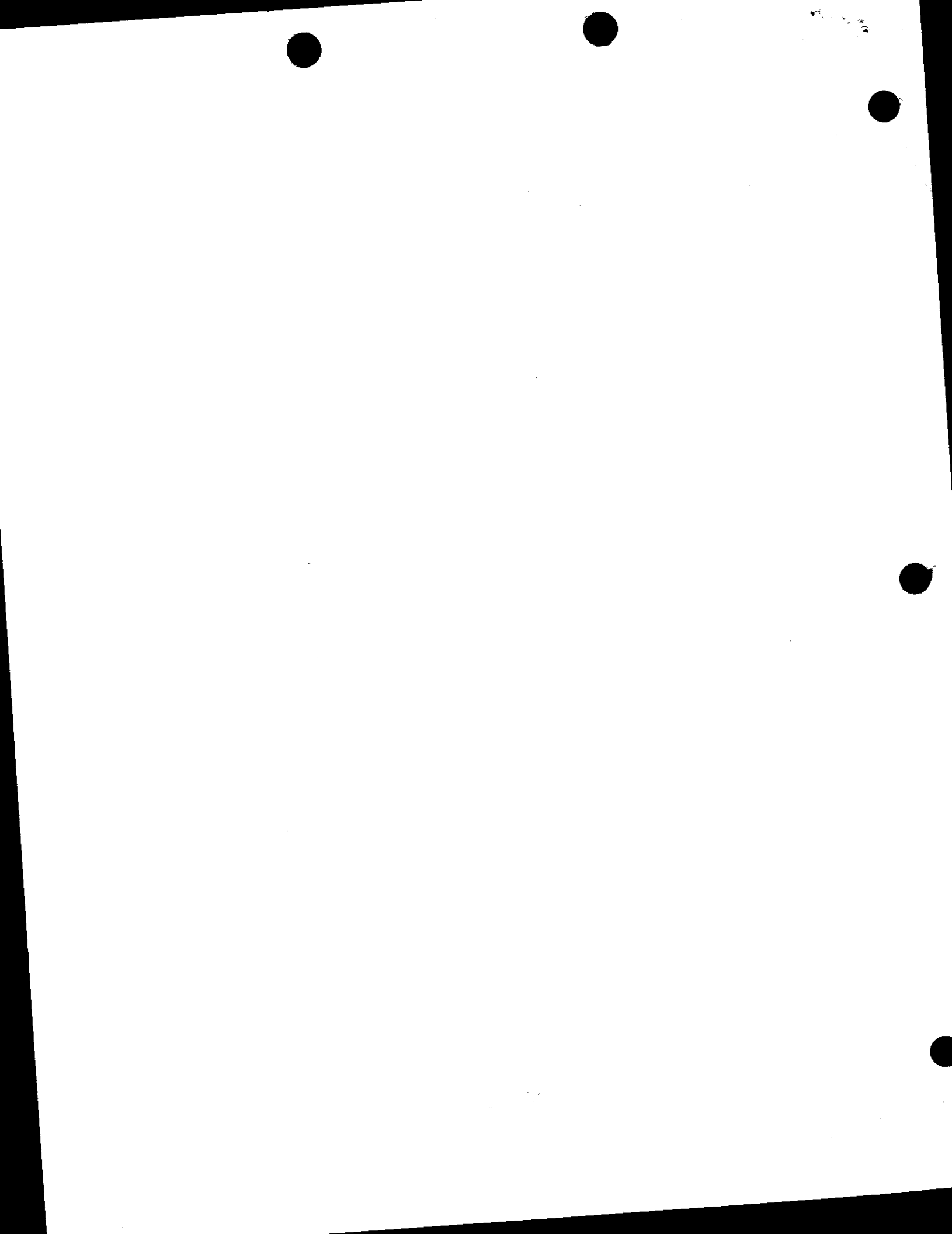
Efficient conveyance of irrigation and stormwater is critical to the District. The District's ditches and canals are prone to infestation by several floating and submersed aquatic weeds including algae, pondweed, coontail, and watermilfoil. The presence of these weeds can slow or stop the flow of water in a canal or ditch, clog siphon tubes or pumps, or block screens, thus preventing delivery of irrigation water to a field and reducing the carrying capacity of the main canals and ditches.

The District's management of aquatic weeds is limited exclusively to its canals and ditches. The District does not control any weeds in Cache Creek, Willow Slough or any other natural stream course within its boundaries.

The District uses Integrated Pest Management (IPM) to manage aquatic weeds. IPM is a management tool that uses site scouting, weed thresholds and implementation of a variety of control measures to maintain weed populations at levels that do not disrupt the flow of water. Control measures employed by the District include cultural, mechanical and chemical techniques. The use of copper-based aquatic pesticides is one of the chemical controls employed by the District.

Application of copper-containing aquatic pesticides is done on an "as-needed basis" in accordance with the IPM approach used by the District. If needed, applications are typically done in the spring, summer, and/or late fall.

In summary, the project is described as the District's application of copper-based aquatic pesticides to canals and ditches under its jurisdiction to control a variety of aquatic weeds for the purposes of maintaining acceptable irrigation and stormwater conveyance.



State Implementation Plan (SIP) Section 5.3 Exception Information Sheet

The Use of Copper to Control Aquatic Weeds In Irrigation
and Stormwater Canals and Ditches

Yolo County Flood Control and Water Conservation District

January 30, 2004

1. **Notification.** The Yolo County Flood Control and Water Conservation District (District) will notify potentially effected public and governmental agencies of the project. The project is described in the District's Initial Study/Mitigated Negative Declaration (IS/MND) dated January 30, 2004.
2. **Description of the Proposed Action.** The proposed action is the application of copper pesticides to water in irrigation ditches and canals for the purposes of controlling weeds and algae. For a more detailed description, see the District's aforementioned IS/MND.
3. **Method of Completing the Action.** The action (the application of copper pesticides) will be completed according to the copper pesticide product's label directions. Refer to Appendix B of the aforementioned IS/MND.
4. **Schedule.** The schedule for the action will be according to Integrated Pest Management (IPM) principles. For example, the application of aquatic pesticides will be done at times and frequencies when the concentration of weeds equals or exceeds thresholds established by the District.
5. **Discharge and Receiving Water Quality Monitoring Plan.** The District will continue to use the Central Valley Regional Water Control Board (CV-RWQCB)-approved Regional Pesticide Monitoring Plan (RPMP) until such time as the new 2004 NPDES permit for the use of aquatic pesticides is adopted by the State Water Resources Control Board (SWRCB). The RPMP describes in detail the requirements for sampling, analysis, and reporting before, during, and after the project. Further, the RPMP contains a Quality Assurance Project Plan (QAPP) that describes in detail the quality assurance and quality control procedures used for the project.
6. **Contingency Plans.** In the event that the District cannot use the SIP exception regarding the use of copper to control aquatic weeds, manual control of these weeds may be an option in some areas.
7. **Identification of Alternate Water Supply.** Not applicable. The District has only the Cache Creek Water shed including Clear Lake and Indian Valley Reservoir as its water sources. Groundwater is a potential ~~no~~ alternative water supplies-y. however the District does not have any groundwater wells at this time. Furthermore, the use of groundwater would not resolve the problem of aquatic weed presence in District's canals and ditches.
8. **Residual Waste Disposal Plans.** Not Applicable. The District's use of copper to control aquatic weeds in canals and ditches does not create residual waste. Note that the manual removal of weeks creates substantial residual waste.
9. **Certification by a Qualified Biologist.** At the completion of the project, the District will provide certification by a qualified biologist that the receiving water beneficial uses have been maintained. Post-project certification will take into account natural variations in project site conditions and the influence these conditions have on beneficial uses.



**Use of Copper to Control Aquatic Weeds
In Irrigation and Stormwater Canals and Ditches**

**California Environmental Quality Act
Initial Study
And
Mitigated Negative Declaration**

February 1, 2004

Prepared for
**Yolo County Flood Control and Water Conservation District
34274 State Highway 16
Woodland, CA 95695
Contact: Christy Barton: 530.662.0265**

Prepared by
**Blankinship & Associates, Inc.
2940 Spafford St, Suite 110
Davis, CA 95616
Contact: Michael S. Blankinship, P.E.
530.757.0941**



**Use of Copper to Control Aquatic Weeds In Irrigation and
Stormwater Canals and Ditches
Draft California Environmental Quality Act
Initial Study & Mitigated Negative Declaration
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- Figure 2. Project Location Map**
- Figure 3. Yolo Co. Flood Control & Water Conservation District Overview Map**
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- Table 1. Summary of Copper Aquatic Toxicity**

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- A DPR PCA Recommendation**
- B Example Product Label, MSDS, and Manufacturer's Use Guide**
- C Yolo Regional Pesticide Monitoring Plan**
- D District Flyer on Dangers of Canals and Ditches**



1.0 PROJECT DESCRIPTION

Introduction

The Yolo County Flood Control and Water Conservation District (YCFC&WCD, herein referred to as the "District") operates over 150 miles of irrigation ditches and canals within its 195,000 acre jurisdiction. The District is located in western Yolo County and is bordered by Solano County to the south. The District includes the cities of Woodland, Davis, Winters, and the towns of Capay, Esparto, and Madison. Refer to **Figures 1 and 2**.

The District gets water from Clear Lake and Indian Valley Reservoir, both of which are upstream of Yolo County and store water for irrigation use. There is a small dam 5 miles downstream of Clear Lake that stores winter water for downstream uses during the summer. Indian Valley Reservoir was constructed by the District and is located on the North Fork of Cache Creek. Stored waters in Clear Lake and Indian Valley Reservoir are released down Cache Creek and the North Fork of Cache Creek, respectively, and diverted into the West Adams and Winters canal systems at the Capay Diversion Dam, an inflatable dam just upstream of the town of Capay. The District then distributes this water typically to Yolo County farms to grow a variety of crops including tomatoes, grapes, rice, corn, and alfalfa. However, industrial uses of water are also made such as uses during construction. In the winter, the District's canals and ditches capture some stormwater that is diverted into the first downstream slough providing some flood control. Refer to **Figure 3**.

Efficient conveyance of irrigation and stormwater is critical to the District. The District's ditches and canals are prone to infestation by several floating and submersed aquatic weeds including algae, pondweed, coontail, and watermilfoil. The presence of these weeds can slow or stop the flow of water in a canal or ditch, clog siphon tubes or pumps, or block screens, thus preventing delivery of irrigation water to a field and reducing the carrying capacity of the main canals and ditches.

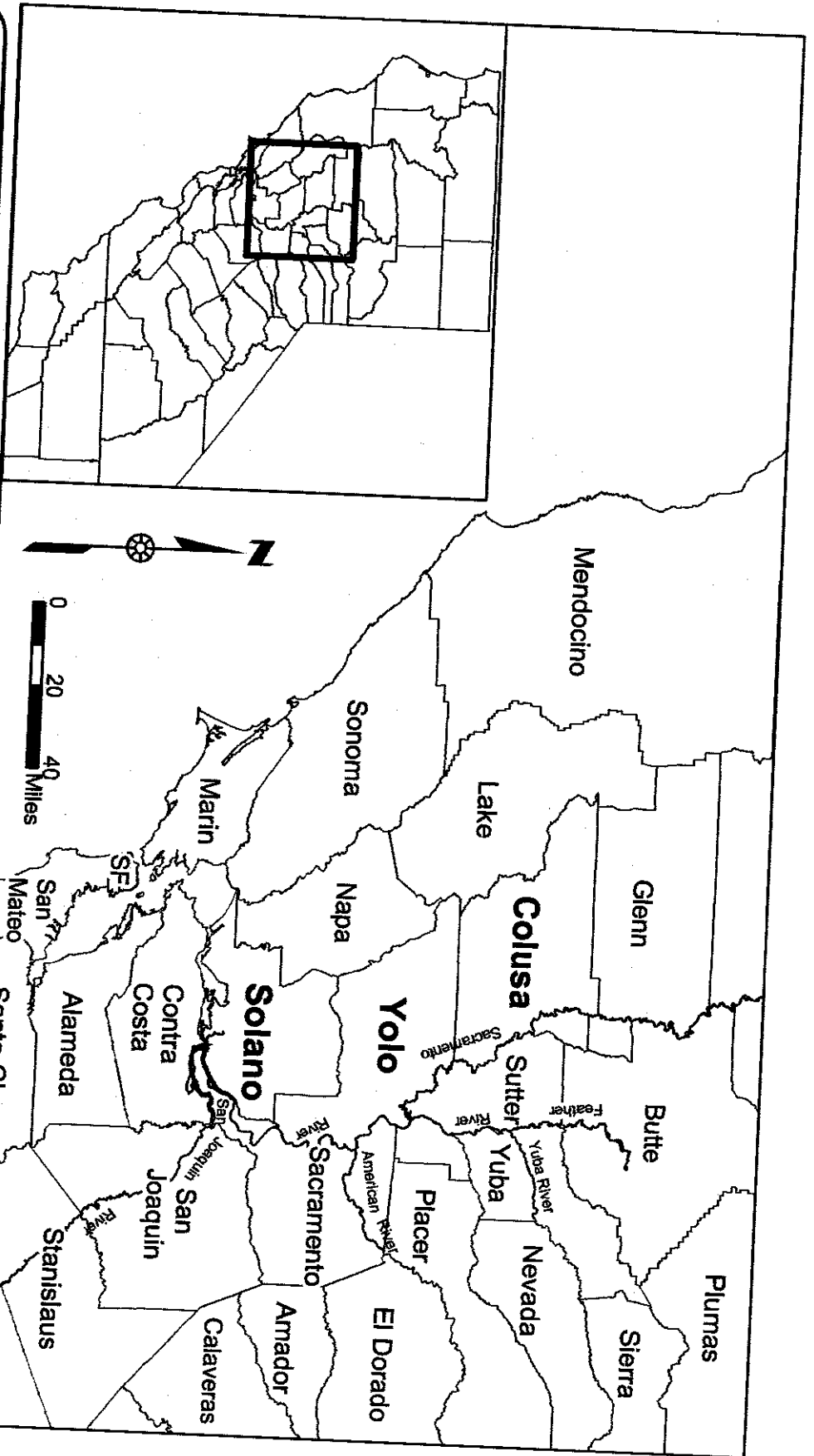
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The District uses Integrated Pest Management (IPM) to manage aquatic weeds. IPM is management tool that uses site scouting, weed thresholds and implementation of a variety of control measures to maintain weed populations at levels that do not disrupt the flow of water. Control measures employed by the District include cultural, mechanical and chemical techniques. The use of copper-based aquatic pesticides is one of the chemical controls employed by the District.

1.2 Regulatory Setting

The District currently applies aquatic pesticides under the State Water Resource Control Board (SWRCB) interim Emergency General Statewide National Pollution Discharge Elimination System (NPDES) Permit for Discharges of Aquatic Pesticides to Surface Waters of the United States (#CAG990003, Water Quality Order #2001-12-DWQ). This interim emergency general NPDES permit expires on January 31, 2004.

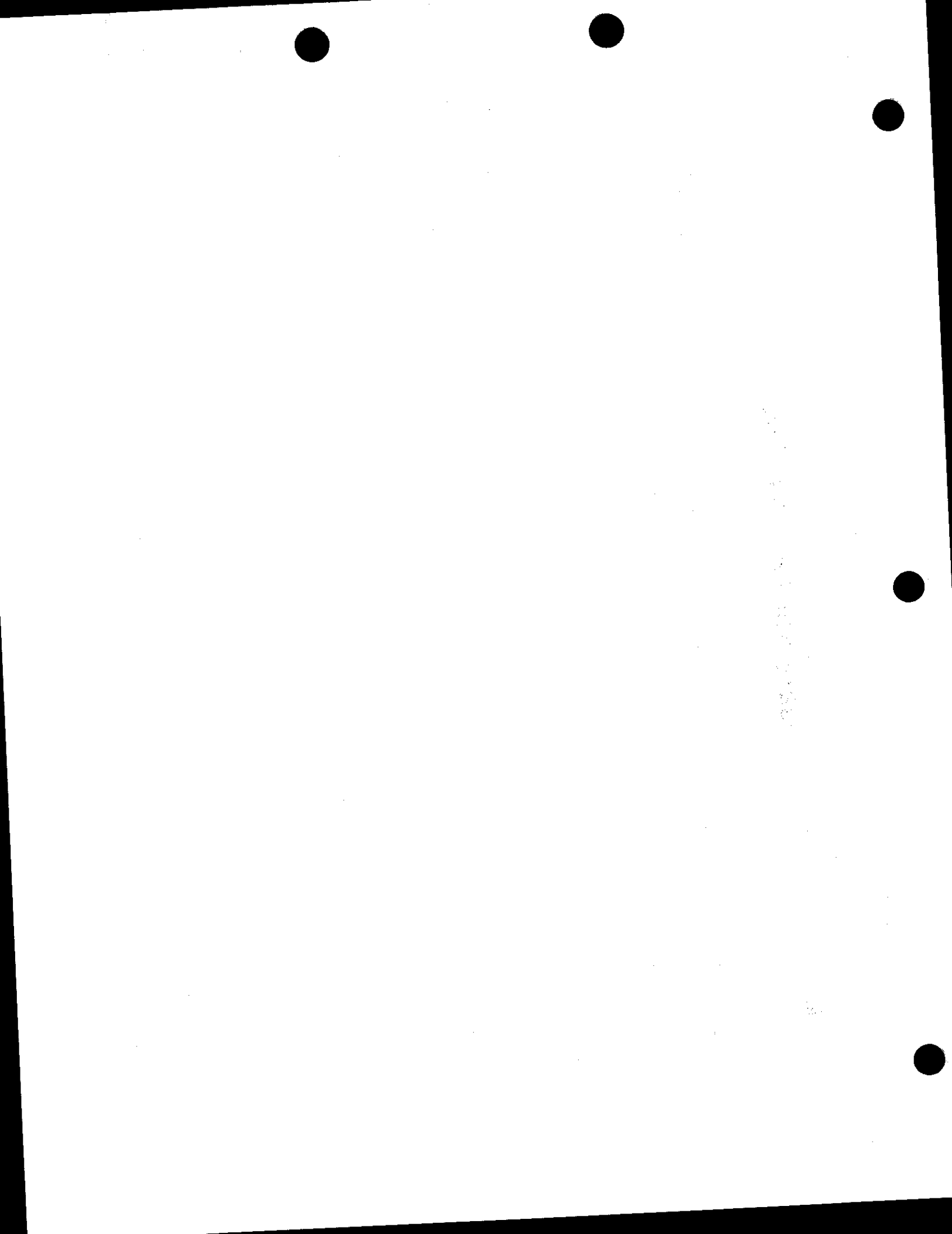


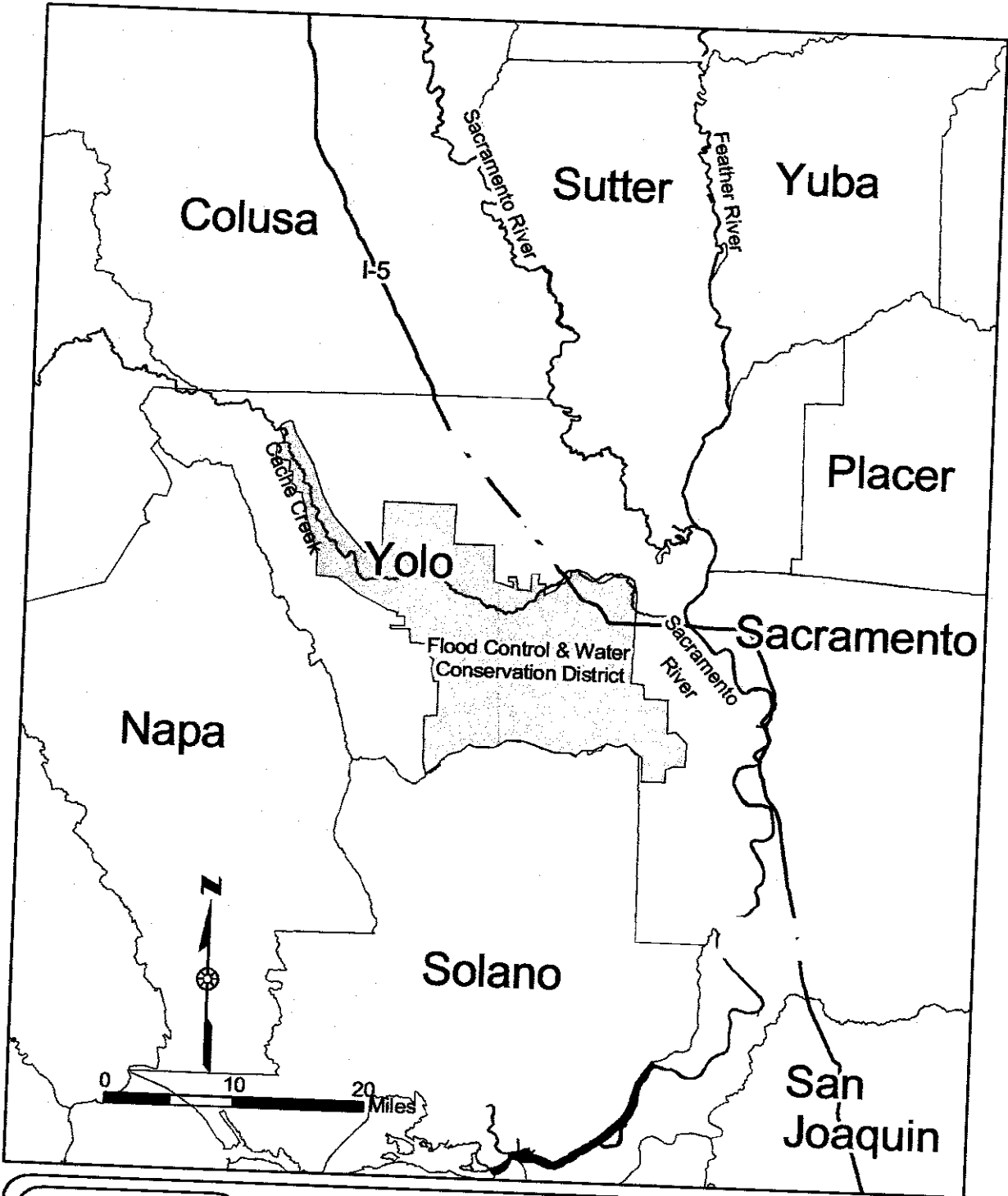


Blankinship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 2940 Spafford Street
 Suite 110
 Davis, California 95616
 Ph: (530) 757-0941 Fax: (530) 757-0940

Project Vicinity Map

Project	Figure
Yolo Co FC&WCD	1
Date	
December 2003	
Scale	
As shown	

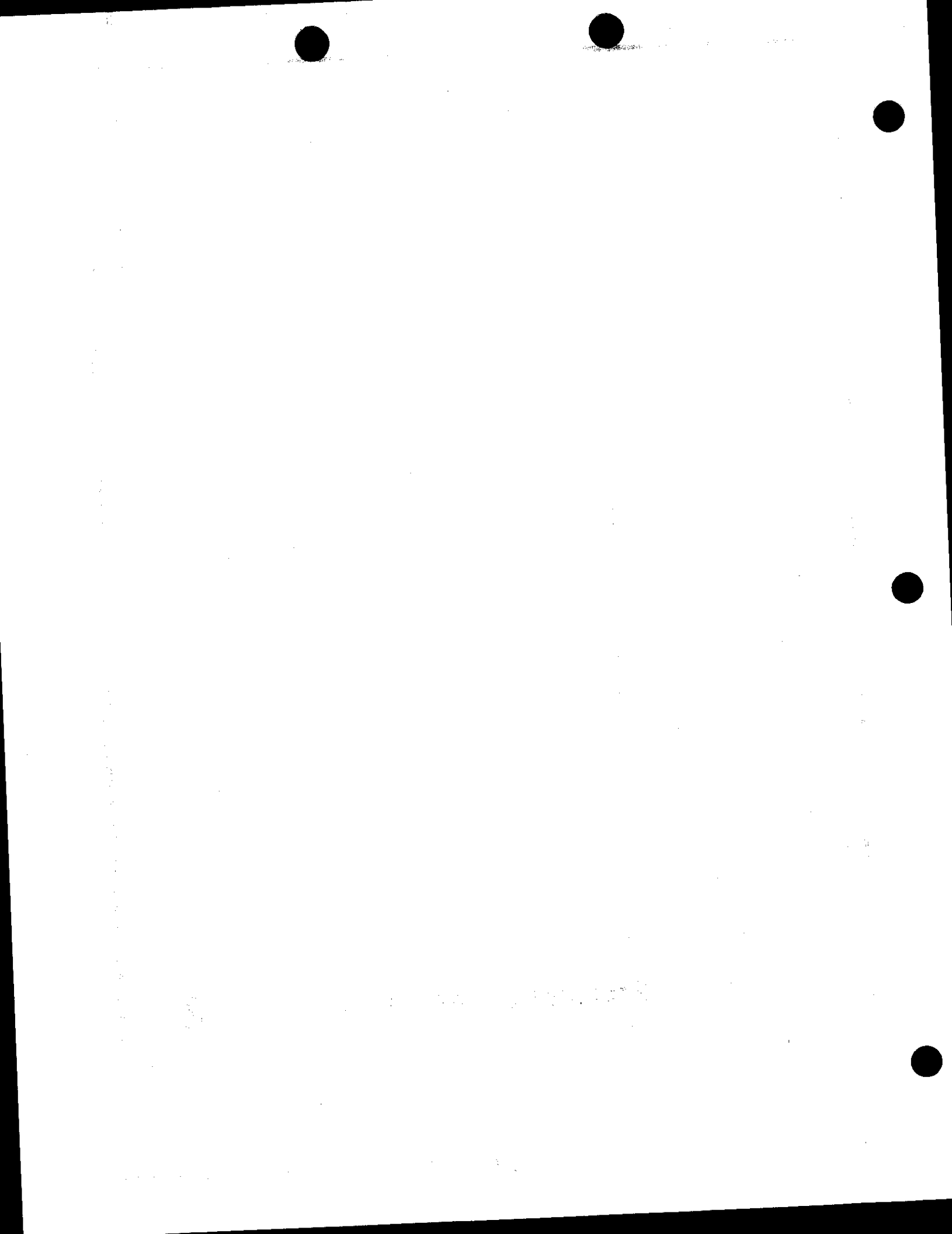




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Project Location Map

Project	Figure
Yolo Co FC&WCD	2
Date	
December 2003	
Scale	As shown



Legend



Canals or Ditches



Natural Water Course

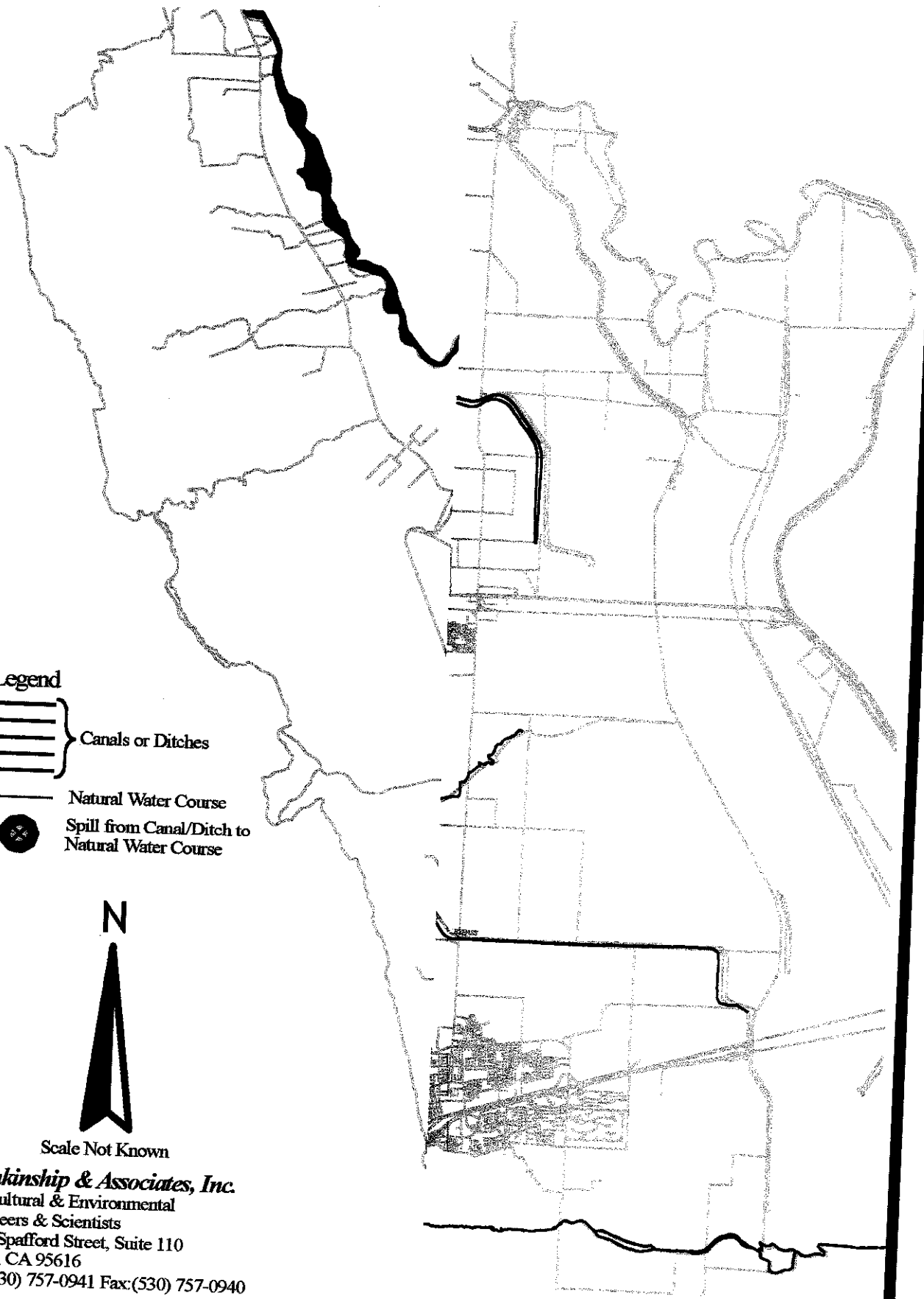


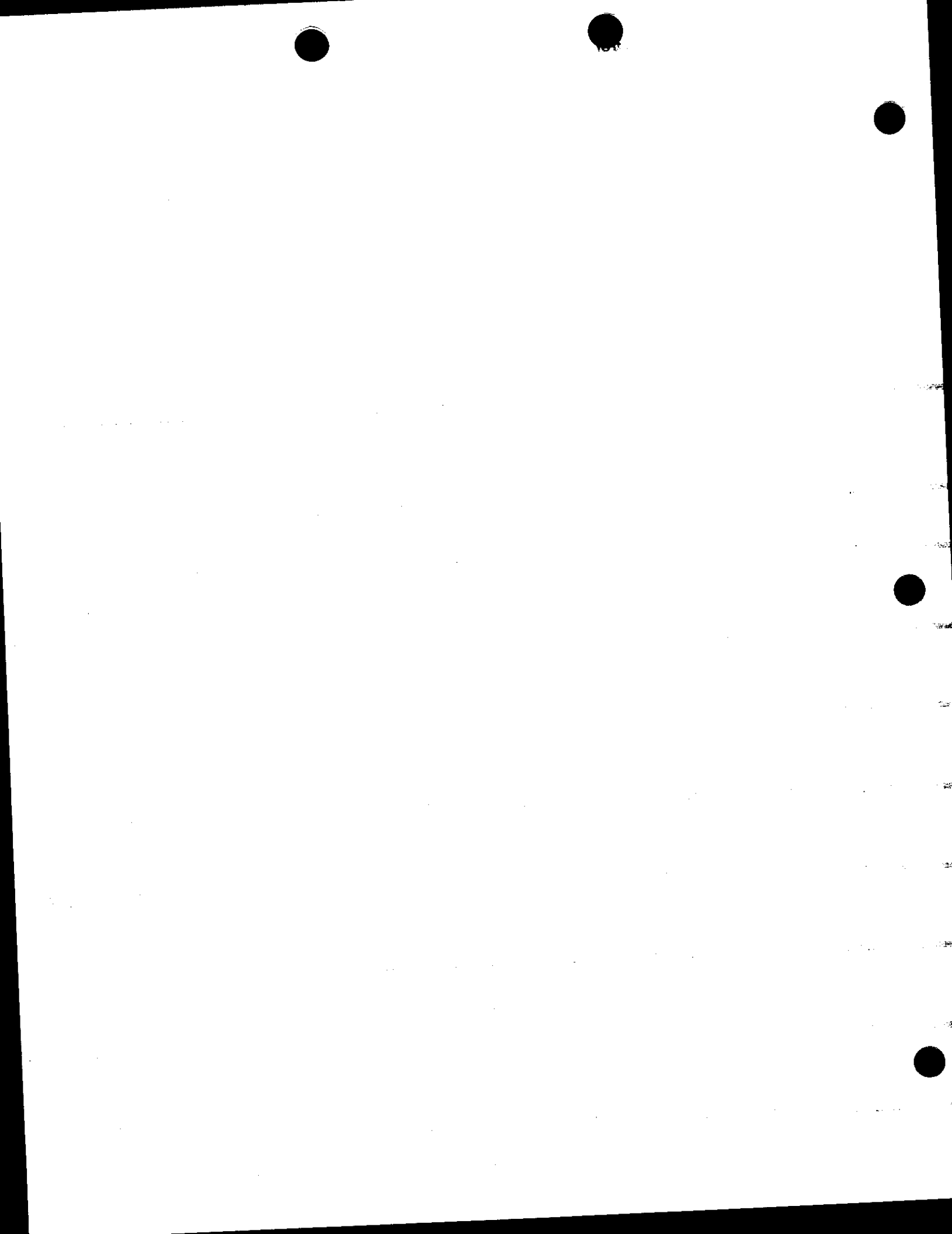
Spill from Canal/Ditch to Natural Water Course



Scale Not Known

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Engineers & Scientists
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Davis, CA 95616
Ph: (530) 757-0941 Fax: (530) 757-0940





For purposes of complying with this permit, the District is a member of the Yolo Regional Pesticide Monitoring Program (RPMP). The Yolo RPMP consists of the District, Reclamation Districts 108, 900, 999, and the Cache Creek Conservancy.

On November 26, 2003, the SWRCB released a draft of the new proposed statewide general NPDES Permit for Discharge of Aquatic Pesticides For Aquatic Weed Control In Irrigation Systems, Drinking Water Canals, and Surface Water Impoundments that are Waters of the United States (herein referred to as the "2004 General Permit"). Because the interim emergency general NPDES will expire, the District intends to use the 2004 General Permit to continue application of aquatic pesticides.

The 2004 General Permit requires compliance with:

- The California Toxics Rule (CTR)
- The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California (aka the State Implementation Plan, or SIP; SWRCB, 2000)
- Applicable Regional Water Quality Control Board (RWQCB) Basin Plan Water Quality Objectives (WQOs)

The CTR established priority pollutant criteria for copper- and acrolein-containing pesticides. Any aquatic pesticide containing copper or acrolein would be prohibited from being applied in concentrations that would exceed applicable water quality criteria outside of an established mixing zone¹.

The presence of a mixing zone, if any, within the District is not defined at this time. Nonetheless, the District has elected to proceed with obtaining a SIP exception in the event that a mixing zone is determined to exist within the District.

Section 5.3 of the SIP stipulates that Regional Water Quality Control Boards (RWQCBs) may allow for short-term or seasonal categorical exceptions from CTR priority pollutant criteria if determined necessary to implement control measures either:

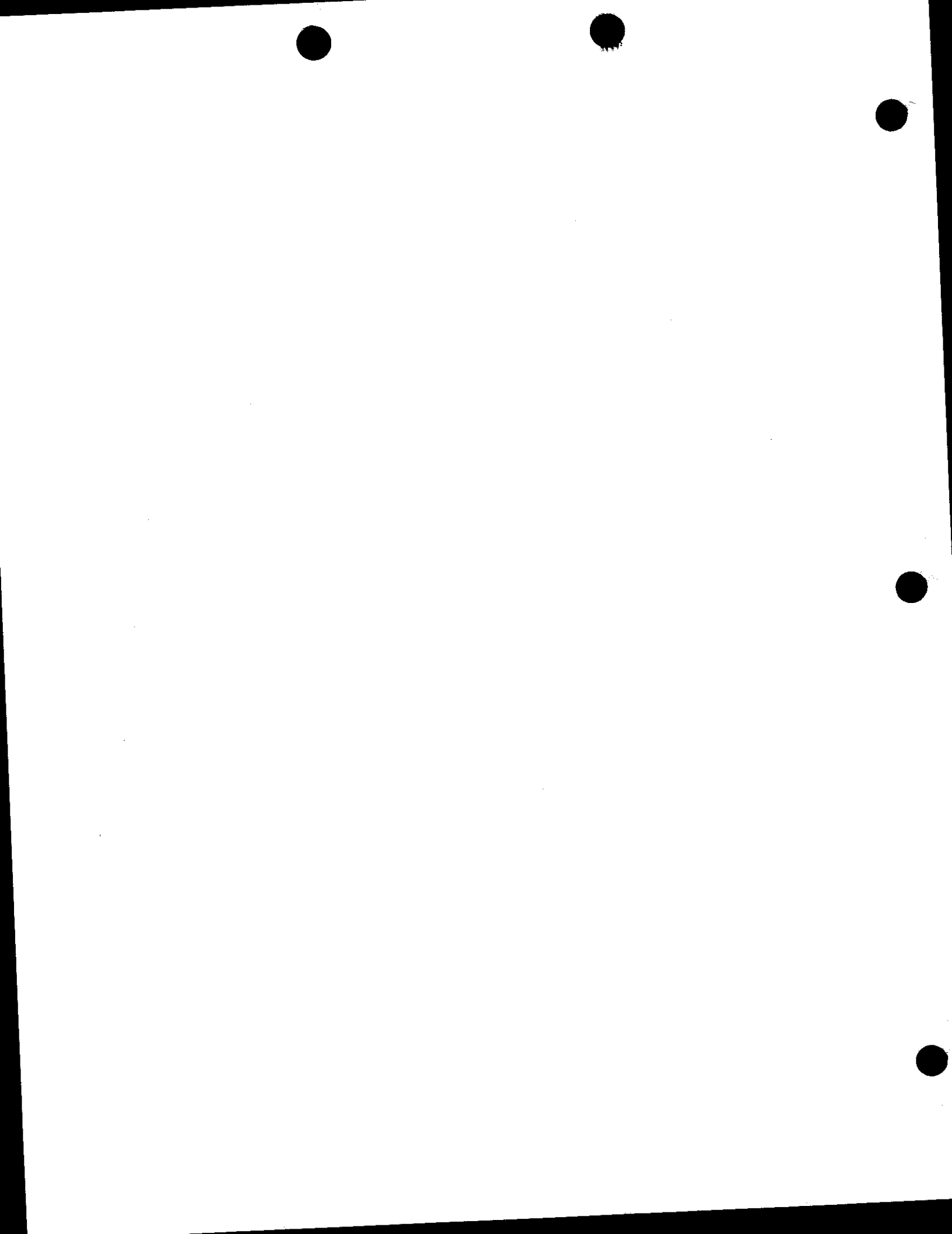
- 1.) For resource or pest management (i.e., vector or weed control, pest eradication, or fishery management) conducted by public entities to fulfill statutory requirements, including, but not limited to, those in the California Fish and Game, Food and Agriculture, Health and Safety, and Harbors and Navigation codes; or
- 2.) Regarding drinking water conducted to fulfill statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code.

Such categorical exceptions may also be granted for draining water supply reservoirs, canals, and pipelines for maintenance, for draining municipal storm water conveyances for cleaning or maintenance, or for draining water treatment facilities for cleaning or maintenance.

Because the District conveys irrigation and stormwater, the District is eligible for categorical exception(s) related to "draining water supply reservoirs, canals, and pipelines for maintenance", and "for draining municipal storm water conveyances for cleaning or maintenance".

Requirements for a SIP categorical exception include preparation of California Environmental

¹ Mixing Zone is defined in the SIP as "a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall waterbody."



Quality Act (CEQA) documentation. This Mitigated Negative Declaration (MND) and Initial Study (IS) is prepared to meet the specific SIP requirement for CEQA documentation. The District is the Lead Agency for this MND and IS. The SWRCB is a responsible agency for this MND and IS.

1.3 Project Schedule

Application of copper-containing aquatic pesticides is done on an "as-needed basis" in accordance with the IPM approach used by the District. If needed, applications are typically done in the spring, summer, and/or late fall.

1.4 Required Approvals

Continued application of copper-containing aquatic pesticides by the District will require:

- 1.) Obtaining confirmation of inclusion in Attachment E of the 2004 General permit; and
- 2.) Consistent with the criteria identified in the SIP, gaining acceptance by the Executive Officer at the Central Valley RWQCB of the following District documents:
 - a. A detailed description of the proposed action, including the proposed method of completing the action;
 - b. A time schedule;
 - c. A discharge and receiving water quality monitoring plan (before project initiation, during the project, and after project completion, with the appropriate quality assurance and quality control procedures);
 - d. CEQA documentation;
 - e. Contingency plans (to the extent applicable);
 - f. Identification of alternate water supply (if needed and to the extent applicable);
 - g. Residual waste disposal plans (to the extent applicable); and
 - h. Upon completion of the project, the discharger shall provide certification by a qualified biologist that the receiving water beneficial uses have been restored.

1.5 Project Description Summary

In summary, the project is described as the District's application of copper-based aquatic pesticides to canals and ditches under its jurisdiction to control a variety of aquatic weeds for the purposes of maintaining acceptable irrigation and stormwater conveyance.



2.0 INITIAL STUDY

This document was prepared in a manner consistent with Section 21064.5 of the California Public Resources Code (California Environmental Quality Act [CEQA]) and Article 6 of the State CEQA Guidelines (14 California Code of Regulations).

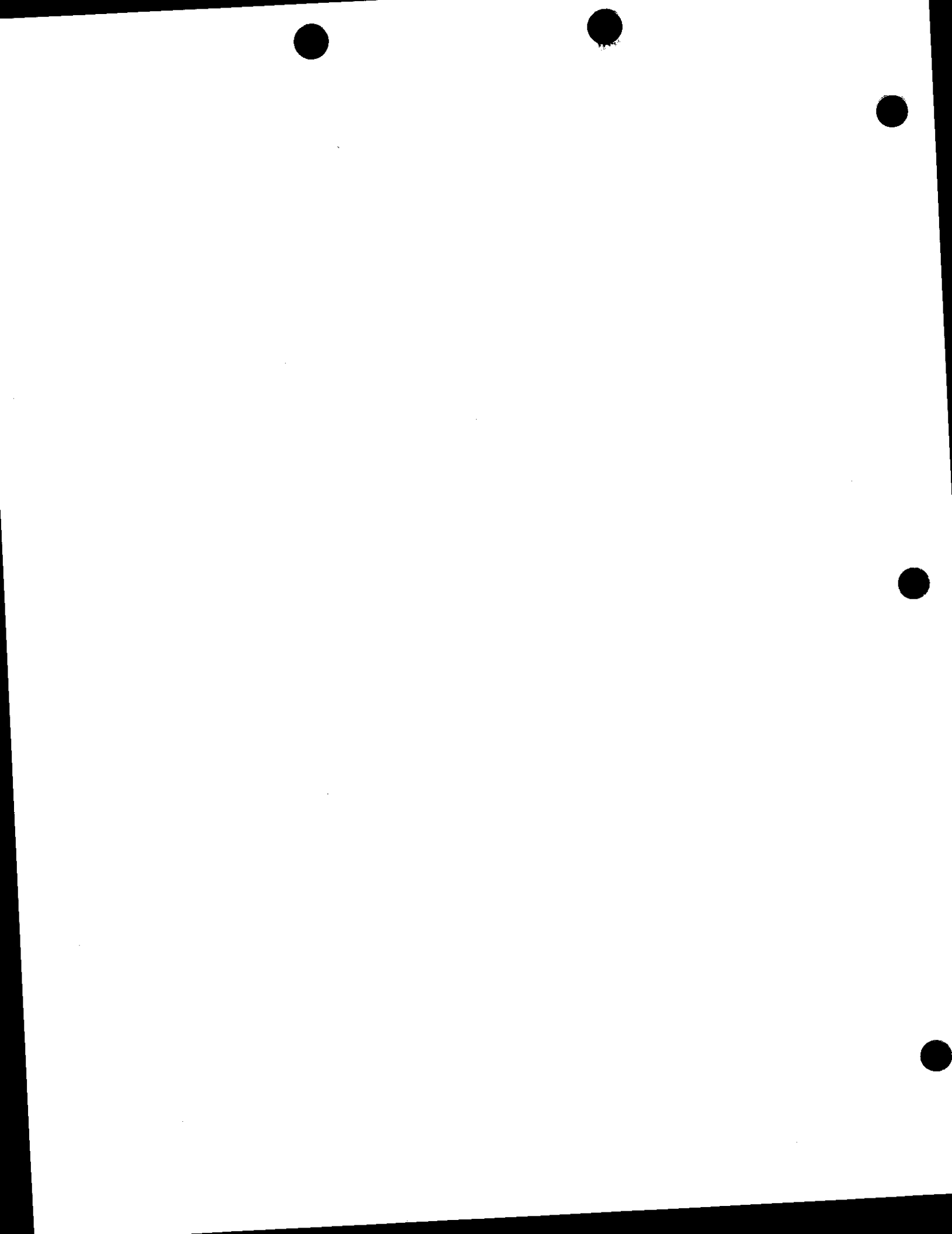
This Initial Study, Environmental Checklist, and evaluation of potential environmental effects were completed in accordance with Section 15063(d) of the *State CEQA Guidelines* to determine if the proposed Project could have any potentially significant effect on the physical environment, and if so, what mitigation measures would be imposed to reduce such impacts to less-than-significant levels.

An explanation is provided for all determinations, including the citation of sources as listed in Section 5. A "No Impact" or a "Less-than-Significant Impact" determination indicates that the proposed Project would not have a significant effect on the physical environment for that specific environmental category.

Mitigation measures will be implemented for water quality and hazardous materials categories to reduce the potentially significant impacts to a less-than-significant levels. No other environmental categories for this evaluation were found to be potentially affected in a significant manner by the proposed Project.

2.1 CEQA Initial Study & Environmental Check List Form

1. **Project Title:** Use of Copper to Control Aquatic Weeds in Irrigation and Stormwater Canals and Ditches
2. **Lead Agency Name and Address:** Yolo County Flood Control & Water Conservation District
34274 State Highway 16
Woodland, CA 95695
3. **Contact Person & Phone Number:** Christy Barton, Assistant General Manager
530.662.0265
4. **Project Location:** Yolo County, Ca
5. **Project Sponsor's Name and Address:** See #2.above
6. **General Plan Land Use Designation:** Agriculture
7. **Zoning:** Agriculture
8. **Description of Project:** See Section 1.0
9. **Surrounding Land Uses and Setting:** Agricultural & Residential
10. **Other Agencies Whose Approval is Required:** SWRCB



2.2 Environmental Factors Potentially Affected

The environmental factor checked below would be potentially affected by the proposed Project, involving at least one impact that is a 'Potentially Significant Impact' as indicated by the checklist on the following pages:

- | | | |
|-------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture Resources | <input type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources | <input type="checkbox"/> Geology/Soils |
| <input checked="" type="checkbox"/> Hazards & Hazardous Materials | <input checked="" type="checkbox"/> Hydrology/Water Quality | <input type="checkbox"/> Land Use/Planning |
| <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise | <input type="checkbox"/> Population/Housing |
| <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation | <input type="checkbox"/> Transportation/Traffic |
| <input type="checkbox"/> Utilities/Service Systems | <input checked="" type="checkbox"/> Mandatory Findings of Significance | |

2.3 Determination (To be completed by lead agency)

On the basis of this initial evaluation:

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect because appropriate mitigation measures are in place. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.
- I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An EIR is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

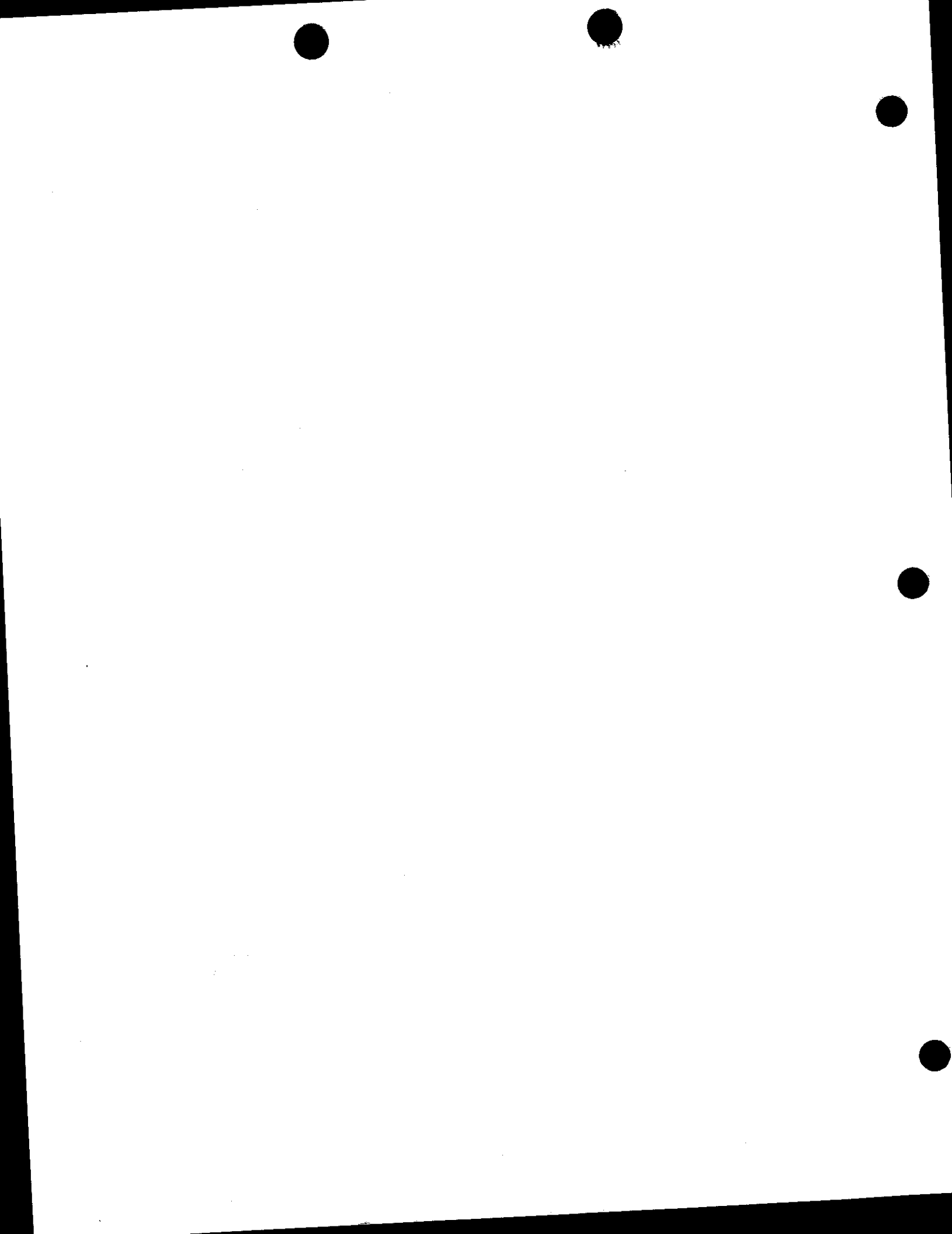
Christy Barton
Signature

January 30, 2004
Date

Christy Barton
Printed Name

Yolo County Flood Control and
Water Conservation District

For



3.0 EVALUATION OF ENVIRONMENTAL IMPACTS

3.1 Aesthetics

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and it's surrounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) and b): No designated scenic vistas or state scenic highways overlook any of the project site, therefore no impact would occur.

Item c): The project involves the application of aquatic pesticides to drainages, ditches and canals in the District to control a variety of aquatic weeds. These weeds are typically at or below the water's surface. Upon control, the removal of these weeds would be unnoticed and as a result not degrade the visual character of the project site.

Item d): The project is done during the daylight hours, therefore no light sources are needed and no light or glare is produced.



3.2 Agriculture Resources

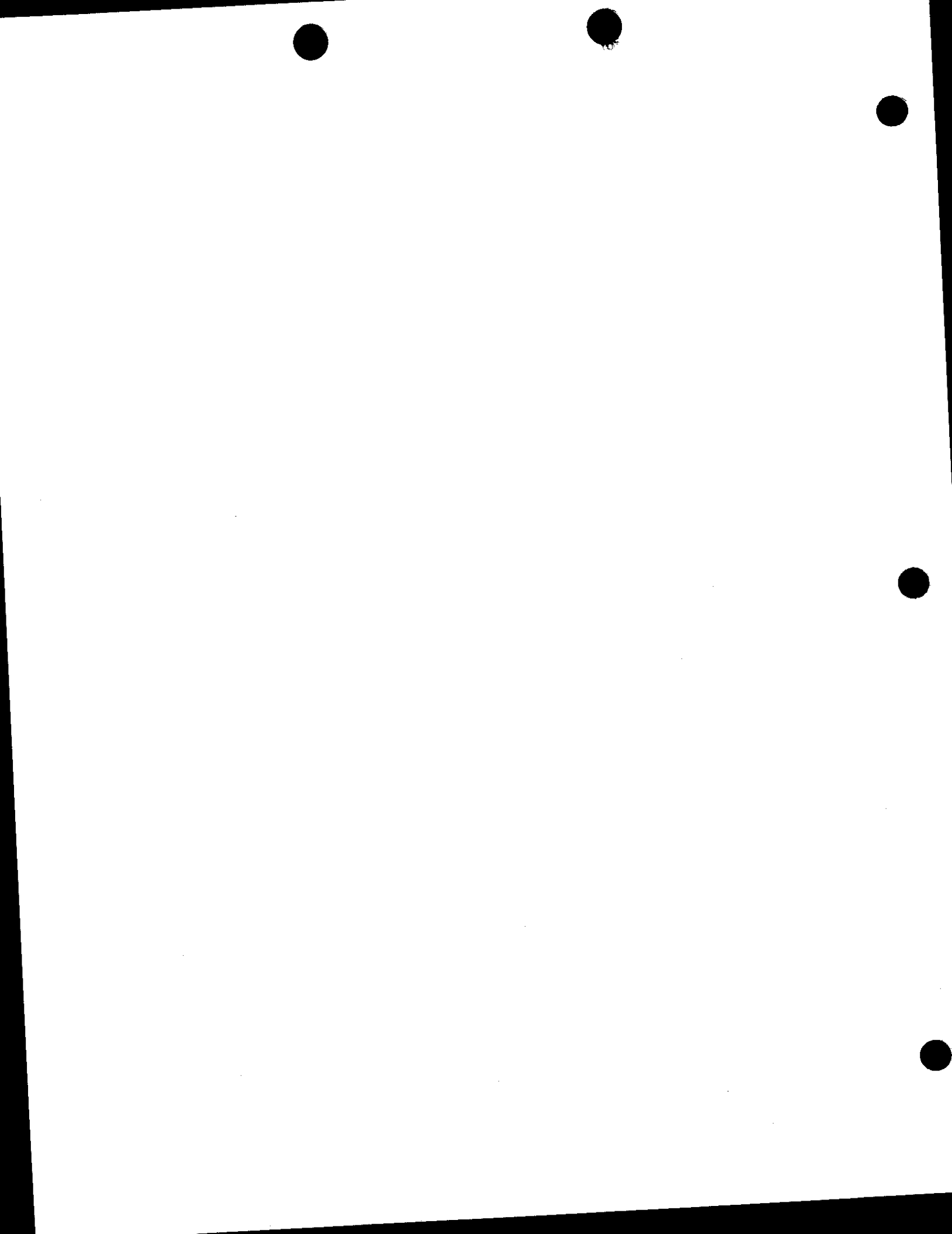
	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) through c): On the contrary, the project accomplishes objectives that maintain and enhance agricultural land use. These objectives include the delivery of irrigation water for the production of crops and the conveyance of incidental stormwater.



3.3 Air Quality

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal and state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

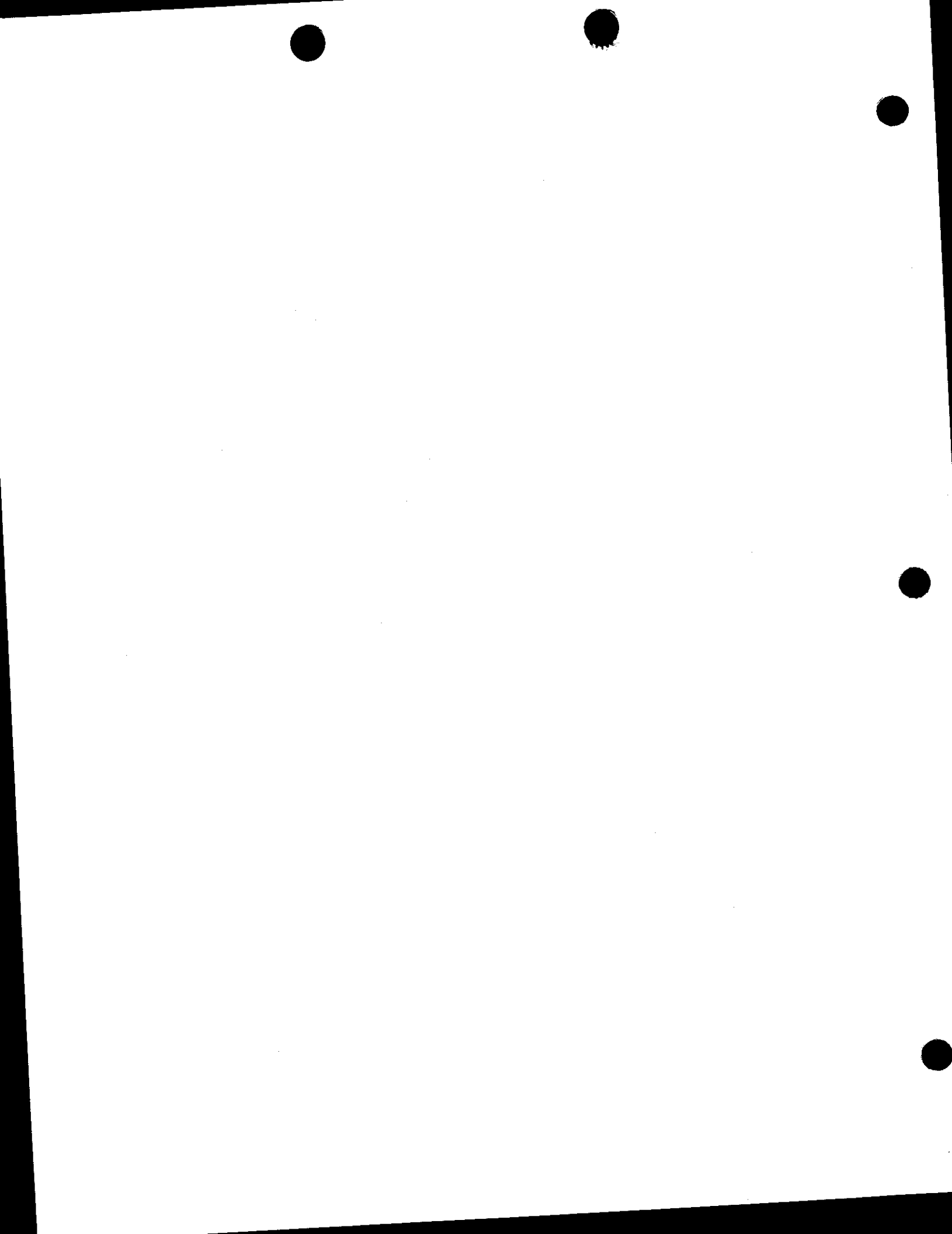
Discussion

Items a) through c): The project will result in de minimus vehicle emissions from the use of a pick-up truck towing a trailer to and from application sites and the use of a small (5 horsepower) generator. This use is limited to approximately 10-15 times per summer and fall. The project will not involve any construction activities, will not change existing conditions, and will not conflict with or result in an impact to policies or control measures established by the Yolo-Solano Air Quality Management District (YSAQMD).

Item d): Aquatic pesticides are applied by District personnel in agricultural areas rarely frequented by people. Applications are not made near, schools, playgrounds, health care facilities, day care facilities, and athletic facilities, thereby eliminating exposure to these sensitive receptors and creating no impact.

District personnel that make aquatic pesticide applications have had specialized training and are under a Qualified Applicator Certificate Holders (QAC) direct supervision. QACs are licensed by the Department of Pesticide Regulation (DPR) and receive no less than 20 hours of continuing education and training every two years on issues including health and safety and prevention of exposure to sensitive receptors. Expertise and training used by these District personnel result in eliminating exposure to sensitive receptors and creates no impact.

Prior to application, a written recommendation is prepared by a DPR-licensed Pest Control



Advisor (PCA). A PCA undergoes 40 hours of training every 2 years on issues including health and safety and prevention of exposure to sensitive receptors. The written recommendation prepared by the PCA must evaluate proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Refer to **Appendix A**. Expertise and training used by the PCA results in eliminating exposure to sensitive receptors and creates no impact.

During the preparation of the written recommendation and prior to and during the application, all District personnel strictly adhere to the aquatic pesticide product label. The label has clear and specific warnings that alert users to hazards that may exist. Use of the product label results in eliminating exposure to sensitive receptors. An example of a specific product label is included in **Appendix B**.

In addition to the product label, District personnel consult the aquatic pesticide Material Safety Data Sheet (MSDS). The MSDS has specific information that describes precautions to be taken during the use of the aquatic pesticide. District personnel's familiarity with the MSDS sheets of aquatic pesticides results in eliminating exposure to sensitive receptors. An example of a MSDS is included in **Appendix B**.

As a supplement to both the label and the MSDS, many manufacturers supply product application documents that give further detail on environmental safe guards, efficacy, etc. An example of a product application document is included in **Appendix B**.

District personnel use the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The following documents are used:

- A-1, Working Safely with Pesticides on Farms
- A-2, Storing, Moving and Disposing of Pesticides on Farms
- A-3, Closed Systems, Enclosed Cabs, Water-Soluble Packaging
- A-4, First Aid
- A-5, Protecting Yourself from Breathing Pesticides on Farms
- A-7, Washing Pesticide Work Clothing
- A-8, Safety Rules for Pesticide Handlers on Farms
- A-9, Pesticide Safety rules for Farmworkers
- A-10, Safety Rules for Minimal Exposure Pesticides on Farms

District personnel's familiarity with the DPR PSIS series further results in eliminating exposure to sensitive receptors and as a result, no impact occurs.

Item e): During application, there may be a slight ammonia odor during the use of some copper-containing aquatic pesticides. This odor is only perceptible directly at the point at which the pesticide enters the water being treated. Because this odor is only slight and is restricted to a location that is not near sensitive receptors, the project creates no impact to a substantial number of receptors.

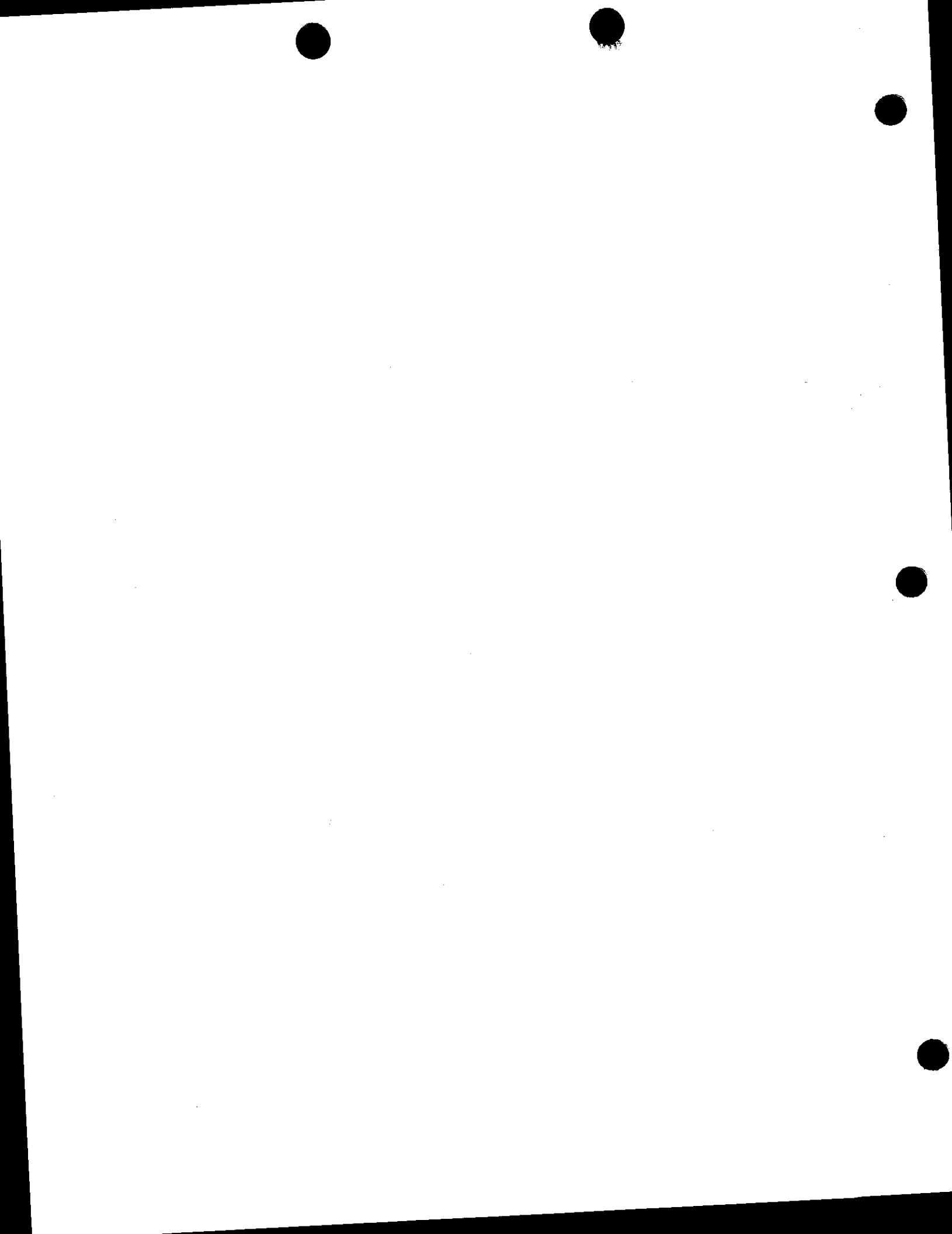


3.4 Biological Resources

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Discussion

Items a) and b): The project involves the application of copper-containing aquatic pesticides to a variety of ditches and canals throughout the District in proximity to riparian habitat near Cache Creek and Willow, Union School, Dry, and Chickahominy Sloughs (EIP 2001). These areas currently support or have the potential to support species listed as Endangered or Threatened by the California Fish and Game Commission (state-listed") or listed by the U.S. Secretary of the Interior (federally-listed) (CNDDDB 2003). These species include: valley elderberry longhorn beetle, giant garter snake, Swainson's hawk, western yellow-billed cuckoo, and bank swallow. These animals currently are managed under the terms of the Yolo County Habitat Conservation Plan (EIP 2001). The project's activity is confined to canal roads and inside canals and ditches and as a result creates a less than significant impact to the habitat of these species.

Between the 1940's and 2000, there appears to be no documentation of salmon in Cache Creek. However, in 2000, four salmon were found in the lower creek (Barton 2003). Numerous studies have shown that applications of copper-based aquatic pesticides at concentrations near the label rate of 1 mg/L are toxic to several fish species, including rainbow trout (EPA 2003). Copper is toxic to larval fish and aquatic invertebrates and has shown a potential for bioaccumulation depending on the water's physical, chemical, and biological characteristics, including total dissolved solids (TDS) and total organic carbon (TOC) (Diamond 1997). **Table 1** below summarizes some relevant aquatic toxicity data for several types of copper with several different aquatic species.

Table 1. Summary of Copper Aquatic Toxicity Data

Common or Trade Name	Name	CAS#	96 Hour Freshwater Ave. LC 50, by Species (ug/L)						
			Bluegill	Rainbow trout	Snail, Tadpole physa	Pond Snail	White grub	Leopard frog	Fairy shrimp
Copper Sulfate Pentahydrate, Bluestone	Sulfuric acid copper (2+) salt (1:1), Pentahydrate	7758998	18469	968	38	929	29	150	240
Komeen	Copper-ethylenediamine complex	52769672	9200						
Copper Triethanolamine, Nautique	[[[2,2',2"-Nitrilotris(ethanolato)](2-)-N,O,O',O']copper	82027596	51000	433					

The use of copper-based aquatic pesticides is confined to the District's canals and ditches. District personnel estimate flow and volume in treated canals and ditches so that sufficient volume is present downstream of the treatment site to dilute the copper to the maximum extent practicable before an outfall to a natural water body is reached. Outfalls are identified in **Figure 3**. Although no known candidate, sensitive, or special status amphibian or fish species occupies Cache Creek and there is no migratory fishery in Cache Creek, District personnel will perform the following mitigation to future potentially significant impacts:

- BR-1. When using copper-containing aquatic pesticides, District staff will estimate flow and volume in the canal or ditch being considered for treatment. District staff will only apply copper-containing aquatic pesticides in locations sufficiently upstream of outfalls to natural water



courses so that dilution of the copper takes place to the maximum extent practicable.

Because the District does not manage aquatic weeds within any natural water course in its jurisdiction, no application of any aquatic pesticide occurs in these natural waters. Accordingly, no species are exposed to aquatic pesticides and a less than significant impact exists.

During 2002, the District applied approximately 500 pounds of copper to its ditches and canals. During that year the District's canals and ditches conveyed approximately 195,000 acre-feet of irrigation water. Assuming a 13% evaporation and leakage loss, the resulting copper concentration in the irrigation water once fully diluted is approximately 1ug/L (microgram per liter or part per billion). This value is approximately 1/38th of the concentration required to cause toxicity in the most sensitive species shown in **Table 1**. The value of 1ug/L is conservatively high because it does not take into account any sequestration by organic or suspended materials in the water. The soluble or bioavailable copper as measured by toxicity in natural waters has been demonstrated to be up to 5 times less than that shown in laboratory water (Diamond 1997), demonstrating that organic and suspended material effectively decreases the amount of copper available to impart toxicity.

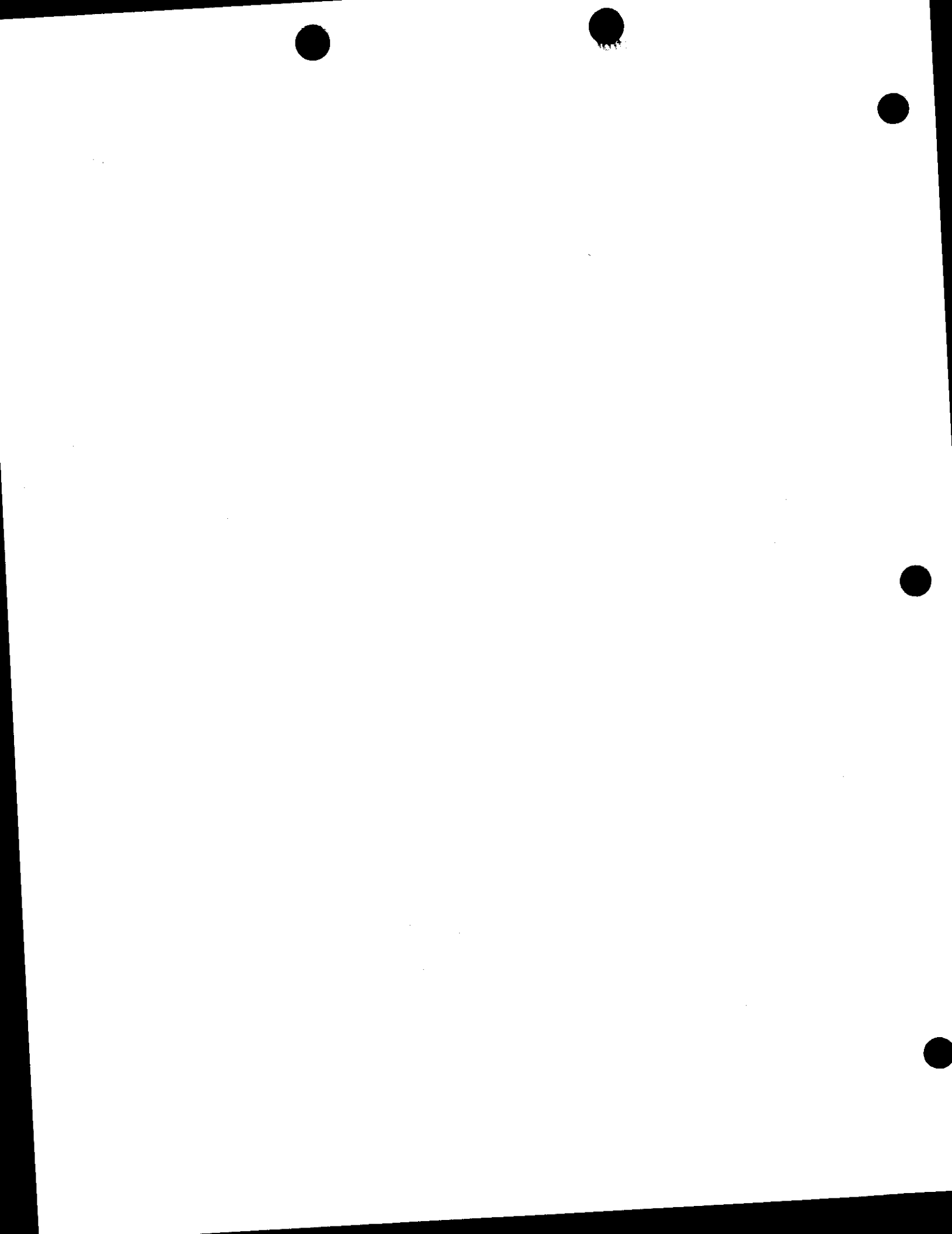
During 2002, copper was applied to the Hungry Hollow Canal. Within 4 hours after application, a sample of water collected downstream of the application site was analyzed and reported less than 10 ug/L. Within 72 hours after application, the same downstream location was sampled and also reported less than 10 ug/L (Blankinship 2002). These values substantiate the concept that copper-containing aquatic pesticides applied in District canals and ditches rapidly dissipates and/or become insoluble and stays that way shortly after application. This results in a less than significant impact to biological resources.

According to District personnel, no apparent adverse impacts to aquatic, avian, terrestrial or benthic have been noted since the District began using copper-based aquatic pesticides in 1988.

Item c): The project takes place in the District's canals and ditches and, therefore, will not impact any upland habitat or wetlands.

Item d): Cache Creek is an ephemeral stream normally dry during summer and fall. The District's release of stored water to the Capay diversion dam artificially keeps the section of Cache Creek above the dam watered. However, stretches of Cache Creek below the dam still dry up in summer and fall. Accordingly, the project will not impact the movement of any native resident or migratory fish. The District's canals and ditches do not currently, nor will they once the project is implemented, adversely impact native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Items e) and f): The project does not conflict with, and has no impact to any local policies or ordinances protecting biological resources and is consistent with the Draft Yolo Habitat Conservation Plan.



3.5 Cultural Resources

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) through d): The project is confined to the District's canals and ditches. No known historical or archaeological resource, unique paleontological resource, unique geologic feature, or human remains in or out of formal cemeteries will be impacted.



3.6 Geology and Soils

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic-related ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

a) through e): The project consists of applying copper-based pesticides to ditches and canals within the jurisdiction of the District. The project does not include any new structures, ground disturbances, or other elements that could expose persons or property to geological



hazards. There would be no risk of landslide or erosion of topsoil. The Project would not require a septic or other wastewater system, as workers would use existing facilities in the operation areas of the reservoirs. No impacts to soils or geologic conditions will occur.



3.7 Hazards and Hazardous Materials

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the Project:</i>				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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Discussion

Items a & b): The project would involve handling copper-based aquatic pesticides which are regulated hazardous material. Acute exposure to humans can cause eye, skin, and respiratory irritation, and can be harmful if swallowed. Refer to the representative MSDS presented in **Appendix B**. Use of this material would create a potential for spills that could affect worker safety and the environment. The spills could occur potentially at the District facility, at the point of application, or during transport. Transportation is done using a 250 gallon carboy container secured in a trailer towed by a pick-up truck.

The District handles, stores, transports and disposes of hazardous materials in accordance with federal, state, and county requirements and manufacturer's recommendations. The District's approach is supplemented by the following mitigation measures:

- HMM-1. District personnel that make aquatic pesticide applications are under the direct supervision of a QAC. Expertise and training used by these District personnel result in mitigating potentially significant impacts.
- HMM-2. Prior to application, a written recommendation is prepared by a PCA. The written recommendation prepared by the PCA must evaluate, among other things, the proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant impact on the environment have been considered and if feasible, adopted. Refer to **Appendix A**. Expertise and training used by the PCA results in mitigating potentially significant impacts.
- HMM-3. During the preparation of the PCA's written recommendation and prior to and during the application, all District personnel strictly adhere to the aquatic pesticide product label. The label has clear and specific warnings that alert users to hazards that may exist. Use of the product label results in mitigating potentially significant impacts. Refer to **Appendix B**.
- HMM-4. In addition to the product label, District personnel consult the aquatic pesticide Material Safety Data Sheet (MSDS). In addition, District personnel consult available product information documentation. Refer to **Appendix B**. The MSDS has specific information that describes precautions to be taken during the use of the aquatic pesticide. District personnel's familiarity with the MSDS sheets of aquatic pesticides results in mitigating potentially significant impacts.



HHM-5. District personnel use the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The following documents are used:

- A-1, Working Safely with Pesticides on Farms
- A-2, Storing, Moving and Disposing of Pesticides on Farms
- A-3, Closed Systems, Enclosed Cabs, Water-Soluble Packaging
- A-4, First Aid
- A-5, Protecting Yourself from Breathing Pesticides on Farms
- A-7, Washing Pesticide Work Clothing
- A-8, Safety Rules for Pesticide Handlers on Farms
- A-9, Pesticide Safety rules for Farmworkers
- A-10, Safety Rules for Minimal Exposure Pesticides on Farms

District personnel's familiarity with the DPR PSIS series mitigates potentially significant impacts. For example, the PSIS series describes the personal protective equipment (PPE) needed for the safe handling of aquatic pesticides, including goggles, disposable coveralls, gloves and respirators.

Item c): No known existing or proposed schools are located within ¼ mile of locations where applications are made. No impact would occur.

Item d): The project sites are not listed on any hazardous waste site lists compiled in Government Code Section 65962.5 and therefore there is no impact.

Items e & f): Four airports are located within a 2 mile range of the project: the UC Davis University Airport, the Woodland Watts Airport, and the Yolo County Airport. One known private airstrip (Medlock Field) is located within the 2 miles of the project area. The use of these four airports during project activity will not create a safety hazard for project participants.

Item g): The proposed Project would not impact emergency evacuation routes because public roadways are not be affected by the Project.

Item h): The project will not increase fire hazards at the project sites. Truck access and parking near application sites is done in such a manner so as to minimize muffler contact with dry grass. No impact from wildland fires would occur.



3.8 Hydrology and Water Quality

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures which would impede or	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



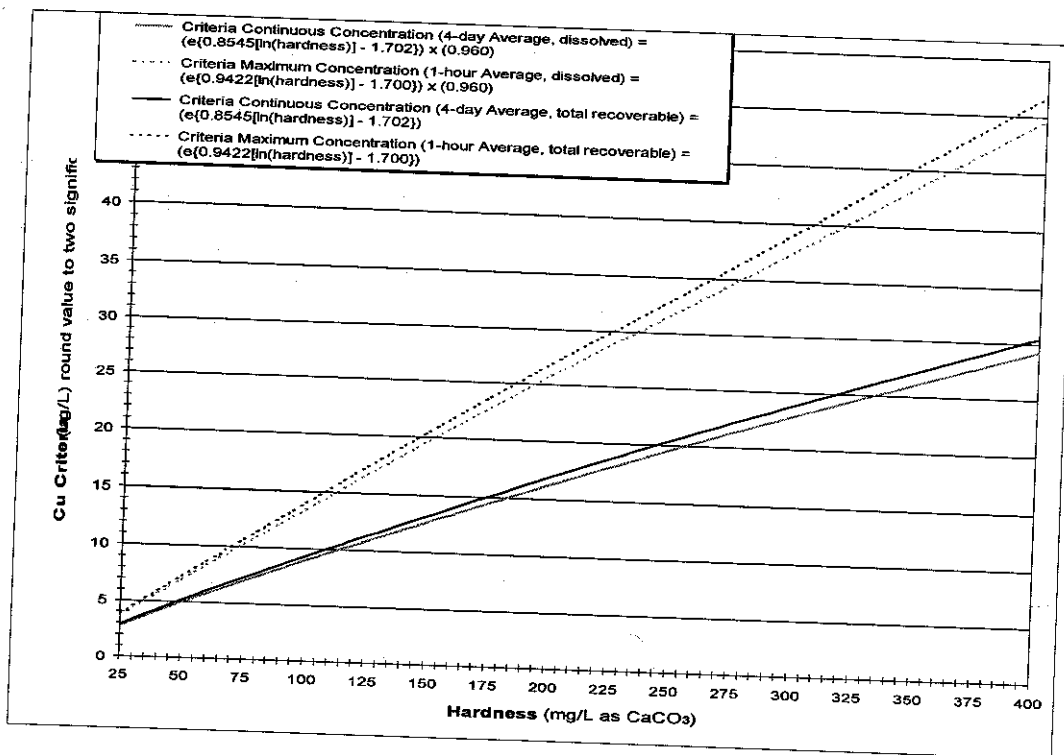
redirect flood flows?				
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
j) Inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

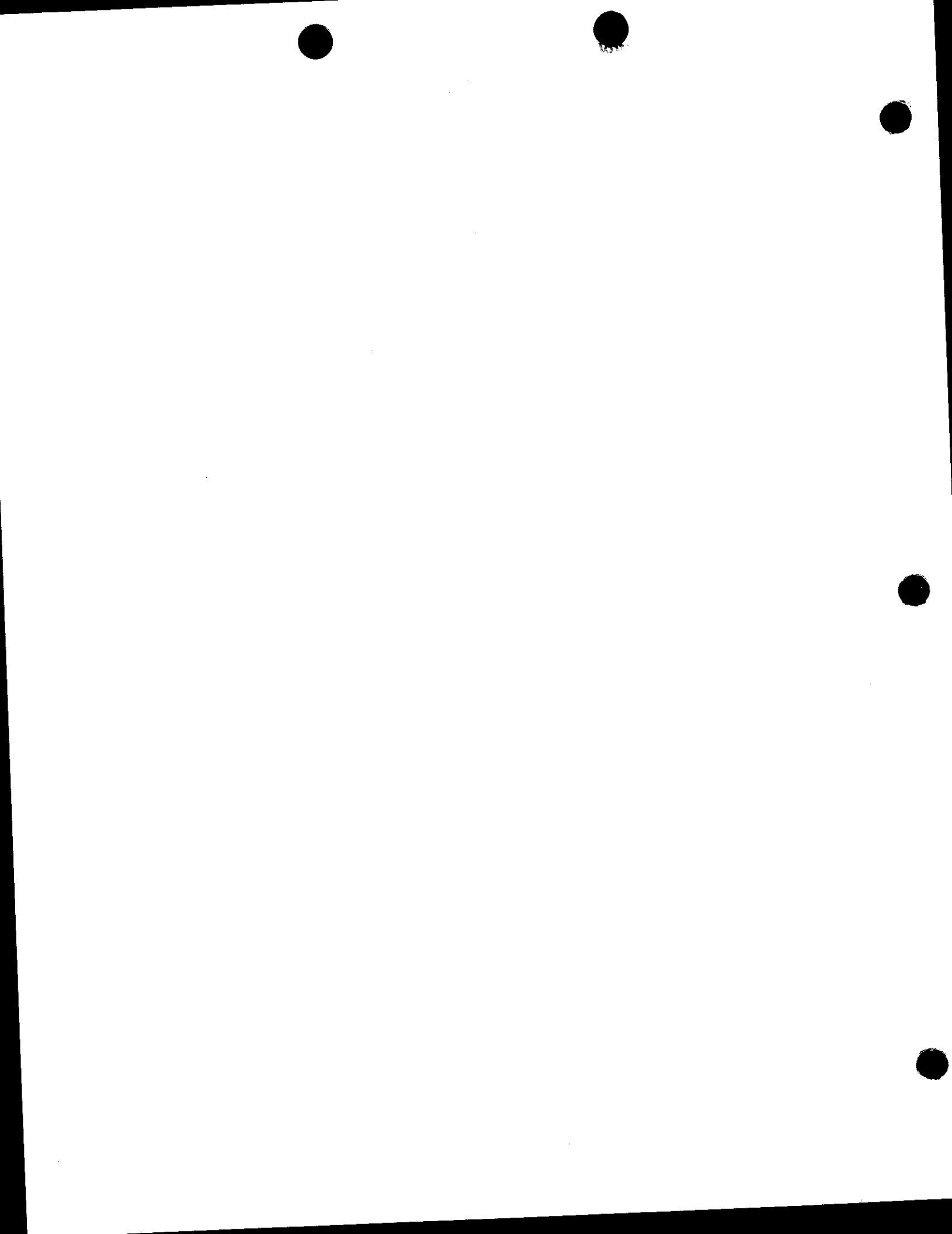
Discussion

Item a): As presented in Section 1.2, the existing interim emergency NPDES permit used by the District will expire. The District intends to obtain coverage under the new 2004 general permit that requires compliance with the SIP and the CTR.

Application of copper-based aquatic pesticides according to label direction typically require concentrations of copper between 500 and 1,000 ug/L. Water quality criteria for copper as described in the CTR are hardness-dependent. Refer to **Figure 4**. District water varies in hardness, averaging approximately 150 mg/L as Calcium Carbonate.

Figure 4. Cu Criteria Dependence on Hardness





Based on the relation of copper criteria to hardness, the applicable water quality criteria for copper in District ditches and canals is approximately as follows:

Continuous Dissolved Concentration (4 day Average):	13 ug/L
Continuous Total Concentration (4 day Average)	13 ug/L
Maximum Dissolved Concentration (1 Hour Average)	20 ug/L
Maximum Total Concentration (1 Hour Average)	21 ug/L

These water quality criteria are between approximately 1/24th and 1/38th of the lowest concentration (500 ug/L) that is typical at the point of delivery when copper-containing aquatic pesticides are applied according to label directions. This concentration exceeds the CTR water quality criteria and may result in a potentially significant impact unless mitigation is incorporated.

Title 22 of the California Code of Regulations (CCR) establishes a primary drinking water standard for copper of 1300 ug/L. When applied according to label directions, the concentration of copper in the District's ditches and canals will not exceed the copper MCL, therefore there is no impact.

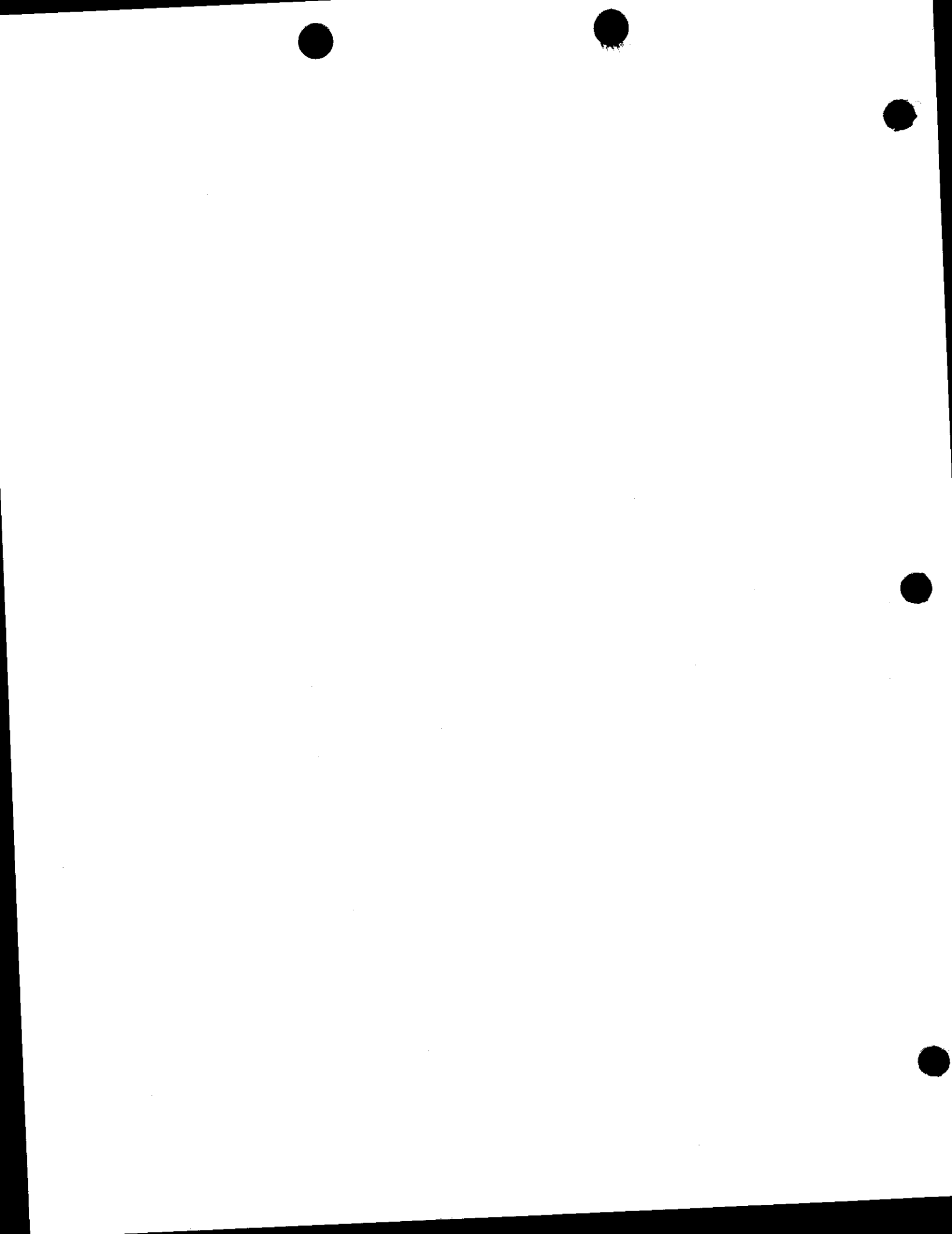
The District is within the jurisdiction of the Central Valley RWQCB. The Central Valley RWQCB Basin Plan (RWQCB 1998) has a trace element water quality objective for copper of 10 ug/L for defined sections of the Sacramento and American Rivers. This water quality objective is not applicable to water within the District's canals and ditches.

As described earlier in Section 3.4, District staff implement mitigation measure BR-1 to address the concentration of copper-based aquatic pesticide prior to discharge to natural water courses. With this mitigation, a less than significant impact exists. Also, because the District does not manage aquatic weeds within any natural water course in its jurisdiction, no application of any aquatic pesticide occurs in these natural waters. Accordingly, no species are exposed to aquatic pesticides and a less than significant impact exists.

Based on application rates and irrigation water delivery in 2002, the resulting copper concentration in the irrigation water once fully diluted is approximately 1ug/L and is 1/38th of the concentration required to cause toxicity in the most sensitive species shown in **Table 1**. In addition, this value of 1 ug/L is conservatively high because it does not take into account any sequestration by organic or suspended materials in the water. Organic and suspended material effectively decrease the amount of copper available to impart toxicity.

Also during 2002, copper was applied to the Hungry Hollow Canal. Within 4 hours after application, a sample of water collected downstream of the application reported less than 10 ug/L. Within 72 hours after application, the same downstream location was sampled and also reported less than 10 ug/L. These values substantiate the concept that copper-containing aquatic pesticides applied in District canals and ditches rapidly dissipate and/or become insoluble and stay that way shortly after application. This strongly suggests that a only a temporary CTR water quality criteria exceedance occurs and the result is less than significant impact.

Since 1988, District personnel have not reported adverse impacts to aquatic, avian, terrestrial or benthic organisms as a result of using copper-based aquatic pesticides, further suggesting that a less than significant impact has occurred.



The precautionary measure to protect agricultural crops from the copper-treated water is to comply with the use recommendations and labeling of the pesticide. For data regarding the potential impact of copper on crops, Roland Meyer, UC Ag Extension Soil Specialist directed the District to the USEPA.1993. 40 CFR Part 503. Standards for the Use or Disposal of Sewage Sludge: Final rule. Federal Register 58 (32):9392, Tables 2 and 4. This indicates that an annual ceiling concentration of approximately 70 pounds per acre and an accumulated ceiling concentration of approximately 1,335 pounds per acre. During 2002 and 2003, the District sampled after and downstream of copper applications. Copper was not detected using a detection limit of 0.05 mg/L. Making the conservative assumption that copper is present right at the detection limit, then approximately 0.8 lbs/acre of copper is applied to fields when irrigated with copper-treated water, well under the annual ceiling concentration cited above. Additionally, the District has applied copper to its irrigation water for several years with no negative impact from copper being reports to the District or to the Yolo County Agricultural Commissioner's office.

In spite of significant evidence that suggests that when used according to label directions by qualified personnel, impacts of copper-containing aquatic pesticides have no significant impact, the District will implement the following mitigation measures to continue operating without a significant impact and reduce any future potentially significant impacts to less than a significant level: These mitigation measures are:

- HWQ-1. The District will obtain coverage under the 2004 general permit and comply with all aspects of it, including monitoring and reporting. Until the 2004 general permit is adopted, the District will continue to use the Yolo RPMP Monitoring Plan that has been reviewed and approved by the Central Valley RWQCB. Refer to **Appendix C**. By regularly monitoring and reporting surface water quality in its ditches and canals, the District will be able to identify problems with water quality and take corrective action if necessary. Corrective action includes such steps as modification to application techniques and timing, use of adjuvants to improve efficacy.
- HWQ-2. The District will continue to implement its IPM program for aquatic weed control. This program, among other things, involves the scouting of aquatic weed locations and densities and making applications of copper-containing aquatic pesticides on an "as-needed" basis to achieve the aquatic weed control necessary convey irrigation and stormwater.
- HWQ-3. Same as HHM-1
- HWQ-4. Same as HHM-2
- HWQ-5. Same as HHM-3

Item b): The project would not involve any construction activities or require the use of groundwater. Thus, there is no impact on groundwater recharge or supplies.

Items c), d), & e): The project will not involve construction of any structures that would alter drainage patterns or increase storm water runoff. The Project would not increase erosion or siltation on- or off-site. In fact, the project will maintain and enhance stormwater conveyance and therefore decrease erosion and siltation. No streambeds would be altered. No increase in drainage capacity of local storm sewers would be required. No impact would result from the project.

Item f): The project does not otherwise degrade water quality beyond that as described in a.).



Based on the relation of copper criteria to hardness, the applicable water quality criteria for copper in District ditches and canals is approximately as follows:

Continuous Dissolved Concentration (4 day Average):	13 ug/L
Continuous Total Concentration (4 day Average)	13 ug/L
Maximum Dissolved Concentration (1 Hour Average)	20 ug/L
Maximum Total Concentration (1 Hour Average)	21 ug/L

These water quality criteria are between approximately 1/24th and 1/38th of the lowest concentration (500 ug/L) that is typical at the point of delivery when copper-containing aquatic pesticides are applied according to label directions. This concentration exceeds the CTR water quality criteria and may result in a potentially significant impact unless mitigation is incorporated.

Title 22 of the California Code of Regulations (CCR) establishes a primary drinking water standard for copper of 1300 ug/L. When applied according to label directions, the concentration of copper in the District's ditches and canals will not exceed the copper MCL, therefore there is no impact.

The District is within the jurisdiction of the Central Valley RWQCB. The Central Valley RWQCB Basin Plan (RWQCB 1998) has a trace element water quality objective for copper of 10 ug/L for defined sections of the Sacramento and American Rivers. This water quality objective is not applicable to water within the District's canals and ditches.

As described earlier in Section 3.4, District staff implement mitigation measure BR-1 to address the concentration of copper-based aquatic pesticide prior to discharge to natural water courses. With this mitigation, a less than significant impact exists. Also, because the District does not manage aquatic weeds within any natural water course in its jurisdiction, no application of any aquatic pesticide occurs in these natural waters. Accordingly, no species are exposed to aquatic pesticides and a less than significant impact exists.

Based on application rates and irrigation water delivery in 2002, the resulting copper concentration in the irrigation water once fully diluted is approximately 1ug/L and is 1/38th of the concentration required to cause toxicity in the most sensitive species shown in Table 1. In addition, this value of 1 ug/L is conservatively high because it does not take into account any sequestration by organic or suspended materials in the water. Organic and suspended material effectively decrease the amount of copper available to impart toxicity.

Also during 2002, copper was applied to the Hungry Hollow Canal. Within 4 hours after application, a sample of water collected downstream of the application reported less than 10 ug/L. Within 72 hours after application, the same downstream location was sampled and also reported less than 10 ug/L. These values substantiate the concept that copper-containing aquatic pesticides applied in District canals and ditches rapidly dissipate and/or become insoluble and stay that way shortly after application. This strongly suggests that a only a temporary CTR water quality criteria exceedance occurs and the result is less than significant impact.

Since 1988, District personnel have not reported adverse impacts to aquatic, avian, terrestrial or benthic organisms as a result of using copper-based aquatic pesticides, further suggesting that a less than significant impact has occurred.



The precautionary measure to protect agricultural crops from the copper-treated water is to comply with the use recommendations and labeling of the pesticide. For data regarding the potential impact of copper on crops, Roland Meyer, UC Ag Extension Soil Specialist directed the District to the USEPA.1993. 40 CFR Part 503. Standards for the Use or Disposal of Sewage Sludge: Final rule. Federal Register 58 (32):9392, Tables 2 and 4. This indicates that an annual ceiling concentration of approximately 70 pounds per acre and an accumulated ceiling concentration of approximately 1,335 pounds per acre. During 2002 and 2003, the District sampled after and downstream of copper applications. Copper was not detected using a detection limit of 0.05 mg/L. Making the conservative assumption that copper is present right at the detection limit, then approximately 0.8 lbs/acre of copper is applied to fields when irrigated with copper-treated water, well under the annual ceiling concentration cited above. Additionally, the District has applied copper to its irrigation water for several years with no negative impact from copper being reports to the District or to the Yolo County Agricultural Commissioner's office.

In spite of significant evidence that suggests that when used according to label directions by qualified personnel, impacts of copper-containing aquatic pesticides have no significant impact, the District will implement the following mitigation measures to continue operating without a significant impact and reduce any future potentially significant impacts to less than a significant level: These mitigation measures are:

- HWQ-1. The District will obtain coverage under the 2004 general permit and comply with all aspects of it, including monitoring and reporting. Until the 2004 general permit is adopted, the District will continue to use the Yolo RPMP Monitoring Plan that has been reviewed and approved by the Central Valley RWQCB. Refer to **Appendix C**. By regularly monitoring and reporting surface water quality in its ditches and canals, the District will be able to identify problems with water quality and take corrective action if necessary. Corrective action includes such steps as modification to application techniques and timing, use of adjuvants to improve efficacy.
- HWQ-2. The District will continue to implement its IPM program for aquatic weed control. This program, among other things, involves the scouting of aquatic weed locations and densities and making applications of copper-containing aquatic pesticides on an "as-needed" basis to achieve the aquatic weed control necessary convey irrigation and stormwater.
- HWQ-3. Same as HHM-1
- HWQ-4. Same as HHM-2
- HWQ-5. Same as HHM-3

Item b): The project would not involve any construction activities or require the use of groundwater. Thus, there is no impact on groundwater recharge or supplies.

Items c), d), & e): The project will not involve construction of any structures that would alter drainage patterns or increase storm water runoff. The Project would not increase erosion or siltation on- or off-site. In fact, the project will maintain and enhance stormwater conveyance and therefore decrease erosion and siltation. No streambeds would be altered. No increase in drainage capacity of local storm sewers would be required. No impact would result from



the project.

Item f): The project does not otherwise degrade water quality beyond that as described in a.).

Items g), h), i), & j): Since the project would involve no new construction, no housing or other structures would be placed within a designated 100-year floodplain. The project would not alter the floodplain or have the potential to redirect flood flows. The Project would not be subject to tsunami or inundation due to mudflows. Nor would the Project expose personnel to a substantial risk due to seiche waves or from flooding as a result of a catastrophic dam failure. In fact, the District's use of copper-containing aquatic pesticides allows for the conveyance of stormwater and as a result, directs flood flows away from property. No impacts would occur.



3.9 Land Use Planning

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Item a): The project will be implemented within the District's existing canals and ditches. Nearby housing, if any, is rural and will not be affected. The proposed Project would not result in any division of an established community. Therefore, no impact would occur.

Item b): The project will not create any new land uses or alter any existing uses and would not conflict with any applicable land use plan, policy or agency regulation. No impact will occur.

Item c): Refer to Section 3.4, item f). No conflict, and therefore no impact will occur.



3.10 Mineral Resources

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a & b): The project involves the addition of copper-containing aquatic pesticides to the District's canals and ditches and has no impact on the availability of any known mineral resource recovery site.



3.11 Noise

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) through d): The project uses a small (5 horsepower) gasoline engine to run a pump during applications. Activity occurs in rural and agricultural areas that commonly have other machinery operating that include tractors, generators large groundwater and irrigation pumps and heavy trucks. The incidental noise and vibration generated by the project is temporary and inconsequential and thus will have no impact.



Items e & f): Four airports are located within a 2 mile range of the project: the UC Davis University Airport, the Woodland Watts Airport, and the Yolo County Airport. One known private airstrip (Medlock Field) is located within the 2 miles of the project area. The use of these four airports during project activity will not create a safety hazard for project participants.



3.12 Population and Housing

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) through c): No new homes, roads or other infrastructure will be required. No displacement of existing homes or people will occur. The control of aquatic weeds for the purposes of conveying irrigation and floodwater will maintain and increase the value of current farm land because of the ability to deliver irrigation water and remove stormwater, and as a result may slow population growth in the area. No impact will occur.



3.13 Public Services

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Item a): The project will not alter or require the construction of new schools, parks, or other public facilities, nor will it increase the need for police and fire services beyond existing conditions.



3.14 Recreation

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) & b): The project takes place in the District's canals and ditches. District policy strictly prohibits playing in and around ditches and canals. Brochures available at the District office explain this in detail. Refer to **Appendix D**. Because no District canals or ditches are used for recreation, the project will have no impact on recreation.



3.15 Transportation/Traffic

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Result in inadequate parking capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

Items a) & b): The project involves the use of one pick-up truck and trailer and will cause no impact in traffic which is substantial in relation to the existing traffic load and capacity of the street system.

Items c): The project has no influence on air traffic and as a result it has no impact.

Items d) through g): The project does not involve changes in road design or encourage incompatible road or highway uses. Further, the project does not impact emergency access or parking. Lastly, the project does not impact or conflict with adopted policies, plans, or programs supporting alternative transportation.



3.16 Utilities and Service Systems

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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Would the Project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

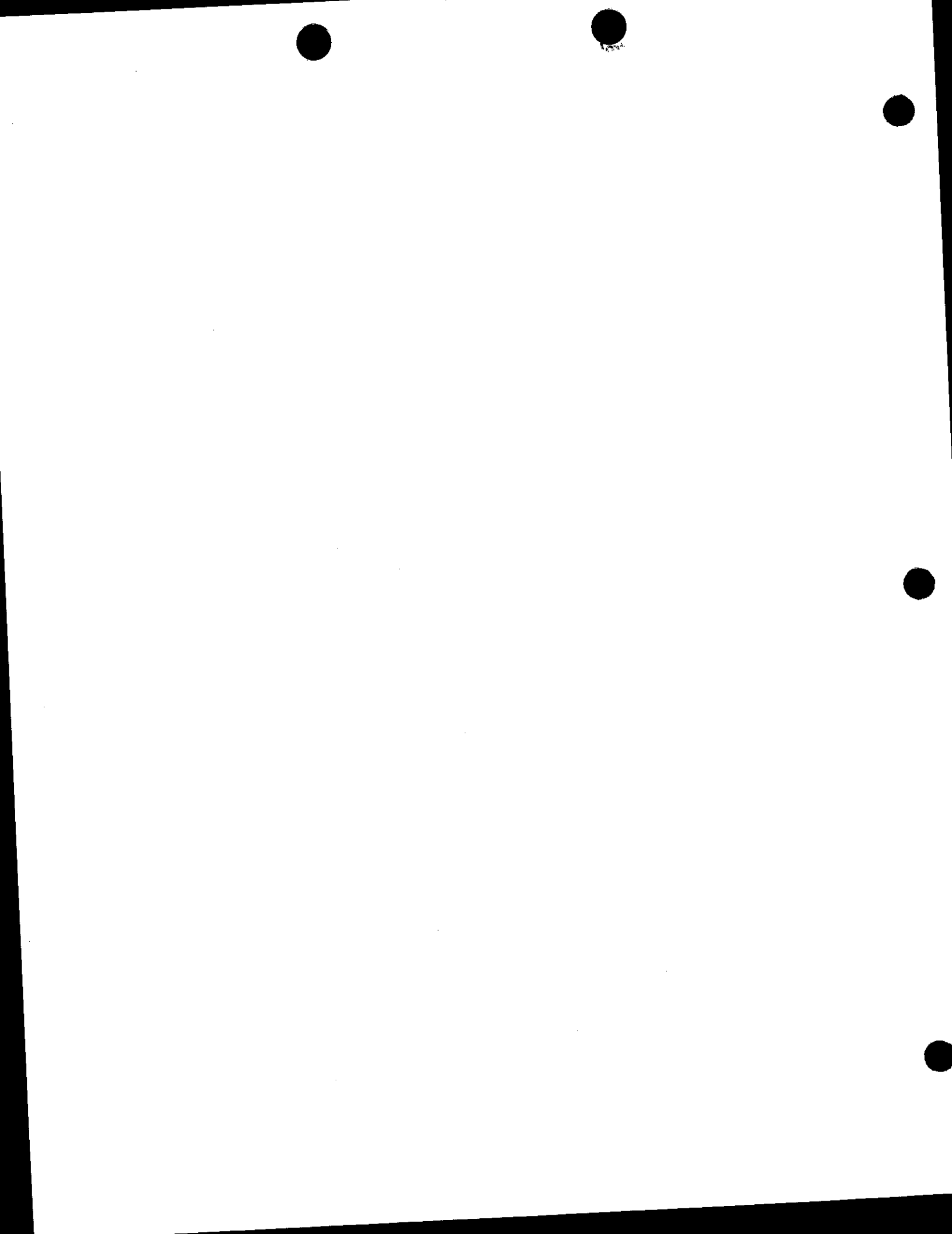
Discussion

Items a) & b), and e) through g): The project does not discharge to a wastewater treatment plant and does not generate any solid waste. All containers used to store and transport aquatic herbicides are returned to the vendor for reuse. No impact occurs.

Item c): The project will maintain and enhance existing storm drainage capacity in the District's facilities. In fact, if the project was not completed, stormwater conveyance may be diminished and could result in flooding and subsequent loss of, or damage to, property.



Item d): The project has existing water rights in Clear Lake and Indian Valley Reservoir. The project would not alter those rights nor seek to gain other rights. No impact occurs.



3.17 Mandatory Findings of Significance

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Item a): The project involves the use of copper-containing aquatic pesticides which are considered hazardous materials. District personnel will implement the 5 mitigation measures (HHM-1 through 5) described in Section 3.7 to reduce the impact to less than a significant level.

The project involves the application of copper-containing aquatic pesticides to the District's canals and ditches at concentrations that temporarily exceed CTR water quality objectives. Significant evidence suggests that when used according to label directions by qualified personnel, impacts of copper-containing aquatic pesticides have no significant impact. However, the District will implement the 6 mitigation measures (BR-1 and HWQ-1 through 5) to continue operating without a significant impact and reduce any future potentially impacts to less than a significant level.



Item b): The cumulative impacts of continued application of copper-containing pesticides is not known. Specifically, the extent to which copper accumulates and is bioavailable, if at all, is not clear at this time. The District knows of no other applications of copper-based materials within or adjacent to the project that will impact the project. Therefore, there are no other uses to consider in a cumulative impact analysis. However, as previously discussed in Section 3.8, information provided by Roland Meyer, UC Ag Extension Soil Specialist included the USEPA.1993. 40 CFR Part 503. Standards for the Use or Disposal of Sewage Sludge: Final rule. Federal Register 58 (32):9392, Tables 2 and 4. This indicates that an accumulated ceiling copper concentration is approximately 1,335 pounds per acre. During 2002 and 2003, the District sampled after and downstream of copper applications. Copper was not detected in surface water using a detection limit of 0.05 mg/L. Assuming a worst-case scenario of 0.49 ug/L of copper, then approximately 0.8 lbs/acre of copper would be applied to fields when irrigated with copper-treated water, well under the accumulated ceiling concentration cited above. Further, mitigation has been incorporated into the project. The mitigation for this potential impact is consistent with Section 3.8, mitigation HWQ-1. This mitigation reduces the impact to less than a significant level.

Item c): As described in Item a) above, Section 3.7 mitigates any hazard/hazardous material impacts to the human beings to less than a significant level with the implementation of mitigation measures HHM-1 through 5.



4.0 List of Mitigation Measures

4.1 Biological Resources

- BR-1. When using copper-containing aquatic pesticides, District staff will estimate flow and volume in the canal or ditch being considered for treatment. District staff will only apply copper-containing aquatic pesticides in locations sufficiently upstream of outfalls to natural water courses so that dilution of the copper takes place to the maximum extent practicable.

4.2 Hazards & Hazardous Materials

- HHM-1. District personnel that make aquatic pesticide applications are either a QAL or QAC or someone under either a QAC or QAL's direct supervision. Expertise and training used by these District personnel result in mitigating potentially significant impacts.
- HHM-2. Prior to application, a written recommendation is prepared by a PCA. The written recommendation prepared by the PCA must evaluate, among other things, the proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant impact on the environment have been considered and if feasible, adopted. Refer to **Appendix B**. Expertise and training used by the PCA results in mitigating potentially significant impacts.
- HHM-3. During the preparation of the PCA's written recommendation and prior to and during the application, all District personnel strictly adhere to the aquatic pesticide product label. The label has clear and specific warnings that alert users to hazards that may exist. Use of the product label results in mitigating potentially significant impacts. Refer to **Appendix B**.
- HHM-4. In addition to the product label, District personnel consult the aquatic pesticide Material Safety Data Sheet (MSDS). The MSDS has specific information that describes precautions to be taken during the use of the aquatic pesticide. District personnel's familiarity with the MSDS sheets of aquatic pesticides results in mitigating potentially significant impacts. Refer to **Appendix B**.
- HHM-5. District personnel use the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The following documents are used:
- A-1, Working Safely with Pesticides on Farms
 - A-2, Storing, Moving and Disposing of Pesticides on Farms
 - A-3, Closed Systems, Enclosed Cabs, Water-Soluble Packaging
 - A-4, First Aid
 - A-5, Protecting Yourself from Breathing Pesticides on Farms
 - A-7, Washing Pesticide Work Clothing



- A-8, Safety Rules for Pesticide Handlers on Farms
- A-9, Pesticide Safety rules for Farmworkers
- A-10, Safety Rules for Minimal Exposure Pesticides on Farms

District personnel's familiarity with the DPR PSIS series mitigates potentially significant impacts. For example, the PSIS series describes the personal protective equipment (PPE) needed for the safe handling of aquatic pesticides, including goggles, disposable coveralls, gloves and respirators.

4.3 Hydrology & Water Quality

- HWQ-1. The District will obtain coverage under the 2004 general permit and comply with all aspects of it, including monitoring and reporting. Until the 2004 general permit is adopted, the District will continue to use the Yolo RPMP Monitoring Plan which has been reviewed and approved by the Central Valley RWQCB. Refer to **Appendix C**. By regularly monitoring and reporting surface water quality in its ditches and canals, the District will be able to identify problems with water quality and take corrective action if necessary. Corrective action includes such steps as modification to application techniques and timing, use of adjuvants to improve efficacy.
- HWQ-2. The District will continue to implement its IPM program for aquatic weed control. This program, among other things, involves the scouting of aquatic weed locations and densities and making applications of copper-containing aquatic pesticides on an "as-needed" basis to achieve the aquatic weed control necessary convey irrigation and stormwater.
- HWQ-3. Same as HHM-1
- HWQ-4. Same as HHM-2
- HWQ-5. Same as HHM-3



1011



5.0 REFERENCES

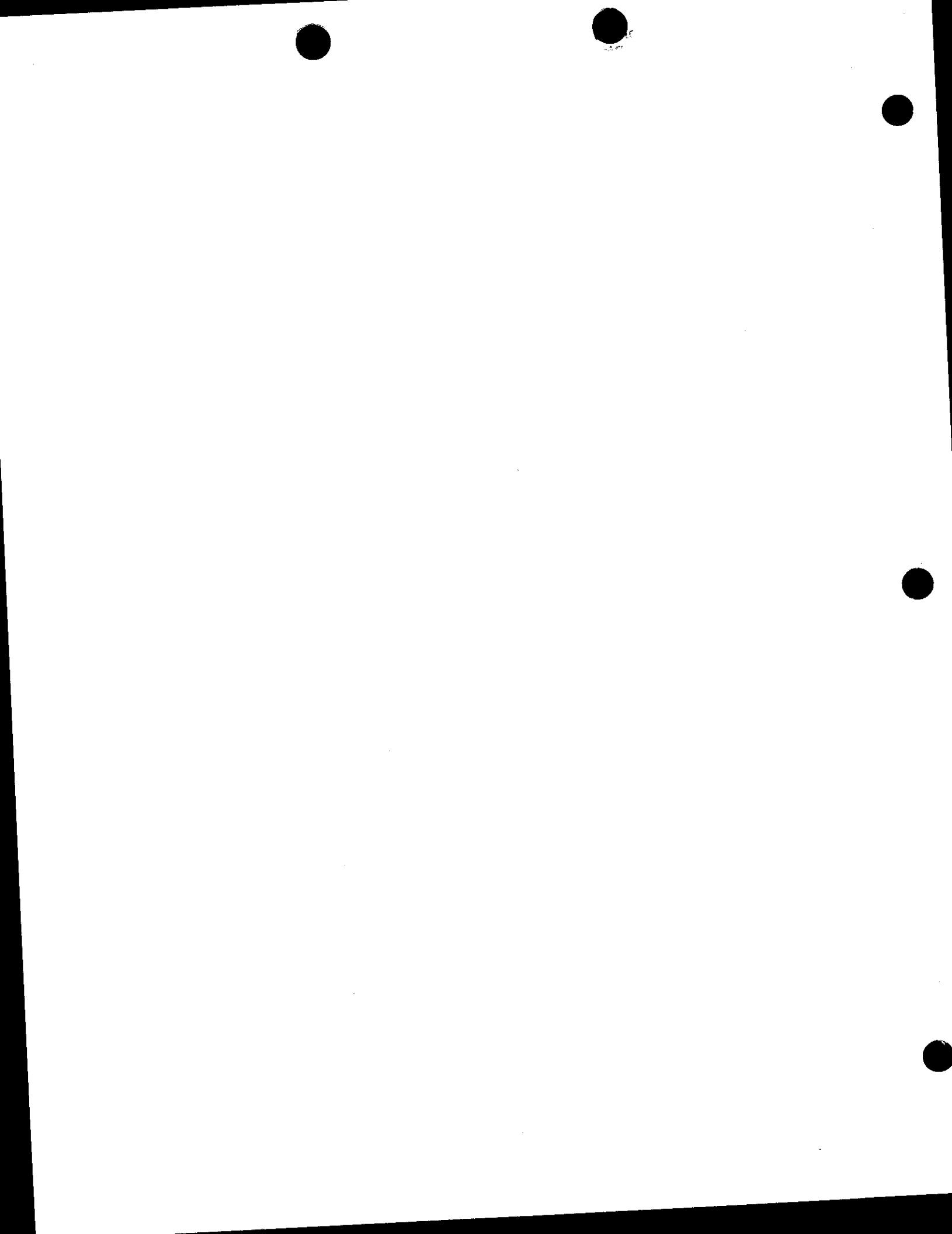
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6.0 PERSONS AND AGENCIES CONTACTED

- 1.) Wayne Sobieralski, SWRCB (916) 445-9379
- 2.) Jim Maughn, SWRCB (916) 341-5522
- 3.) Phillip Isorena, SWRCB (916) 341-5544
- 4.) Emily Alejandrino, RWQCB-CV (916) 464-4636
- 5.) Rudy Schnagl, RWQCB-CV (916) 464-4701
- 6.) Lance Lowe, Yolo County Planning and Public Works (530) 666-8775

7.0 LIST OF PREPARERS

- 1.) Michael S. Blankinship, Project Manager, Blankinship & Associates
- 2.) Josh Owens, Staff Scientist, Blankinship & Associates
- 3.) Christy Barton, Assistant General Manager, Yolo County Flood Control and Water Conservation District



Appendix A

Pest Control Recommendation

1. Operator of the Property		2. Recommendation Expiration Date	
Address		City County	
3. Location to be Treated			
4. Commodity to be Treated			5. Acres or Units to be Treated
6. Method of Application: <input type="checkbox"/> Air <input type="checkbox"/> Ground <input type="checkbox"/> Fumigation <input type="checkbox"/> Other		7. Pest(s) to be Controlled	
8. Name of Pesticide(s)		Rate Per Acre or Unit	Dilution Rate
			Volume Per Acre or Unit
9. Hazards and/or Restrictions:		10. Schedule, Time or Conditions	
<input type="checkbox"/> 1. Highly toxic to bees <input type="checkbox"/> 2. Toxic to birds, fish and wildlife <input type="checkbox"/> 3. Do not apply during irrigation or when run-off is likely to occur <input type="checkbox"/> 4. Do not apply near desirable plants <input type="checkbox"/> 5. Do not allow to drift onto humans, animals, desirable plants or property <input type="checkbox"/> 6. Keep out of lakes, streams and ponds <input type="checkbox"/> 7. Birds feeding on treated area may be killed <input type="checkbox"/> 8. Do not apply when foliage is wet (dew, rain, etc.) <input type="checkbox"/> 9. May cause allergic reaction to some people <input type="checkbox"/> 10. This product is corrosive and reacts with certain materials (see label) <input type="checkbox"/> 11. Closed system required <input type="checkbox"/> 12. Restricted use pesticide (California and/or Federal) <input type="checkbox"/> 13. Hazardous area involved (see map and warnings) <input type="checkbox"/> 14. Other (see attachment)		11. Surrounding Crop Hazards	
		12. Proximity of Occupied Dwellings, People, Pets or Livestock	
		13. Non-Pesticide Pest Control, Warnings and Other Remarks	
		14. Criteria Used for Determining Need for Pest Control Treatment:	
		<input type="checkbox"/> Sweep Net Counts <input type="checkbox"/> Leaf or Fruit Counts <input type="checkbox"/> Preventive <input type="checkbox"/> Field Observation <input type="checkbox"/> Pheromone or Other Trap <input type="checkbox"/> Soil Sampling <input type="checkbox"/> History <input type="checkbox"/> Other	
15. Crop and Site Restrictions:		<div style="border: 1px dashed black; width: 100%; height: 100%; position: relative;"> N E W S </div>	
<input type="checkbox"/> 1. Worker reentry interval _____ days <input type="checkbox"/> 2. Do not use within _____ days of harvest/slaughter <input type="checkbox"/> 3. Posting required <input type="checkbox"/> Yes <input type="checkbox"/> No _____ days <input type="checkbox"/> 4. Do not irrigate for at least _____ days after application <input type="checkbox"/> 5. Do not apply more than _____ application(s) per season <input type="checkbox"/> 6. Do not feed treated foliage or straw to livestock <input type="checkbox"/> 7. Plantback restrictions (see label) <input type="checkbox"/> 8. Other (see attachment)			
16. I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.			
Adviser Signature	Date		
Adviser License Number			
Employer			
Employers Address			

Appendix B

Specimen Label



Aquatic Herbicide

*Trademark of SePRO Corporation

For control of floating, emersed, and submersed vegetation in still or flowing aquatic sites such as potable water sources, lakes, rivers, reservoirs, and ponds, slow-flowing or quiescent water bodies, crop and non-crop irrigation systems (canals, laterals, and ditches), fish, golf course, ornamental, swimming, and fire ponds and aquaculture including fish and shrimp.

Active Ingredient:

Copper Carbonate*	15.9%
Inert Ingredients	84.1%
Total	100.0%

*Metallic copper equivalent, 9.1%

Keep Out of Reach of Children

DANGER PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted no detalle. (If you do not understand this label, find someone to explain it to you in detail).

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Refer to label booklet for additional precautionary information and Directions for Use, including Storage and Disposal.

Notice: Read the entire label. Use only according to label directions. Before buying or using this product, read "Warranty Disclaimer", "Inherent Risks of Use" and "Limitation of Remedies" inside label booklet.

EPA Reg. No. 67690-10
FPL 092402

EPA Est. No. 5905-GA-01
SC-84-0042

*Trademark of SePRO Corporation

SePRO Corporation • Carmel, IN 46032 U.S.A.

First Aid	
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If swallowed	<ul style="list-style-type: none"> • Call a poison center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or a doctor for further treatment advice.
<p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of emergency endangering health or the environment involving this product, call INFOTRAC 1-800-535-5053.</p>	

Precautionary Statements

Hazards to Humans and Domestic Animals

DANGER: Corrosive. Causes irreversible eye damage and skin burn. May be fatal if absorbed through skin. Harmful if swallowed. Do not get in eyes on skin or on clothing. Wear goggles, face shield, or safety glasses, protective clothing and chemical resistant gloves. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking and using tobacco. Remove contaminated clothing and wash before reuse.

Nautique* Aquatic Herbicide

Environmental Hazards

Fish toxicity is dependent on the hardness of the water. In soft water, trout and other species of fish may be killed at application rates recommended on this label. Do not use in waters containing trout or other sensitive species if the carbonate hardness of the water is less than 50 ppm. Fish toxicity generally decreases when the hardness of water increases. Do not treat more than one-half of lake or pond at one time to avoid depletion of oxygen levels due to decaying vegetation. Consult State Fish and Game Agency or other responsible Agency before applying this product to public waters.

Directions for Use

It is a violation of Federal Law to use this product in a manner inconsistent with its label directions.

General Information

Nautique may be applied to potable water sources, lakes, rivers, reservoirs, ponds, slow-flowing or quiescent water bodies, crop and non-crop irrigation systems (ditches, canals, and laterals), fish, golf course, ornamental, swimming, and fire ponds, and aquaculture including fish and shrimp. In waters with greater calcium carbonate hardness, the higher use rates are recommended for improved plant control.

Target Species

Nautique Aquatic Herbicide is a double chelated copper formulation that provides effective control of floating, submersed, and emersed aquatic plants having a sensitivity to copper absorption including:

Coontail	Naiads
Curlyleaf Pondweed	Thin Leaf Pondweed
Egeria (Brazilian Elodia)	Vallisneria
Elodea	Water Lettuce
Eurasian Watermillfoil*	Water Hyacinth
Horned Pondweed*	Widgeon Grass
Hydrilla	Pondweed (e.g., Sago, American,)*

* Variable control may be obtained in waters with greater calcium carbonate hardness.

Timing of Treatments

When target vegetation is actively growing, apply Nautique Aquatic Herbicide to the area of greatest concentration of foliage in such a way as to evenly distribute the herbicide. In lakes, reservoirs, ponds, and static canals, the application site is defined by this label as the specific location where Nautique is applied. In slow moving and flowing canals and rivers, the application site is defined by this label as the target location for plant control. In order to maximize effectiveness, apply Nautique early in the day under bright or sunny conditions when water temperatures are at least 60 F (15 C). The activity of this product may be reduced if there is insufficient penetration of light into the water or if the plants and weeds are covered with silt, scale, or algae.

If algae mats are thick, use high pressure when spraying to break up the algae mats.

Dissolved Oxygen Consideration

Treatment of aquatic plants and weeds can result in a reduction of dissolved oxygen due to the decomposition of the dead vegetation. This loss of dissolved oxygen can cause fish suffocation. To minimize this possible hazard treat 1/3 to 1/2 of the water area in a single operation, then wait 10-12 days before treating the remaining area. Begin treatment in the shallow areas, gradually proceeding outward in bands to permit the fish to move into the untreated area.

Application Options

Nautique Aquatic Herbicide can be applied directly as a surface spray, subsurface through trailing weighted hoses, or in combination with other aquatic herbicides and algaecides, surfactants, sinking agents, polymers, or penetrants. These products are used to improve the retention time, sinking, and distribution of the herbicide. For surface application, this product may be applied diluted or undiluted, whichever is most suitable to insure uniform coverage of the area to be treated.

Aquatic plants and weeds will typically drop below the surface within 4-7 days after treatment. The complete results of treatment will be observed in 3-4 weeks in most cases. In heavily infested areas a second application may be necessary after 10-12 weeks. Repeating application of this product too soon after initial application may have no effect.

Use the lower rates for treating shallow water and the higher rates for treating deeper water and heavier infestations. Surface applications may be made from shore into shallow water along the shoreline.

Nautique Aquatic Herbicide inverts easily using either tank mix or multi-fluid mixer techniques. For submersed plants invert applications should be made through weighted hoses dragged below the water surface; for heavy infestations, direct application is preferable.

No Restrictions on Water Use

Waters treated with Nautique may be used immediately after application for swimming, fishing, drinking, livestock watering, or irrigating turf and ornamental plants.

Permits

Some states may require permits for the application of this product to public waters. Check with your local authorities.

Application Rates

Recommended application rates in the chart below are based on minimal water flow in ponds, lakes, reservoirs, and irrigation conveyance or drainage systems. Treatments that extend chemical contact time with target vegetation will generally result in improved efficacy. In lakes, reservoirs, ponds, and static canals, the application

site is defined by this label as the specific location where Nautique is applied. In conveyance systems where significant water flow results in rapid off-site movement of copper, consult the Flowing Water Treatment Instructions for the recommended application instructions.

Application Rates		Gallons Per Surface Acre				Liters Per Surface hectare			
		Depth in Feet				Depth in meters			
Relative Density	ppm	1	2	3	4 ¹	0.5	0.75	1.0	1.25 ¹
Low Density	.5	1.5	3.0	4.5	6.0	12.0	24.1	36.1	48.2
	.6	1.8	3.6	5.4	7.2	14.9	29.8	44.7	59.6
Medium Density	.7	2.1	4.2	6.3	8.4	17.2	34.4	51.6	68.8
	.8	2.4	4.8	7.3	9.6	19.5	39.0	58.5	78.0
High Density	.9	2.7	5.4	8.1	10.8	21.8	43.6	65.4	87.2
	1.0 ²	3.0	6.0	9.0	12.0	24.1	48.2	72.3	96.4

¹For depths greater than 4 ft (1.25 m) add rates given for the sum of the corresponding depths in the chart

²Do not apply more than 1.0 ppm copper per application

Free-Floating Plants Apply Nautique at a rate of 8-12 gallons/acre for control of water hyacinth and salvinia and 4-6 gallons/acre for control of water lettuce. Add Nautique and appropriate surfactant to 100 gallons of water and use an adequate spray volume to insure good coverage of the plant.

Tank Mix

Nautique + Sonar A.S. Tank Mix (Except CA)

The following mixture can be used to provide rapid control of dense infestations of coontail, duckweed, egeria, elodea, Eurasian watermilfoil, hydrilla, sago and American pondweed, naiads, and other susceptible species. Apply 1 to 4 gallons of Nautique per surface acre in conjunction with normal Sonar rates. Observe all cautions and restrictions on the labels of both products used in this mixture.

Nautique + Reward® Tank Mix

The following mixture can be used to enhance control of coontail, duckweed, egeria, elodea, Eurasian watermilfoil, hydrilla, pondweeds (Potamogeton species), salvinia, water lettuce, water hyacinth, and other susceptible species. Tank mix a ratio of 2:1 or 1.5:1 Nautique to Reward. This can be applied as a tank mix or metered in as a concentrate. The addition of a surfactant is recommended to enhance performance on floating plants. Observe all cautions and restrictions on the labels of both products used in this mixture. **DO NOT MIX CONCENTRATES IN TANK WITHOUT FIRST ADDING WATER.**

Flowing Water Treatment :

Drip System or Metering Pump Application for Canals, Ditches, and Laterals

This product should be applied as soon as submersed macrophytes begin to interfere with normal

delivery of water (clogging of lateral head gates, suction screens, weed screens, and siphon tubes). Delaying treatment could perpetuate the problem causing massing and compacting of plants. Heavy infestations and low flows may result in pooling or uneven chemical distribution resulting in unsatisfactory control. Under these conditions increasing the water flow rate during application may be necessary. In flowing canals the application site is defined by this label as the target location for aquatic plant control.

To achieve desired control with Nautique herbicide in flowing waters, it is recommended that a minimum exposure period of three hours be maintained. Other factors to consider include: plant species and density of infestation and water temperature and hardness. Treatment on bright sunny days will tend to enhance efficacy of this product.

1. Treatment with Nautique requires accurate calculations of water flow rates. Devices that provide accurate flow measurements such as weirs or orifices are the preferred method, however, the volume of water to be treated may also be estimated using the following formula:

$$\text{Average width (ft.)} \times \text{Average Depth (ft.)} \times \text{Average Velocity (ft/sec)} = \text{Cubic feet per Second (CFS)}$$

The velocity can be estimated by determining the length of time it takes a floating object to travel a defined distance. Divide the distance (ft.) by the time (sec.) to estimate velocity (ft/sec). This measure should be repeated 3 times at the intended application site and then calculate the average velocity.

2. After accurately determining the water flow rate in C.F.S. or gallons/minute, find the corresponding drip rate in the chart below.

Water Flow Rate		ppm Copper	Chemical Drip Rate	
C.F.S.	Gal/Min.		Quart/ Hr	MI / min
1	450	0.5-1.0	0.5-1.0	8.0-16.0
2	900	0.5-1.0	1.0-2.0	16.0-32.0
3	1350	0.5-1.0	1.5-3.0	23.5-47.0
4	1800	0.5-1.0	2.0-4.0	31.5-63.0
5	2250	0.5-1.0	2.5-5.0	39.5-79.0

Calculate the amount of product needed to maintain the drip rate for a treatment period of 3 or more hours by multiplying quart/hr x 3; ml / min. by 180; or Fl. oz. / min x 180. Dosage will maintain 1.0 ppm copper concentration in the treated water for the treatment period. Introduction of the chemical should be made in the channel at weirs or other turbulence-creating structures to promote the dispersion of the chemical.

Pour the required amount of this product into a drum or tank equipped with a brass needle valve and constructed to maintain a constant drip rate. Use a stopwatch and appropriate measuring container to set the desired drip rate. Readjust accordingly if the canal flow rate changes during the treatment period. This product can also be applied by using metering pumps that adjust to flow rates in the canal.

Results can vary depending upon species and density of vegetation, desired distance of control and flow rate, and impact of water quality on copper residues and efficacy. Consult an Aquatic Specialist to determine optimal use rate and treatment period under local conditions. Periodic maintenance treatments may be required to maintain seasonal control.

Irrigation Ponds

When applying to irrigation ponds, it is best to hold water for a minimum of 3 hours before irrigating to ensure proper exposure of Nautique at targeted rates to plants. If water is to be continually pumped from the treated system during application, application techniques (drip, injection, or multiple spray applications) should be made to compensate for dilution of Nautique within the targeted area.

General Treatment Notes

The following suggestions apply to the use of this product as an algacide or herbicide in all approved use sites. For optimum effectiveness:

- Apply early in the day under calm, sunny conditions when water temperatures are at least 60 deg. F.
- Treat when growth first begins to appear or create a nuisance, if possible.
- Apply in a manner that will ensure even distribution of the chemical within the treatment area.
- Re-treat areas if regrowth begins to appear and seasonal control is desired. Allow one to two weeks between consecutive treatments.
- Allow seven to ten days to observe the effects of treatment (bleaching and breaking apart of plant material).

Storage and Disposal

Store in a cool, dry place.

Pesticide Disposal: Do not contaminate water, food or feed by storage and disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incinerate, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Warranty Disclaimer

SePRO Corporation warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. **SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.**

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to the label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation as the seller. All such risks shall be assumed by the buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such losses or damages in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies can not be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or Limitation of Remedies in any manner.

Form No. A-56-MC-01 (03)
Revised 12/30/02

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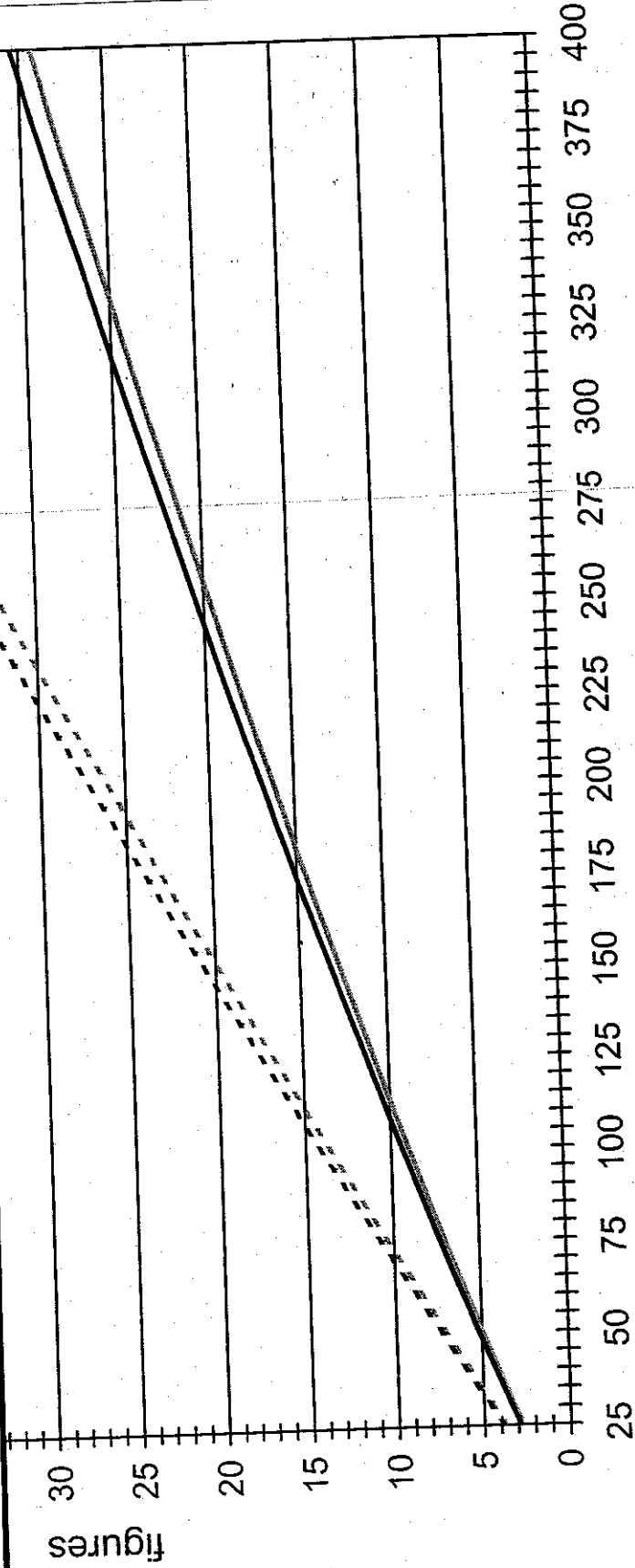
Criteria Continuous Concentration (4-day Average, dissolved) =
 $(e^{0.8545[\ln(\text{hardness})] - 1.702}) \times (0.960)$

Criteria Maximum Concentration (1-hour Average, dissolved) =
 $(e^{0.9422[\ln(\text{hardness})] - 1.700}) \times (0.960)$

Criteria Continuous Concentration (4-day Average, total recoverable) =
 $(e^{0.8545[\ln(\text{hardness})] - 1.702})$

Criteria Maximum Concentration (1-hour Average, total recoverable) =
 $(e^{0.9422[\ln(\text{hardness})] - 1.700})$

Criteria (ug/L) round value to two significant figures



Hardness (mg/L as CaCO₃)

Material Safety Data Sheet



Transportation and Medical Emergency Phone: 1-800-535-5053
(INFOTRAC)
General Phone: 317-580-8282

EPA Reg. Number: 67690-10
Effective Date: 2/28/03

SePRO Corporation Carmel, IN 46032

Nautique* Aquatic Herbicide

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: Nautique* Aquatic Herbicide

COMPANY IDENTIFICATION:

SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032
www.sepro.com

2. COMPOSITION / INFORMATION ON INGREDIENTS

Copper as Elemental**	9.1%
Inert Ingredients, Total, Including	90.9%
Ethylenediamine	CAS # 000107-15-3

**One gallon contains 0.91 pounds of elemental copper from a mixed ethylenediamine/triethanolamine/copper complex (1 liter contains 110.0 grams copper).

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. HAZARDOUS IDENTIFICATIONS

EMERGENCY OVERVIEW

Dark purple liquid with a slight ammoniacal odor. May cause severe eye irritation with corneal injury, even blindness. May be absorbed through the skin in harmful amounts. Corrosive to the skin.

EMERGENCY TELEPHONE NUMBER:
(800) 535-5053

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYES: Corrosive to eyes. Corneal injury may be severe, extensive, and, if not treated promptly, could result in permanent impairment of vision. Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the eye.

SKIN: Corrosive to skin. Avoid contact. May cause local discomfort or pain, severe excess redness and swelling, tissue destruction, fissures, ulceration, and possibly bleeding into the injured area. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material. LD₅₀ for skin absorption in rabbits is 700 mg/kg.

INGESTION: May be toxic if swallowed. May cause burns of the mouth and throat, abdominal pain, nausea, vomiting, diarrhea, dizziness, weakness, thirst, collapse, and possible coma. The nature and severity of these signs and symptoms will be dependent on the amount swallowed. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury. Oral LD₅₀ for rats is 680 mg/kg.

INHALATION: Vapors may be irritating and may cause excessive tear formation, burning sensation of the nose and throat, coughing, wheezing, shortness of breath, nausea and vomiting. Extremely high vapor concentrations may cause lung damage. Some individuals may develop asthma. Inhalation LC₅₀ for rats is 2.1 mg/L.

SYSTEMIC (OTHE RTARGET ORGAN) EFFECTS:
No relevant information found.

CANCER INFORMATION: No relevant information found.

TERATOLOGY (BIRTH DEFECTS): No relevant information found.

REPRODUCTIVE EFFECTS: No relevant information found.

4. FIRST AID

EYE: Immediately flush eyes with flowing water while holding eyelid away from eyeball. Continue washing for at least 15 minutes. Do not remove contact lenses if worn. Get prompt medical attention.

SKIN: Immediately flush skin thoroughly with water for at least 15 minutes while removing contaminated clothing and shoes. Wash thoroughly with soap and water. Get medical attention if irritation persists. Wash clothing before reuse. Discard contaminated leather articles such as shoes and belt.

Material Safety Data Sheet



Transportation and Medical Emergency Phone: 1-800-535-5053
(INFOTRAC)
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EPA Reg. Number: 67690-10
Effective Date: 2/28/03

Nautique* Aquatic Herbicide

SePRO Corporation Carmel, IN 46032

INGESTION: Do not induce vomiting. Get immediate medical attention. If patient is fully conscious, give 1 or 2 glasses of water or milk.

INHALATION: Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

NOTE TO PHYSICIAN: Corrosive. May cause stricture. If lavage is performed, suggest endotracheal and/or esophagoscopy control. If burn is present, treat as any thermal burn after decontamination. No specific antidote. Supportive care. Treatment is based on the judgment of the physician in response to reactions of the patient. Prolonged or repeated inhalation may aggravate preexisting asthma, liver and kidney disease. Corrosive to eyes and skin. Causes irreversible eye damage.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not determined
METHOD USED: Not applicable

FLAMMABLE LIMITS:
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: All-purpose foam is preferred.

FIRE AND EXPLOSION HAZARDS: Keep unnecessary people away; isolate the hazard area and deny unnecessary entry. Highly toxic fumes are released in fire situations.

FIRE FIGHTING EQUIPMENT: Wear positive-pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO TAKE FOR SPILLS AND LEAKS: Ventilate area. Avoid breathing vapors. Wear respiratory protection and avoid contact with skin, eyes or clothing. Use absorbent material such as sweeping compound, oil absorbent, or lime to contain and clean up small spills and dispose as waste in a chemical disposal container. Wash spill area with water containing a strong detergent, absorb it, and place in chemical disposal container. Report large spills to INFOTRAC and consult SePRO Corporation for assistance. Prevent runoff.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Utilize good personal hygiene practices and exercise normal liquid handling procedures. Store below 95°F (35°C) whenever possible. Decomposes at temperatures above 400°F (200°C). Average shelf life under proper storage conditions in the original sealed containers is 2 years. Store in a clean, dry area. Keep out of reach of children. Harmful if swallowed, absorbed through the skin, or inhaled. Avoid breathing of spray mist or contact with skin, eyes, or clothing.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES:

Ethylenediamine: ACGIH TLV and OSHA PEL are 10 ppm or 25 mg/M³, TWA.

Proprietary Ingredient: ACGIH TLV is 5 mg/M³, TWA

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Use a NIOSH approved full-face air-purifying respirator. For emergency response or for situations where the atmospheric level is unknown, use a NIOSH approved positive-pressure self-contained breathing apparatus.

SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as face shield, gloves, boots, apron, or full body suit will depend on operation. Use gloves, impervious to this material, at all times. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse. Items, which cannot be decontaminated, such as shoes, belts, and watchbands, should be removed, destroyed, and disposed.

Material Safety Data Sheet



Transportation and Medical Emergency Phone: 1-800-535-5053
(INFOTRAC)
General Phone: 317-580-8282

EPA Reg. Number: 67690-10
Effective Date: 2/28/03

SePRO Corporation Carmel, IN 46032

Nautique[®] Aquatic Herbicide

EYE/FACE PROTECTION: Use chemical goggles. Eye wash fountain should be located in immediate work area. If vapor exposure causes eye discomfort, use a NIOSH approved full-face respirator for vapors.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not determined
SOLUBILITY IN WATER: Soluble
VAPOR PRESSURE: Approximately the same as water
SPECIFIC GRAVITY: 1.2
APPEARANCE: Dark purple liquid
ODOR: Slight ammoniacal
pH: Not determined

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

INCOMPATIBILITY: (Specific materials to avoid) Strong acids and nitrites. Should not be used in water where the pH is less than 6.0 due to the possible breakdown of the copper chelate, which could form copper ions, which would precipitate. Should not be applied to water when temperature of the water is below 60°F (15°C).

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposes above 390°F (200°C). May form oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION

MUTAGENICITY: No relevant information found.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: No relevant information found.

13. DISPOSAL CONSIDERATIONS

DISPOSAL: Responsibility of proper waste disposal rests with the owner of the waste. Consult with local and environmental authorities. Contaminated materials should be placed in sealed drums and shipped to an approved chemical dump for disposal in accordance with all federal, state and local regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION:

FOR PACKAGE SIZES ONE GALLON OR LESS AND ALL MODES OF TRANSPORTATION (air, land, vessel):
This material is not regulated.

FOR PACKAGES SIZES GREATER THAN ONE GALLON AND ALL MODES OF TRANSPORTED (air, land, vessel):

Copper based pesticides, liquid, toxic (mixed copper ethylenediamine/triethanolamine complex).
DOT Hazard Class: Class 6.1

15. REGULATORY INFORMATION

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund

Material Safety Data Sheet



Transportation and Medical Emergency Phone: 1-800-535-5053
(INFOTRAC)
General Phone: 317-580-8282

EPA Reg. Number: 67690-10
Effective Date: 2/28/03

Nautique* Aquatic Herbicide

SePRO Corporation Camel, IN 46032

Amendments and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An Immediate Health Hazard

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA 701): (4 = Extreme; 3 = High; 2 = Moderate; 0 = Insignificant)

Health 3
Flammability 0
Reactivity: 1

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in Section 1 of the MSDS.

Chemical Name	CAS Number	List
Proprietary Ingredient	Proprietary	PA1
Ethylenediamine	000107-15-3	NJ1 NJ2 NJ3 PA1 PA3

NJ1=New Jersey Special Health Hazard Substance (present at > or = to 0.1%).
NJ2=New Jersey Environmental Hazardous Substance (present at > or = to 1.0%).
NJ3=New Jersey Workplace Hazardous Substance (present at > or = to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at > or = to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at > or = to 1.0%).

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD: This product is a "hazardous Chemical" as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA, which may require reporting of releases:

Chemical Name	CAS Number	RQ	% in Product
Ethylenediamine	000107-15-3	5000	20.7%

16. OTHER INFORMATION

MSDS STATUS: Revised
Replaces MSDS Dated: 6/25/98
Replaces MSDS Dated: 10/10/02

The information herein is given in good faith, but no warranty, express or implied, is made. Consult SePRO Corporation for further information.

Nautique*

Aquatic Herbicide

Use
Guide

For more information call SePRO Corporation:
1-800-419-7779



SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032-4562
Internet: www.sepro.com

*Trademark of SePRO Corporation.



Nautique

Aquatic Herbicide

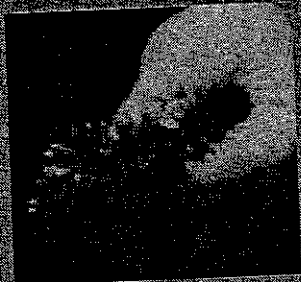
*is a chelated copper formulation that provides effective control of hydrilla, egeria, naiads, coontail, elodea, water lettuce, water

hyacinth, horned pondweed, widgeon grass and other species having a sensitivity to copper absorption. Under certain water quality conditions, such as low hardness, this product may also control Eurasian watermilfoil and various pondweed species (e.g. *P. nodosus*, *P. pectinatus*, *P. crispus*). Nautique may be applied to lakes, rivers, reservoirs, ponds, potable water sources, crop and non-crop irrigation systems (ditches, canals, and laterals), fish, golf course, ornamental, swimming, and fire ponds, and aquaculture including fish and shrimp.

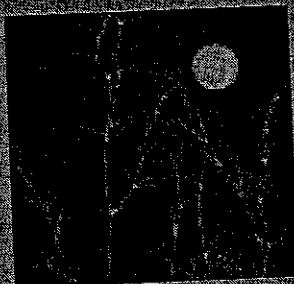
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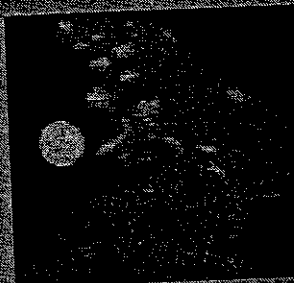
EGERIA



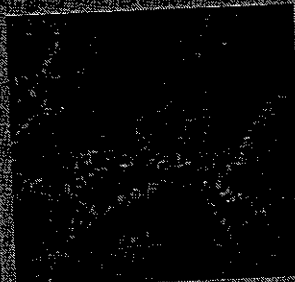
NAIADS



COONTAIL



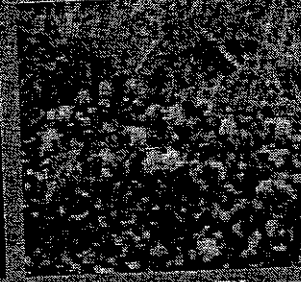
ELODEA



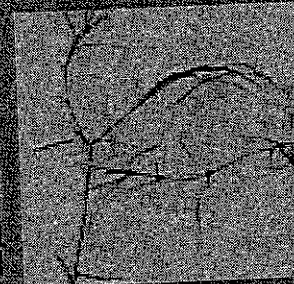
WATER LETTUCE



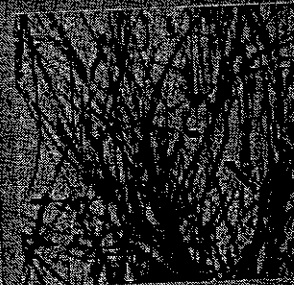
WATER HYACINTH



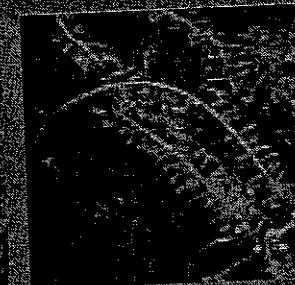
HORNED PONDWEED



WIDGEON GRASS



EURASIAN WATERMILFOIL



Contents

- Page 3 Chemical and Physical Properties
- Page 4 - 5 Application
- Page 6 Precautions
- Page 6 Environmental Fate
- Page 7 Handling

Chemistry and Physical Properties

Chemical family: Copper complex

Solubility in water: Miscible

Common name: Copper chelate

Stability: Stable to light

Vapor pressure: Approximately the same as water

Trademarks and other designations: Nautique

Formulations: One single-product formulation of Nautique is available as a liquid containing .91 lb. of elemental copper. (1 liter contains 110.0 grams copper).

Decomposition temperature: 400°F (200°C)

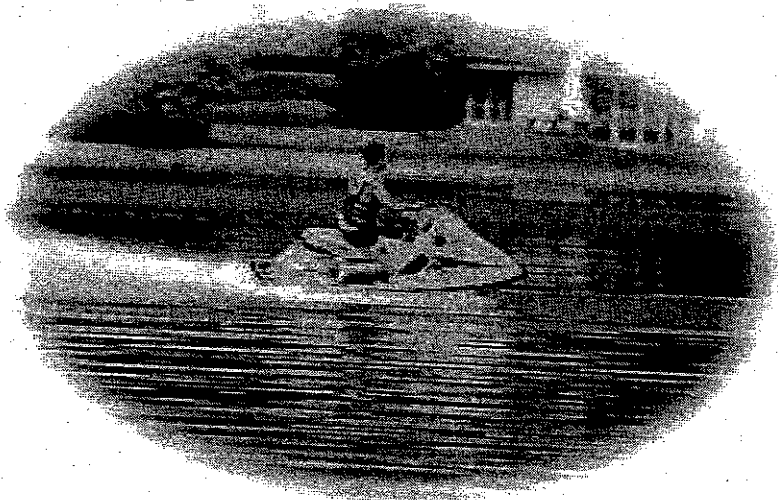
Physical state: Solid

Color: Dark purple

Odor: Slight ammoniacal

Specific gravity: 1.2

Mode of Action: Mode of action is uptake through plant cells where the copper ion inhibits plant photosynthesis providing a fast-acting result.



Application

General Information

Nautique Aquatic Herbicide provides effective control of hydrilla, egeria, southern naiad, horned pondweed, and widgeon grass in lakes, rivers, ponds, reservoirs, potable water sources, crop and non-crop irrigation systems (ditches, canals and laterals), fish, golf course, ornamental, swimming and fire ponds, and aquaculture including fish and shrimp. This product rapidly penetrates into the plant tissues. Proper application of this contact product is, therefore, important.

Nautique can be applied directly to actively growing plants as a surface spray, subsurface through trailing weighted hoses, or as an invert emulsion. For surface or subsurface application, this product may be applied diluted or undiluted, whichever is most suitable to insure uniform coverage of the area to be treated. The activity of this product may be reduced if there is insufficient penetration of light into the water or if plants are covered with silt, scale or algae.

Aquatic plants will usually drop below the surface within 4 days after treatment. The complete results of treatment will be observed in 3-4 weeks in most cases. In heavily infested areas a second application may be necessary after 10-12 weeks. Repeating application of this product too soon after initial application may have no effect.

Use the lower rates for treating shallow water and the higher rates for treating deeper water and heavier infestation. Surface applications may be made from shore into shallow water along the shoreline. Nautique may be applied directly, tank mixed or through a multi-fluid mixer technique. For subsurface plants,

applications should be made through weighted hoses dragged below the water surface using direct application, tank mixing or inverts.

No Waiting

Water may be used immediately after treatment for swimming, fishing, livestock watering and irrigation.

Nautique Aquatic Herbicide may be applied directly to the surface at water shorelines or in shallow water.

Subsurface application is preferable for deeper waters. Apply Nautique through weighted hoses. Adjust the hose depth to about one foot above the lake or pond bottom or at the depth where the infestation is greatest. Avoid dragging the hose on the bottom. Other copper-sensitive weeds may be controlled by varying the application rate.

Heavy infestation may require additional applications. Use lower application rates for shallow water; higher rates for deeper waters.

Directions for Use

Nautique has a long shelf-life and excellent stability because the copper is totally solubilized and chelated to prevent precipitation. For maximum effectiveness, apply Nautique to actively growing plants on bright sunny days when the water temperature is more than 60°F or 15°C.

Avoid overspraying of the spray mist. Apply Nautique to the area of greatest foliage density, allowing the herbicide spray to deposit directly on to the weed surfaces. Repeat as necessary to control re-growth and plants missed in the previous operation. Cloudy water or silt or algae layers on foliage may reduce the effectiveness of the application.

Application Rates to Control

*American Pondweed, Coontail, Egeria, Elodea, Eurasian watermilfoil, Hydrilla, Naiads, Sago pondweed, Widgeon Grass*¹

Application Rates		Gallons per surface acre				Liters per surface hectare			
		Depth in feet				Depth in meters			
Relative Density	PPM	1	2	3	4 ²	0.5	0.75	1.0	1.25 ²
Low Density	.5	1.5	3.0	4.5	6.0	12.0	24.1	36.1	48.2
	.6	1.8	3.6	5.4	7.2	14.9	29.8	44.7	59.6
Medium Density	.7	2.1	4.2	6.3	8.4	17.2	34.4	51.6	68.8
	.8	2.4	4.8	7.3	9.6	19.5	39.0	58.5	78.0
High Density	.9	2.7	5.4	8.1	10.8	21.8	43.6	65.4	87.2
	1.0 ³	3.0	6.0	9.0	12.0	24.1	48.2	72.3	96.4

1) Species susceptibility may vary with water hardness. 2) For depths greater than 4 feet (1.25 meters) add the rates given for the sum of corresponding depths in the chart. 3) Do not apply more than 1.0 ppm copper per application.

Application

Applications:

Nautique may be applied directly, tank mixed or metered into a treatment site. Nautique may be used in combination with other aquatic herbicides to enhance control.

Invert Applications:

Nautique Aquatic Herbicide inverts easily using multi-fluid mixer techniques. For subsurface plants apply invert emulsions by dragging weighted hoses below the water surface.

Tank Mix

Nautique plus Reward® Tank Mix:

The following mixture can be used to enhance control of coontail, duckweed, egeria, elodea, Eurasian watermilfoil, hydrilla, pondweeds (Potamogeton species), salvinia, water lettuce, water hyacinth, and other susceptible species. Tank mix a ratio of 2:1 or 1.5:1 Nautique to Reward. This can be applied as a tank mix solution or metered in separately as concentrates. **Do not mix concentrates in a tank without first adding water.** The addition of a surfactant is recommended to enhance performance. Observe all cautions and restrictions on the labels of both products used in this mixture.

Nautique plus Sonar® A.S. Tank Mix: (Except CA)

The following mixture can be used to provide rapid control of dense infestations of coontail, duckweed, egeria, elodea, Eurasian watermilfoil, hydrilla, Sago and American pondweed, naiads, and other susceptible species. Apply 1 to 4 gallons of Nautique per surface acre in conjunction with normal Sonar rates. Observe all cautions and restrictions on the labels of both products used in this mixture.

Flowing Water Treatment

Drip System or Metering Pump Application for canals, ditches, laterals and other flowing systems.

This product should be applied as soon as submersed macrophytes begin to interfere with normal delivery of water (clogging of lateral head gates, suction screens, weed screens, and siphon tubes). Delaying treatment could perpetuate the problem causing massing and compacting of plants. Heavy infestations and low flows may result in pooling or uneven chemical distribution resulting in unsatisfactory control. Under these conditions increasing the water flow rate during application may be necessary. In flowing systems, the application site is defined by this label as the target location for aquatic plant control.

To achieve desired control with Nautique herbicide in flowing waters, it is recommended that a minimum exposure period of three hours be maintained. Other factors to consider include: plant species and density of infestation and water temperature and hardness. Treatment on bright sunny days will tend to enhance efficacy of this product.

1. Treatment with Nautique requires accurate calculations of water flow rates. Devices that provide accurate flow measurements such as weirs or orifices are the preferred method, however, the volume of water to be treated may also be estimated using the following formula:

$$\text{Average width (feet)} \times \text{Average depth (feet)} \times \text{Average velocity (feet/second)} = \text{Cubic feet per second (CFS)}$$

The velocity can be estimated by determining the length of time it takes a floating object to travel a defined distance. Divide the distance (feet) by the time (seconds) to estimate velocity (feet/second). This measure should be repeated 3 times at the intended application site and then calculate the average velocity.

2. After accurately determining the water flow rate in C.F.S. or gallons/minute, find the corresponding drip rate in the chart below.

Water Flow Rate		PPM Copper	Chemical Drip Rate	
C.F.S.	Gal/Min.		Quart/Hr.	MI/Min.
1	450	0.5 - 1.0	0.5 - 1.0	8.0 - 16.0
2	900	0.5 - 1.0	1.0 - 2.0	16.0 - 32.0
3	1350	0.5 - 1.0	1.5 - 3.0	23.5 - 47.0
4	1800	0.5 - 1.0	2.0 - 4.0	31.5 - 63.0
5	2250	0.5 - 1.0	2.5 - 5.0	39.5 - 79.0

Calculate the amount of product needed to maintain the drip rate for a period of 3 hours by multiplying qt./hr. x 3; ml/min. by 180; or Fl. oz./min. x 180. Dosage will maintain 1.0 ppm copper concentration in the treated water for the 3 hour period. Introduction of the herbicide should be made in the channel at weirs or other turbulence-creating structure to promote the dispersion of the herbicide.

Pour the required amount of Nautique into a drum or tank equipped with a brass needle valve and constructed to maintain a constant drip rate. Use a stopwatch and appropriate measuring container to set the desired drip rate. Readjust accordingly if the canal flow rate changes during the 3 hour treatment period. This product can also be applied by using metering pumps that adjust to flow rates in the canal.

Distance of control obtained will vary depending on the density of vegetation growth. Periodic maintenance treatments may be required to maintain seasonal control.

AVOID INJURIOUS SPRAY DRIFT: Do not permit sprays containing this herbicide to drift onto adjacent desirable plants as injury may occur. Read and follow the Use Precautions on this product.

Precautions

General Precautions

Desirable plants and fish: Concentrated Nautique Aquatic Herbicide may injure ornamental plants, grass or other foliage. Do not allow direct contact of Nautique with desirable plants and grass. Apply only as specified on the label.

Treating aquatic plants can result in a reduction of dissolved oxygen due to decomposition of vegetation. This loss of dissolved oxygen can cause fish suffocation. To minimize the potential hazard, treat no more than 1/2 of the water area in a single operation. Wait approximately 2 weeks before treating the remaining area. Begin treatment in the shallow areas, gradually proceeding outward in bands to permit fish to move into untreated areas.

Precautionary Statements

Hazards to humans and domestic animals:

DANGER. Corrosive. Can cause irreversible eye damage and skin burn. May be fatal if absorbed through skin. Harmful if swallowed. Do not get in eyes or on skin or on clothing.

Ventilation: Good general ventilation is sufficient for most conditions.

Respiratory protection: No respiratory protection should be needed when using Nautique according to label directions.

Eye Protection: Wear goggles, face shield or safety glasses.

Skin Protection: Wear protective clothing and rubber gloves (ie. long sleeved shirt and pants, shoes plus socks). Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking and using tobacco. Remove contaminated clothing and wash before reuse.

Keep out of reach of children.

Statement of Practical Treatment

If in eyes: Hold eyelids open and flush eyes with a gentle steady stream of water for 15 minutes. Get medical attention.

If on skin: Wash with plenty of soap and water. Get medical attention.

If swallowed: Call physician or poison control center. Drink a large quantity of milk, egg white or gelatin mixture or if these are not available, large quantities of water.

Note to physician: Possible mucosal damage may contraindicate gastric lavage.



Environmental Fate

Environmental Hazards

This product may be toxic to fish. Trout and other species of fish may be killed at application rates recommended on this label. However, fish toxicity generally decreases when the hardness of water increases. Consult State Fish and Game Agency before applying this product to public waters.

Permits

Some states may require permits for the application of this product to public water. Check with your local authorities.

Handling

Storage

Store in a cool, dry place.

Spills

For small spills, use absorbent material to contain and clean. Dispose as waste (see "Disposal" below for instructions). Dike large spills to prevent runoff, then report to INFO-TREC and SePRO Emergency Phone: 317-580-8282.

Pesticide Disposal

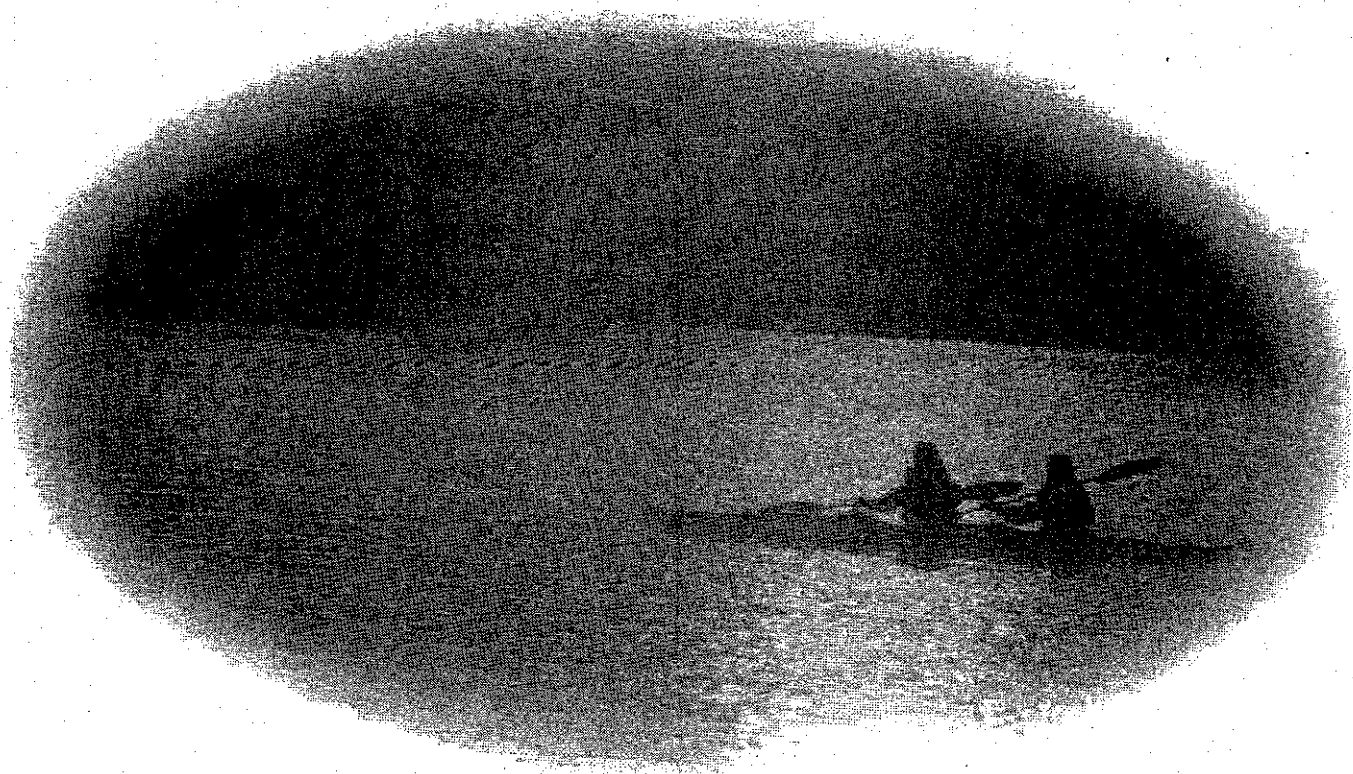
Do not contaminate water, food or feed by storage and disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal Law.

If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

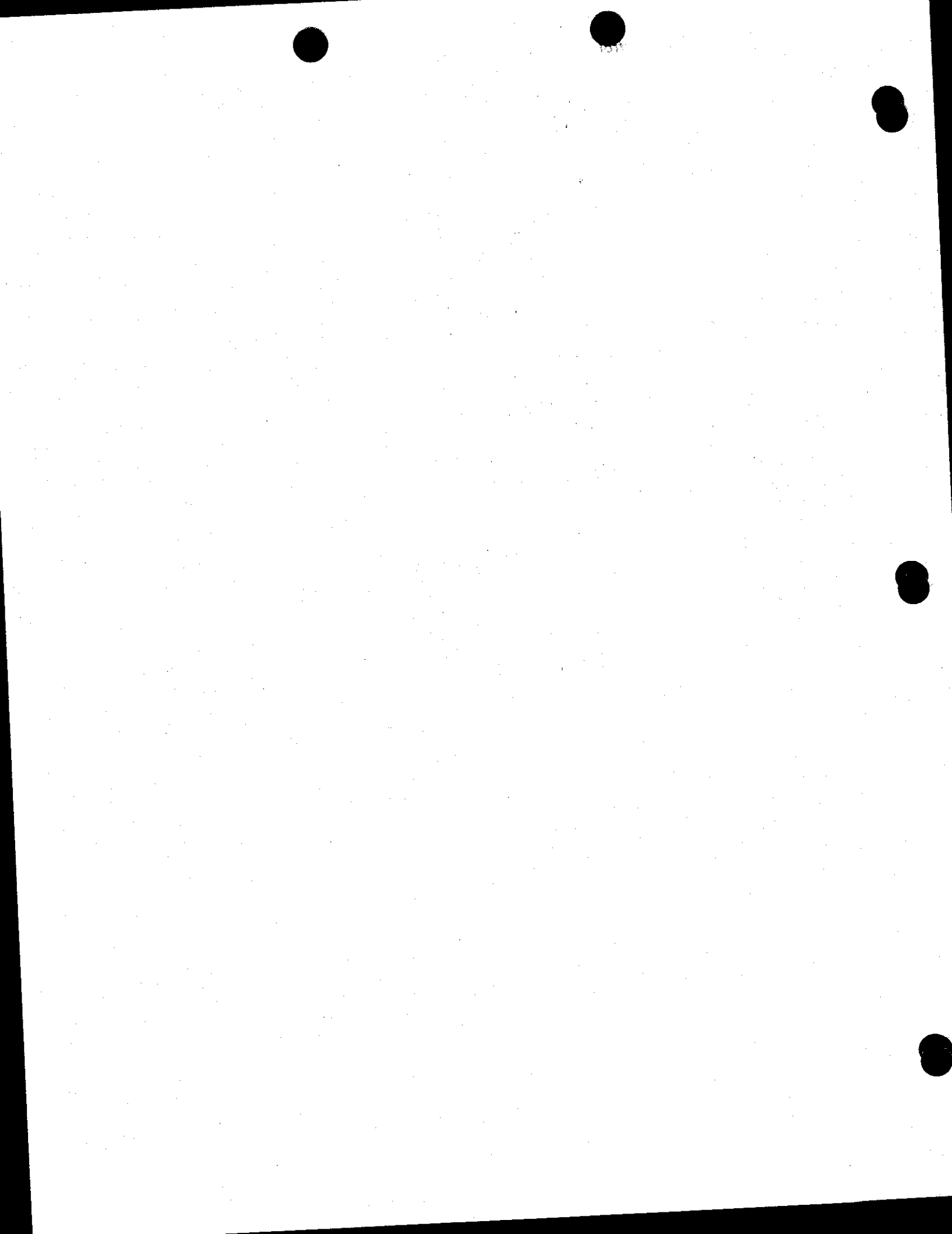
Container Disposal

Container Disposal (Plastic): Do not reuse container. Triple-rinse (or equivalent) then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration. Or, if allowed by state and local authorities, dispose of containers by burning, but stay out of the resulting smoke.

Neither the manufacturer nor the seller makes any warranty, expressed or implied, concerning the use of this product other than indicated on the label. Buyer assumes all risk of use of this material when such use is contrary to label instructions. Read and follow label directions.



Always read and follow the directions and precautions on the Nautique herbicide labels and material safety data sheets carefully.



Appendix C

**YOLO REGIONAL
PESTICIDE MONITORING PROGRAM
FOR THE STATEWIDE NPDES PERMIT
FOR DISCHARGES OF AQUATIC PESTICIDES**

Originally Submitted July 31, 2002

First Revision September 12, 2002

Second Revision October 11, 2002

Submitted Jointly By:

YOLO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECLAMATION DISTRICT #108

RECLAMATION DISTRICT #999

CACHE CREEK CONSERVANCY

RECLAMATION DISTRICT #900

Prepared for Review and Approval By:

**Central Valley Regional Water Quality Control Board
3443 Routier Road, Suite A
Sacramento, California 95827
Contact: Emily Alejandrino**

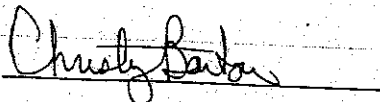
Prepared by:

**Blankinship & Associates, Inc.
2940 Spafford St., Suite 110
Davis, CA 95616
Contact: Michael Blankinship
(530) 757-0941**

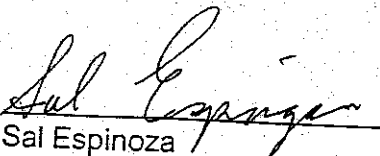
CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to insure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".

Signed and Agreed:



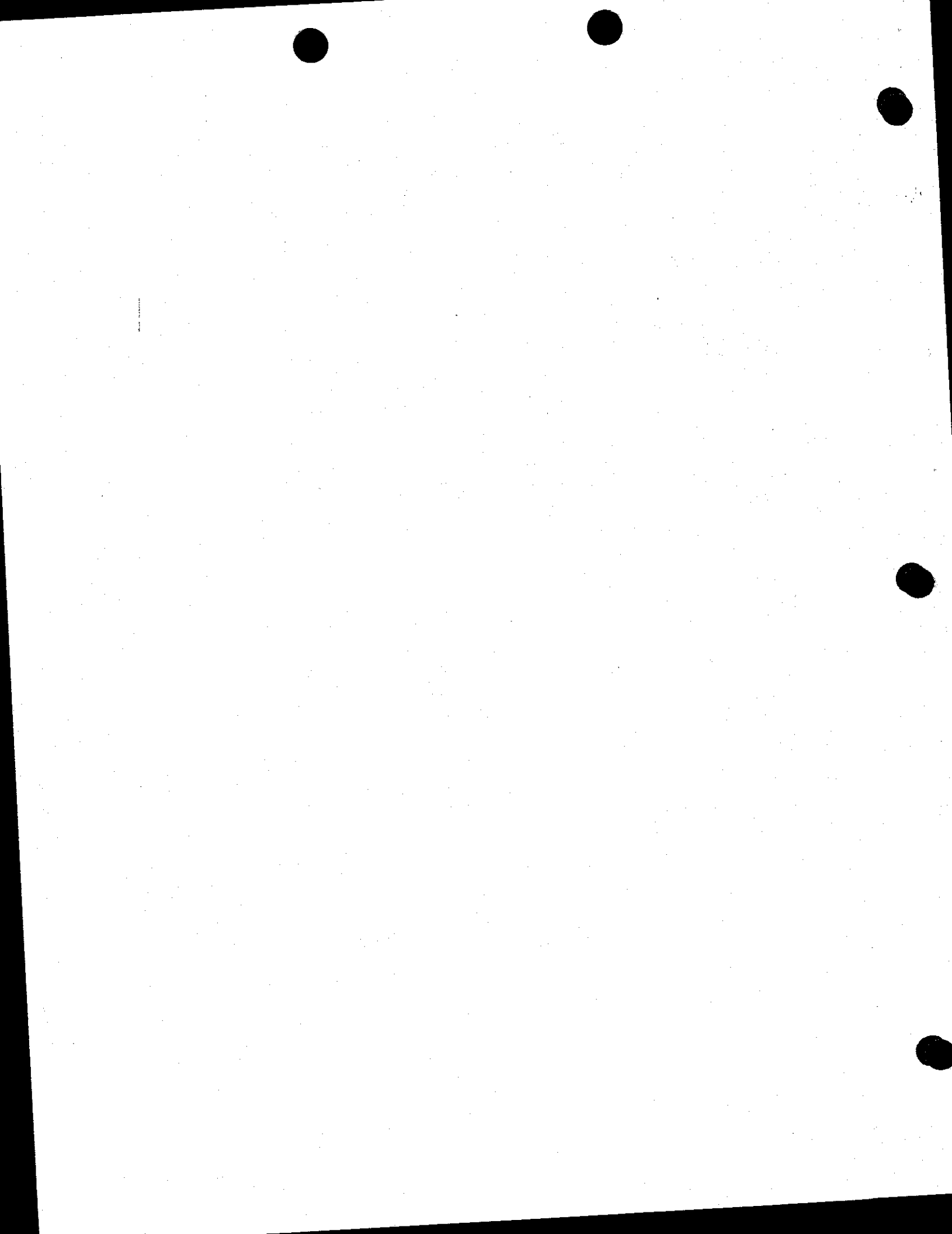
Christy Barton
Assistant General Manager
Yolo County Flood Control & Water Conservation District
34274 State Highway 16
Woodland, CA 95695



Sal Espinoza
Ditchtender Supervisor
Yolo County Flood Control & Water Conservation District
34274 State Highway 16
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Lewis E. Bair, P.E.
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Grimes, CA 95950

John Robert Webber
Manager
Reclamation District #999
38563 Netherlands Road
Clarksburg, CA 95612-5003




CERTIFICATION

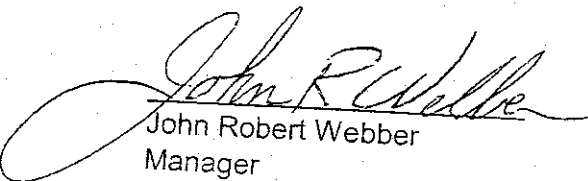
"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to insure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".

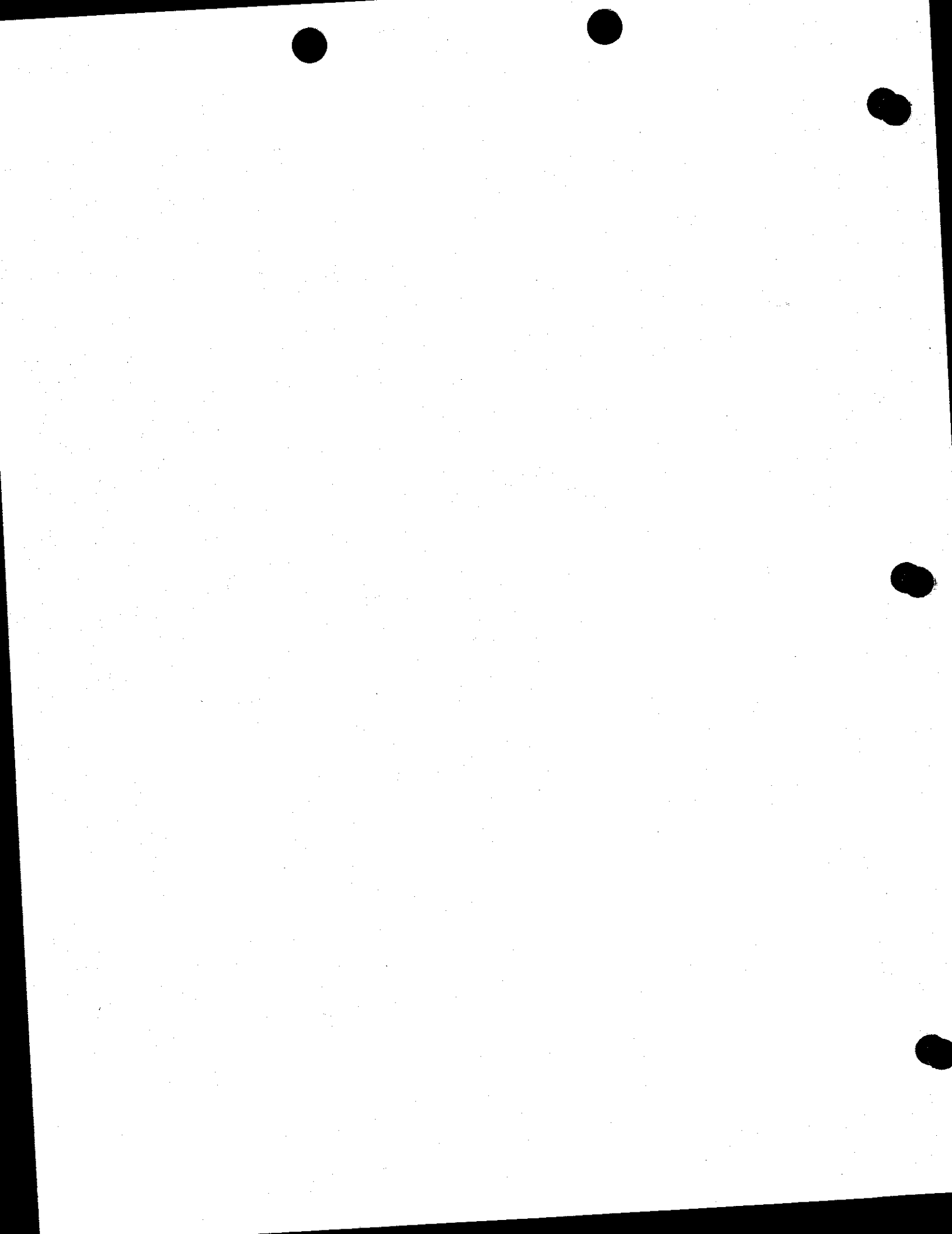
Signed and Agreed:

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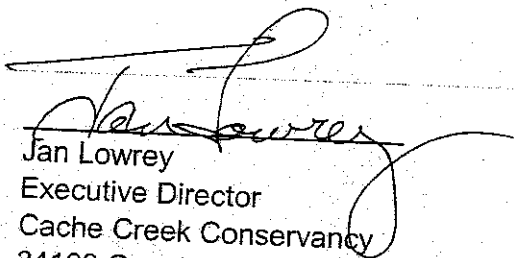

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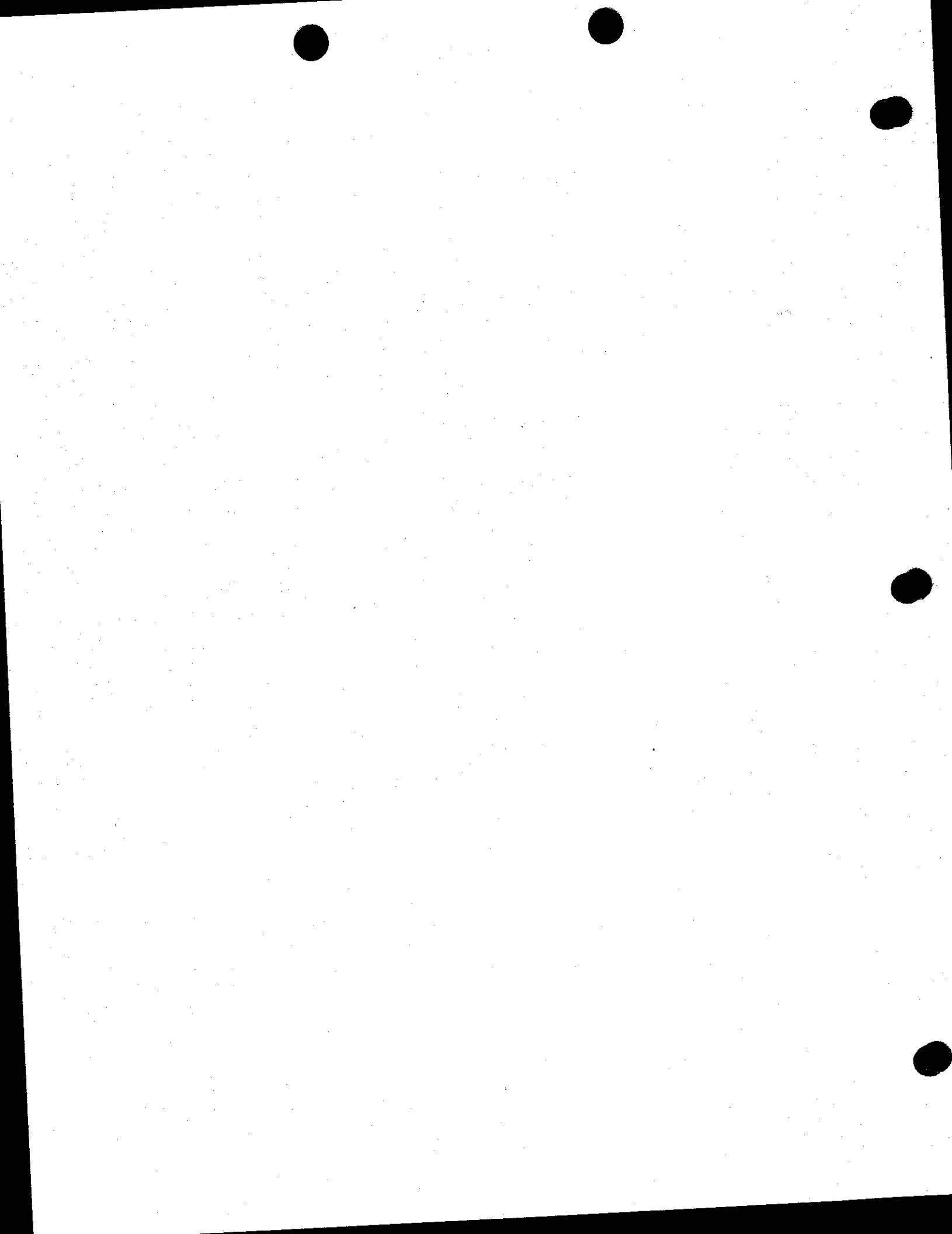
CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to insure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".

Signed and Agreed:



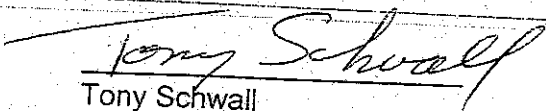
Jan Lowrey
Executive Director
Cache Creek Conservancy
34199 County Road 20
Woodland, CA 95695



CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to insure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".

Signed and Agreed:



Tony Schwall
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**YOLO REGIONAL PESTICIDE MONITORING PROGRAM FOR THE STATEWIDE
NPDES PERMIT FOR DISCHARGES OF AQUATIC PESTICIDES
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FOR THE STATEWIDE NPDES PERMIT
FOR DISCHARGES OF AQUATIC PESTICIDES

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1.0 Introduction

In March 2001, the State Water Resources Control Board (SWRCB) prepared Water Quality Order # 2001-12-DWQ which created Statewide General National Pollutant Discharge Elimination System (NPDES) Permit # CAG990003 (herein referred to as the "general permit") for the discharges of aquatic pesticides to waters of the United States.

The purpose of Order # 2001-12-DWQ is to minimize the areal extent and duration of adverse impacts to beneficial uses of water bodies treated with aquatic pesticides. The purpose of the general permit, which expires January 31, 2004, is to substantially reduce the potential Discharger liability incurred for releasing water treated with aquatic pesticides into waters of the United States.

Coverage under the general permit is available to single or regional Dischargers for releases of potential and/or actual pollutants to waters of the United States. Dischargers eligible for coverage under the general permit are public entities that conduct resource or pest management control measures, including local, state, and federal agencies responsible for control of algae, aquatic weeds, and other organisms that adversely impact operation and use of drinking water reservoirs, water conveyance facilities, irrigation canals, flood control channels, detention basins and natural water bodies.

The general permit does not cover indirect or non-point source discharges from agricultural or other applications of pesticides to land that may be conveyed in storm water or irrigation runoff, and only covers pesticides that are applied according to label directions and that are registered for use on aquatic sites by the California Department of Pesticide Regulation (DPR).

On July 31, 2002 the Yolo County Flood Control and Water Conservation District, Reclamation District #108, and Reclamation District #999 submitted the original Yolo Regional Pesticide Monitoring Plan (RPMP) to the Central Valley Regional Water Quality Control Board (CVRWQCB). The original Yolo RPMP was approved by the CVRWQCB on August 6, 2002.

On September 12, 2002 the above-mentioned group submitted the revised Yolo RPMP that incorporated the Cache Creek Conservancy. The revised Yolo RPMP received approval from the CVRWQCB on September 16, 2002.

This document describes a second revision to include Reclamation District # 900 in the Yolo RPMP.

2.0 Regional Pesticide Monitoring Program (RPMP)

Under provisions of a Memo of Understanding, (MOU), the Yolo County Water Conservation & Flood Control District, Reclamation District #999, Reclamation District #108, the Cache Creek Conservancy, and Reclamation District #900 (collectively referred to as "Dischargers") have created the Yolo Regional Pesticide Monitoring Program (RPMP) for the purposes of complying with the general permit. Refer to **Figures 1 and 2**.

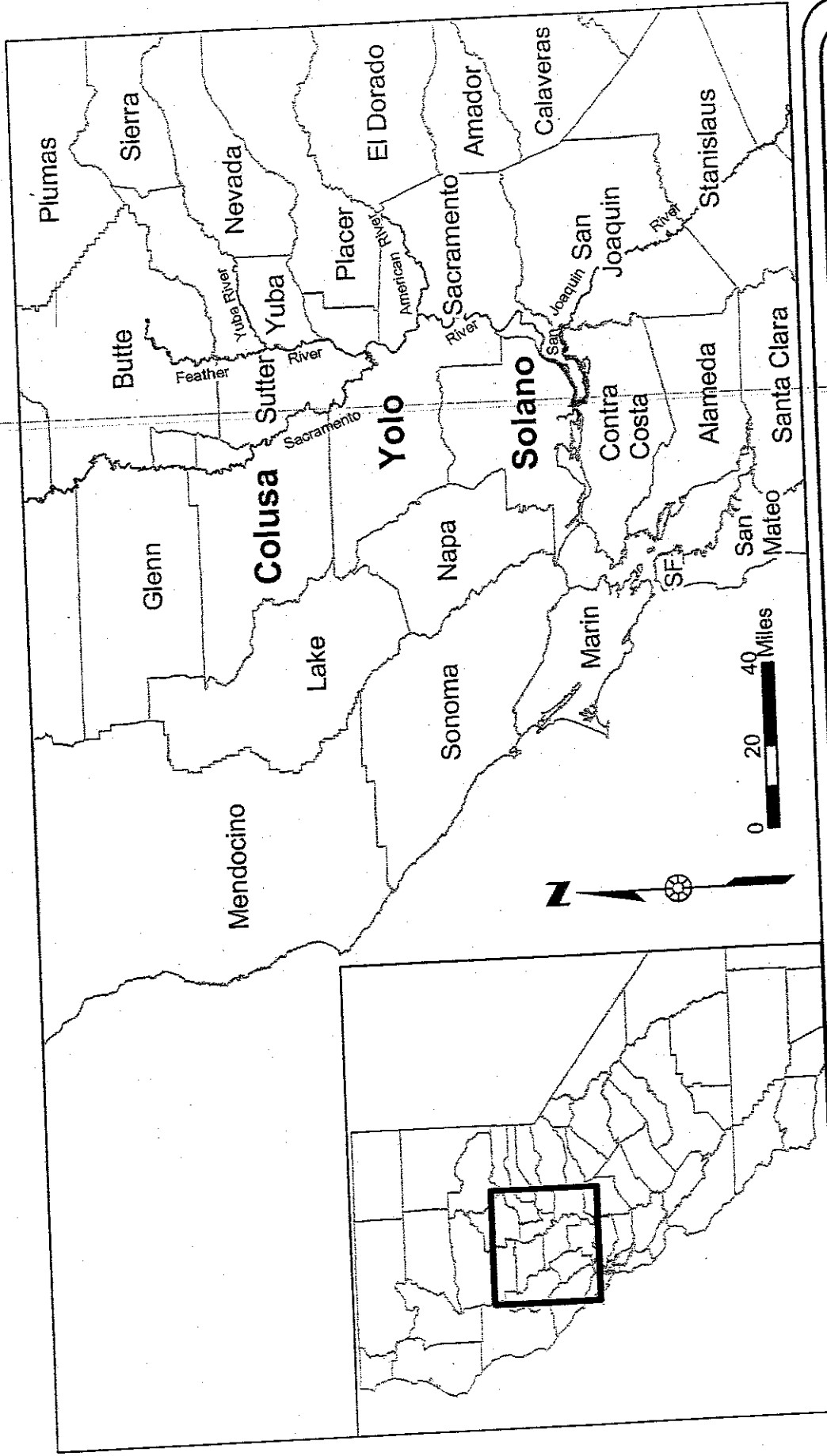
The rationale for the formation of the Yolo RPMP is based on the many similarities that exist between the Dischargers. These similarities include similar primary objectives (i.e., the delivery of irrigation water to similar crops) virtually identical topography, many of the same pests, and use of many of the same techniques for managing these pests.

Using Integrated Pest Management (IPM) techniques, the Dischargers apply aquatic pesticides that are identified in their respective Notices of Intent to Comply (NOIs) previously submitted to the Central Valley Regional Water Quality Control Board (RWQCB).

Attachment B of the general permit describes the Monitoring and Reporting Program (MRP), which requires the following six elements:

1. Characterization of representative aquatic pesticide application projects, including: diversity of actual pesticide use, diversity in season, receiving water types (e.g., canals, creeks, sloughs, etc.), climate, differing rates of pesticide applications or concentrations, and project size (area, water volume, and flow).
2. Visual assessment of existing or potential adverse impacts on beneficial uses caused by the application of pesticides.
3. Water quality analysis (using the test procedures specified in 40 Code of Federal Regulations [CFR] Part 136) for selected constituents and parameters to demonstrate an acceptable level of water quality and protection of beneficial uses of the receiving waters following project completion.
4. A Quality Assurance Plan (QAP) to provide references, standardized procedures, and quality specifications for the sampling, analysis, and data review procedures for the monitoring program.
5. An evaluation of any nontoxic or less-toxic pest control methods that may provide a practicable substitute for pesticide application. This evaluation shall include an estimate of each alternative's relative costs, a review of any known barriers to implementing the alternative, and any solutions to overcoming these barriers. Pilot projects for promising alternatives may be conducted and monitored.
6. Evaluation of the effectiveness of representative BMPs in eliminating or reducing the discharge of pollutants and minimizing the areal extent and duration of impacts caused by the discharge of pollutants.

This RPMP is organized to encompass the aforementioned six MRP elements.



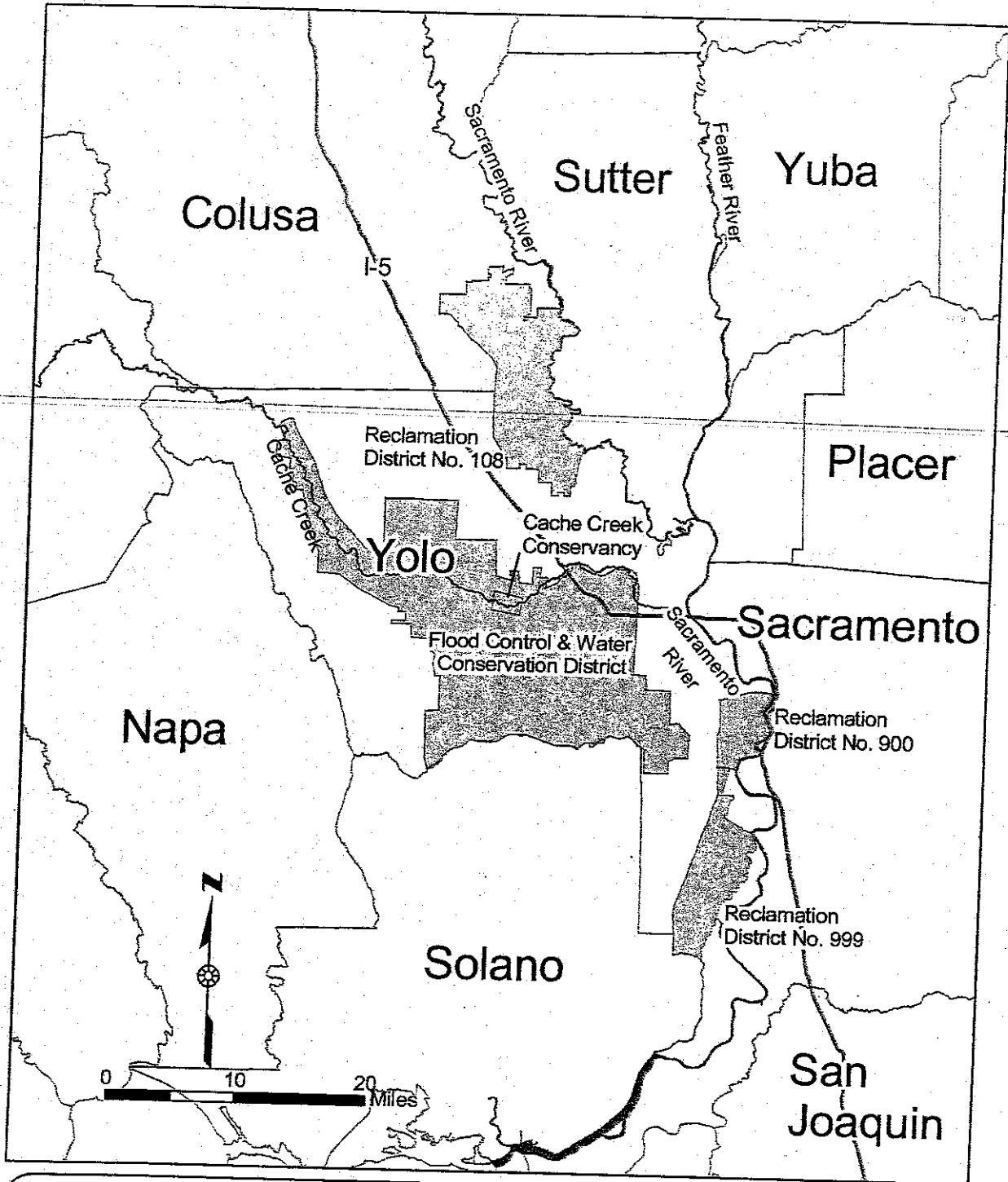
Project	Yolo RPMP		Figure	1
	Date	July 25, 2002		
	Scale	As shown		

Project Vicinity Map

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Project Location Map

Project	Figure
Yolo RPMP	2
Date	
October 8, 2002	
Scale	
As shown	

3.0 Element 1: Application Characterization

3.1 Integrated Pest Management

Treatment of aquatic weeds by all Dischargers in the region uses Integrated Pest Management (IPM). To the extent possible, weeds populations are suppressed by the use of Best Management Practices (BMPs). Details of BMPs are presented in Chapter 8.

First, Dischargers perform scouting to properly identify weed species. Second, weed-specific thresholds exist and are most typically associated with one or more of the following: flow, sediment build-up, displacement of storage capacity, or evapotranspiration and subsequent loss of conveyance water. Third, if a population of weeds is reached that equals or exceeds a threshold, appropriate pesticide and non-pesticide techniques are evaluated. Fourth, if non-pesticide techniques are deemed ineffective, appropriate pesticides are considered. Selection of the appropriate pesticide and application rate is done based on protection of sensitive natural resources in the area and pesticide efficacy.

3.2 Reclamation District # 108

3.2.1 Area Description (Size, Land Use, Climate, Topography)

Reclamation District # 108 is located west of the Sacramento River in north Yolo and south Colusa Counties. The topography is essentially flat. The western and southern boundary of the District is the 21-mile long eastern bank of the Colusa Basin Drain. The small communities of Grimes and Knight's Landing are just outside of, and to the north and south, respectively, of the District. Refer to **Appendix A, Figure 18**.

The District occupies approximately 48,000 acres with 11 pumping plants. Approximately 150,000 acre-ft of water are pumped from the Sacramento every year, with approximately 50,000 acre-ft recycled within the District. The District uses approximately 120 miles of irrigation canals; 40 miles are concrete-lined. Tailwater and stormwater are collected in 300 miles of drains. This drain water is either recycled and reused in the District, or is channeled to the Rough and Ready Pump Station for return to the Sacramento River. Canals range in size from 3 to approximately 50 feet across from bank to bank. Flows are variable and range seasonally from no flow to as high as approximately 830 cubic feet per second (cfs). Major crops include, but are not limited to: tomatoes, rice, safflower, melons, and alfalfa. A summary of the region's climate is presented in **Table 1**.

Table 1. Summary of Regional Climate and Weather

Name	Approx. Location	CIMIS Station #	Total ETo (in.)	Total Precip. (in.)	Avg. Air Temp. (F)	Avg. Wind Speed (mph)
Davis	S. Yolo County	6	57	15	60	6
Zamora	NE. Yolo County	27	54	21	60	5
Nicolaus	S. Sutter County	30	15	15	60	6
Dixon	NE. Solano County	121	57	18	59	8
Hastings Tract	E. Solano County	122	60	17	59	9

Notes:

CIMIS: California Irrigation Management Information System

3.2.2 Receiving Water Types (Area, Water Volume, Flow, Common Pests)

Receiving waters and associated beneficial uses of waterways adjacent to canals managed by Reclamation District #108 are listed for informational purposes in **Table 2**. Note that no applications are made by Reclamation District #108 to the receiving waters listed in **Table 2**.

Common pests in District canals include the following: sego pondweed, bulrush and cattails (collectively herein referred to as "tules"), and water primrose.

Refer to **Appendix A, Figure 18** for potential pesticide treatment locations and locations of representative past weed problems.

3.2.3 Pesticide Use (Diversity in Type & Season; Application Rates)

Rodeo® or AquaMaster® (Glyphosate) may be applied from May to November at rates up to 7 1/2 pints per acre. Applications are made working upstream with a backpack sprayer, handgun, or boom sprayer from either the bank or a boat. Applications are not made if wind speed is excessive, or if sensitive crops are cross or downwind, or if any other adverse conditions exist.

Copper Sulfate Crystals® (Copper Sulfate) may be applied from May to September. Applications are made according to the label rates of 0.25 lbs to 2 lbs per cfs. Applications of Copper is made to concrete-lined and earthen channels by placing appropriate amount of solid copper sulfate in burlap bags and placing the bags into water until the solid is dissolved and dispersed.

In addition, two adjuvants are used to improve the efficacy of Glyphosate. Agridex® is an aquatically approved surfactant used to improve the uptake of Glyphosate into target weeds. Surphtac® is a surfactant designed to prevent alkaline hydrolysis of herbicides due to the presence of metal ions in the spray water.

Refer to **Table 3** for a summary of select product label, environmental fate, and toxicity data for each of the chemicals listed above and other pesticides used by Dischargers in the region.

3.3 Yolo County Flood Control & Water Conservation District

3.3.1 Area Description (Size, Land Use, Climate, Topography)

The Yolo County Flood Control & Water Conservation District (YCFC&WCD) lays in the southeast corner of Yolo County and is bordered by Solano County to the south and Sacramento County to the east. The District's boundaries surround 195,000 acres and include the cities of Woodland, Davis, Winters, Capay, Esparto, and Madison.

The YCFC&WCD operates a total of approximately 150 miles of irrigation ditches and canals; 30 miles are concrete-lined. YCFC&WCD operates the dam that regulates the outflow from Clear Lake, which provides up to 150,000 acre-feet of irrigation water for Yolo County farms. Supplemental water to meet demand is supplied by the district's Indian Valley Reservoir (capacity: 300,000 acre/feet.)

Major crops include, but are not limited to: tomatoes, grapes, rice, corn, alfalfa, and seed crop. Topography is primarily flat with some rolling hills to the west. Refer to **Appendix A, Figures 4-10**.

A summary of the region's climate, including the YCFC&WCD, is presented in **Table 1**.

3.3.2 Receiving Water Types (Area, Water Volume, Flow, Common Pests)

Receiving waters and associated beneficial uses of waterways adjacent to canals managed by the YCFS&WCD are listed for informational purposes in **Table 2**. Note that no applications are made by YCFC&WCD to the receiving waters listed in **Table 2**. Irrigation water is drawn from Cache Creek for use by YCFCWCD. Tailwater discharge is made to Cache Creek at the Salisbury Spill and to Yolo By-Pass via Willow Slough tributaries.

Irrigation ditches range in size from 3 to approximately 25 feet across from bank to bank. ~~Flows are variable and are influenced by agricultural water needs, rainfall, and farmer's tailwater return flow.~~ Flows range from no flow to approximately 520 cfs on the Winter's Canal.

Common pests in these conveyances include the following: sego pondweed, tules, and water primrose.

Refer to **Appendix A, Figures 4-10** for potential pesticide treatment locations and locations of representative past weed problems.

3.3.3 Pesticide Use (Diversity in Type & Season; Application Rates)

AquaMaster®/AquaNeat™ (Glyphosate) may be applied from May to November at rates up to 20 pints per 100 gallons of solution per acre (i.e., up to 2.5 % solution). Applications are made working upstream with a backpack sprayer, handgun, or boom sprayer from the bank. Applications are not made if wind speeds are excessive, or if sensitive crops are cross or downwind, or if any other adverse conditions exist.

Nautique® (Copper Carbonate) may be applied from April to August at rates required to maintain up to 1 part per million [(ppm or milligram/Liter, (mg/L)]. Applications of Copper are made to earthen channels using a calibrated drip emitter. No applications are made to concrete-lined channels.

Refer to **Table 3** for a summary of select product label, environmental fate, and toxicity data for Aquamaster® and Nautique®. Note that this table also summarizes data for other pesticides used by other Dischargers in the region.

In addition, two adjuvants are used to improve the efficacy of Glyphosate. Prospread® is an aquatically approved surfactant used to improve the uptake of Glyphosate into target weeds. Surphtac® is a surfactant designed to prevent alkaline hydrolysis of herbicides due to the presence of metal ions in the spray water.

Table 2. Summary of Beneficial Uses

Discharger	Receiving Water Name	MUN	AGR			INDUSTRY			REC 1		REC 2	HAB		MIGR		SPWN		WILD	NAV
			I	S	P	I	P	C	R	W		C	W	C	W	C			
			R	R	R	O	N	O	O	A		A	O	A	O	A	O		
RD 108	Butte Creek: Colusa Basin Drain	-	E	E	-	-	-	-	E	E	-	E	P	E	-	E	-	E	-
YCFC&WCD	Yolo Bypass	-	E	E	-	-	-	-	E	E	-	E	P	E	-	E	-	E	-
YCFC&WCD, COC	Cache Creek: Clear Lake to Yolo Bypass	E	E	E	E	E	-	-	E	E	E	E	P	E	E	E	-	E	-
RD 999, RD 900	Sacramento Delta	E	E	E	E	E	-	-	E	E	E	E	P	E	E	E	-	E	-

Legend:

P- Potential Beneficial Use

E- Existing Beneficial Use

"-" No beneficial use designated.

Municipal and Domestic Supply (MUN) - Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR) - Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.

Industrial Process Supply (IND) - Use of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

Industrial Process Supply (PROC) - Use of water for industrial activities that depend primarily on water quality.

Hydropower Generation (POW) - Uses of water for hydropower generation.

Water Contact Recreation (REC-1) - Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2) - Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (HAB, WARM) - Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold Freshwater Habitat (HAB, COLD) - Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Migration of Aquatic Organisms (MIGR) - Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

Spawning, Reproduction, and Early Development (SPWN) - Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Wildlife Habitat (WILD) - Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Navigation (NAV) - Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Beneficial Use Designation Source:

CVRWQCB. 1998. The water quality control plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region. Fourth edition.

Table 3. Summary of Select Product Data

Product Name	Producer	Active Ingredient	% A.I.	Pest(s) Controlled	Environmental Hazards	Aquatic Fate	Aquatic Half life	Sediment Fate	Sediment Half Life	LC50			
										mp/L	Species	mp/L	Species
Nautique	SePRO	Copper Carbonate	15.9	Algae and Submerged Aquatic Weeds	May be toxic to fish. Fish toxicity is dependent upon the hardness of water. Do not use in water with hardness <50 ppm. Do not treat more than 1/2 of lake or pond at one time to avoid depletion of oxygen levels due to decaying vegetation.	Cu^{2+} is released into the water column and is either taken up by vegetation or remains in the water column. Other chemicals may precipitate Cu^{2+} causing it to settle into sediment.	3-5 days	Once precipitated, copper remains in sediment and may move by physical means (i.e., scour, dredging, etc.)	Indefinite	.6 to 2	Fathead Minnow	0.18	Daphnia Magna
Aquamaster	Monsanto	Glyphosate Isopropylamine Salt	53.8	Aquatic Weeds	Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation	When glyphosate enters water as runoff or inadvertent overspray or spray drift, it adsorbs strongly to sediment and particulate matter in the water column. It may also form insoluble complexes with metal ions and precipitate. Evidence from microcosm studies suggests that sediment adsorption and/or biodegradation represents the major dissipation process in aquatic systems.	1.5 to 70 days	Sediment is the primary sink for glyphosate. After spraying, glyphosate levels in sediment rise and then decline to low levels in a few months.	7 to 70 days	79-120	Fathead Minnow	218	Daphnia Magna
Reward	Zeneca/Syenta	Diquat Dibromide	37.3	Aquatic Weeds	This pesticide is toxic to aquatic invertebrates. Treatment of dense weeds may result in oxygen loss from decomposition of dead weeds. Oxygen loss may result in fish suffocation. Treat only 1/3 to 1/2 of the water body area at one time, especially if dense areas of weeds or algae exist, and water 14 days between treatments.	Diquat is removed rapidly from aquatic systems, principally by adsorption. If adsorption is initially to weeds, biodegradation to soluble or volatile products occurs in several weeks.	<2 days	When sorbed to sediment, little or no degradation occurs.	160 days	12.3	Rainbow Trout	0.77	Daphnia Magna
Copper Sulfate Crystals	Chem One LTD.	Copper Sulfate Pentahydrate	99	Algae and Submerged Aquatic Weeds	This product is toxic to fish. Direct application to water may cause a reduction to aquatic invertebrate, fish and plant populations. Do not treat more than 1/2 of a pond at one time in order to avoid depletion of oxygen from decaying vegetation. Allow 1 to 2 weeks between treatments for oxygen levels to recover. Fish toxicity decreases when the hardness of water increases. Do not contaminate water by cleaning of equipment or disposal of wastes.	Copper will bind to carbonates as well as humic materials, clay and hydrous oxides of iron and manganese.	3-5 days	Once precipitated, copper remains in sediment and may move by physical means (i.e., scour, dredging, etc.)	Indefinite	0.838	Fathead Minnow	0.18	Daphnia Magna
Sonar	SePRO	Fluridone	41.7	Submerged Aquatic Weeds	In order to avoid impacts to endangered species, users must consult their State Fish and Game Agency or U.S. Fish and Wildlife Service before making application. Lowest rates should be used in shallow areas.	Fluridone is moderately persistent in water.	21 days	Fluridone is moderately persistent in sediments.	90 days	11.7	Rainbow Trout	6.3	Daphnia Magna

3.4 Reclamation District # 999

3.4.1 Area Description (Size, Land Use, Climate, Topography)

Reclamation District # 999 lays within Sacramento Delta, in southern Yolo and northern Solano Counties. It is west of the Sacramento River and east of the Deepwater Shipping Channel. The city of Clarksburg lies within the District's boundaries. The District is essentially flat with a total change in elevation of less than 5 feet from north to south. Reclamation District #999 includes nearly 26,000 acres, 33 miles of levees, and 260 miles of ditches that deliver irrigation water to agricultural users. Major ditches and sloughs are represented in light blue in **Appendix A, Figures 11-17**.

Major crops include, but are not limited to: tomatoes, grapes, rice, corn, alfalfa, and dicandra.

A summary of the region's climate is presented in **Table 1**. There are no CIMIS stations located in Reclamation District # 999.

3.4.2 Receiving Water Types (Area, Water Volume, Flow, Common Pests)

Receiving waters and associated beneficial uses of waterways adjacent to canals managed by Reclamation District #999 are listed for informational purposes in **Table 2**. No applications or discharges are made by the District on or into the Sacramento River. Irrigation water is pumped or siphoned from Elk Slough and the Sacramento River, then distributed throughout the District. Tailwater or stormwater is returned to Minor Slough near Arrowhead Harbor, typically when no aquatic pesticide applications occur.

Canal sizes within the District range in size from 3 to approximately 50 feet across from bank to bank. Flows are variable and range seasonally from no flow to as high as approximately 10,000 cfs in the Minor Slough.

Common weeds in District conveyances include milfoil, tules, and primrose.

Refer to **Appendix A, Figures 11-17** for potential pesticide treatment locations and locations of anticipated weed problems.

3.4.3 Pesticide Use (Diversity in Type & Season; Application Rates)

Sonar® (Fluridone) may be applied year around at rates necessary concentrations up to 150 parts per billion [ppb, or micrograms per Liter (ug/L)]. Applications of Fluridone are made by applications from a boat. Fluridone is anticipated for use in controlling milfoil in Winchester Lake.

Rodeo®/AquaMaster® (Glyphosate) may be applied from May to November at rates up to 20 pints per 100 gallons of solution per acre (i.e., up to 2.5 % solution). Applications are made working upstream with a backpack sprayer, handgun, or boom sprayer from either the bank or a boat. Applications are not made if wind speed exceeds 7 miles per hour (mph), or if sensitive crops are cross or downwind, or if any other adverse conditions exist.

Refer to **Table 3** for a summary of select product label, environmental fate, and toxicity

data for Rodeo®/Aquamaster® and Sonar®.

In addition, two adjuvants are used to improve the efficacy of Glyphosate. Surphtac® is a surfactant designed to prevent alkaline hydrolysis of herbicides due to presence of metal ions in the spray water. No Foam A® is used to optimize wetting and spreading of Glyphosate on the plant surface.

3.5 Cache Creek Conservancy (CCC)

3.5.1 Area Description (Size, Land Use, Climate, Topography)

The Cache Creek Conservancy (CCC) is located in central Yolo County. CCC is located within the boundary of the Yolo County Flood Control & Water Conservation District. The CCC is a 501(c)(3) non-profit corporation dedicated to the restoration of the lower Cache Creek corridor. Their mission is to promote the restoration, enhancement and prudent management of the stream environment along Cache Creek downstream from Capay Dam. The CCC was created in 1996 as a vehicle to implement projects, provide environmental education, hold conservation easements and manage land for wildlife habitat. During the past five years CCC has developed a 130-acre property into the Cache Creek Nature Preserve (CCNP).

The CCNP is located west of County Road 94B, between State Highway 16 and County Road 20. West Adams Canal, Gordon Slough, and East Adams Canal run along the Northern side of CCNP. The CCNP is bordered on the south by Cache Creek. Salisbury Pond crosses the Eastern portion of the property. Topography is primarily flat with 10-acre pond located in the central area of the property. Refer to **Appendix A, Figure 19**.

A summary of the region's climate, including the CCC, is presented in **Table 1**.

3.5.2 Receiving Water Types (Area, Water Volume, Flow, Common Pests)

Receiving waters and associated beneficial uses of waterways adjacent to the CCNP are listed for informational purposes in **Table 2**. Note that no aquatic pesticide applications are made by the CCC to the receiving waters listed in **Table 2**. The pond is fed by water drawn from Gordon Slough through an inlet pipe at the northeast end of the pond. Discharge from the pond is made to Cache Creek through an outlet pipe located at the southwest end of the pond. Pond discharge to Cache Creek is controlled by CCC personnel by manually raising and lowering flow plates at the outlet pipe.

Common pests in the pond include the following: milfoil, tules, and primrose.

Refer to **Appendix A, Figure 19** for potential pesticide treatment locations and locations of representative past weed problems.

3.5.3 Pesticide Use (Diversity in Type & Season; Application Rates)

Sonar® (Fluridone) may be applied year around at rates necessary to achieve concentrations up to 150 parts per billion [ppb, or micrograms per Liter (ug/L)]. Applications of Fluridone are made by boat. Fluridone is anticipated for use in controlling milfoil.

Reward[®] (Diquat) may be applied, typically with Sonar[®], at rates up to 2 gallons per 4 acre-feet of water treated.

Refer to **Table 3** for a summary of select product label, environmental fate, and toxicity data for Aquamaster[®], Sonar, and Reward[®]. Note that this table also summarizes data for other pesticides used by other Dischargers in the region.

In addition, two adjuvants may be used to improve the efficacy of Fluridone or Diquat. Prospread[®] is an aquatically approved surfactant used to improve the uptake of active ingredient into target weeds. Surphtac[®] is a surfactant designed to prevent alkaline hydrolysis of herbicides due to the presence of metal ions in the spray water.

3.6 Reclamation District # 900

3.6.1 Area Description (Size, Land Use, Climate, Topography)

Reclamation District # 900 (RD 900) occupies the southern two thirds of the City of West Sacramento, in Yolo County. It is west of the Sacramento river and east of the Deepwater Ship Channel and the Yolo Bypass. RD 900 is essentially flat with a total change in elevation of less than 5 feet from north to south. RD 900 includes approximately 11,000 acres, 13 miles of levees, and 38 miles of ditches. The ditches are used to deliver irrigation water to agricultural users in the spring and summer and are used for storm drainage in the winter months. Major ditches and sloughs are represented in yellow in Appendix A, Figure 20.

Major crops include, but are not limited to: tomatoes, corn, and alfalfa.

A summary of the region's climate is presented in Table 1. There are no CIMIS stations located in Reclamation District # 900.

3.6.2 Receiving Water Types (Area, Water Volume, Flow, Common Pests)

Receiving waters and associated beneficial uses of waterways adjacent to canals managed by Reclamation District #900 are listed for informational purposes in Table 2. No applications or discharges are made by the District on or into the Sacramento river. Irrigation water is pumped from the Sacramento River then distributed throughout the District. Tailwater or stormwater is returned to the Deepwater Ship Channel (DWSC), typically when no aquatic pesticide applications occur.

Canal sizes within the District range in size from 3 to approximately 50 feet across from bank to bank. Flows are variable and range seasonally from no flow to as high as approximately 10,000 cfs in the main canal. A pond exists along the western border of RD 900 that receives stormwater runoff from adjacent neighborhoods.

Common weeds in District conveyances include milfoil, tules, and primrose.

Refer to Appendix A, Figure 20 for potential pesticide treatment locations and locations of anticipated weed problems.

3.6.3 Pesticide Use (Diversity in Type & Season; Application Rates)

Sonar[®] (Fluridone) may be applied year around at rates necessary and concentrations up to 150 parts per billion [ppb, or micrograms per Liter (ug/L)]. Applications of Fluridone are made by applications from a boat. Fluridone is anticipated for use in controlling milfoil in various detention ponds located throughout the district.

Rodeo[®]/AquaMaster[®] (Glyphosate) may be applied from May to November at rates up to 20 pints per 100 gallons of solution per acre (i.e., up to 2.5 % solution). Applications are made working upstream with a backpack sprayer, handgun, or boom sprayer from either the bank or a boat. Applications are not made if wind speed exceeds 7 miles per hour (mph), or if sensitive crops are cross or downwind, or if any other adverse conditions exist.

Refer to Table 3 for a summary of select product label, environmental fate, and toxicity data for Rodeo[®]/Aquamaster[®] and Sonar[®].

In addition, two adjuvants are used to improve the efficacy of Glyphosate. Surphtac[®] is a surfactant designed to prevent alkaline hydrolysis of herbicides due to presence of metal ions in the spray water. No Foam A[®] is used to optimize wetting and spreading of Glyphosate on the plant surface.

4.0 Element 2: Potential Impacts to Beneficial Uses

Past and current visual assessment by Discharger staff of lined and unlined canals, sloughs, ponds, lakes and ditches (collectively referred to as "conveyances") under their jurisdiction during either scouting or aquatic pesticide application does not suggest that any of the beneficial uses presented in **Table 2** have been adversely impacted.

Water treated by the Dischargers flows intermittently in conveyances that do not have officially designated beneficial uses as described in the Central Valley Basin Plan (CVRWQCB 1998). In some cases these conveyances flow or discharge to receiving waters that have designated beneficial uses. Refer to **Table 2**.

Although not specifically listed in the Basin Plan, an important beneficial use of these conveyances is flood control. Adequate flood control requires maintenance of adequate stormwater flow, which in turn requires removal of impediments to flow. Impediments include, but are not limited to, aquatic weeds and the sediment that they grow in. The control of aquatic weeds is critical to maintain the beneficial use of these conveyances for flood control. Therefore, the presence of aquatic weeds poses a potential impact to the flood control beneficial use.

Agricultural use is a designated beneficial use. Agricultural use requires that adequate flow be maintained to insure delivery of water. Because aquatic weeds slow or stop flow, they allow for water-borne sediment to drop out of the water and deposit on the creek or channel bottom, potentially impacting the agricultural beneficial use. Further, sediment deposition in and of itself reduces flows and provides for establishment of additional aquatic weeds. Lastly, because aquatic weeds transpire water intended for conveyance and subsequent downstream use, water is unnecessarily wasted.

Based on the above, there are potential adverse impact(s) to both flood control and agriculture beneficial uses if aquatic weeds are allowed to grow. The use of aquatic pesticides as a tool to manage aquatic weeds is therefore critical to maintaining the beneficial uses of these conveyances.

5.0 Element 3: Water Quality Analyses

Table 4 below represents a summary of the sampling and analysis that will be done for the products used by the Dischargers.

Table 4. Summary of Sample Locations

Product	Discharger	Regional Area-Project Type Represented	Conveyance Name	Surface Water Sample Type
Glyphosate	RD 108	Main Drain & Outlet to Sacramento River	Main Drain	US, DS
Copper	YCFC&WCD	Earthen-Lined Ditch	Hungry Hollow Canal	US, DS
Fluridone	RD 999	Irrigation Supply Conveyance/Reservoir	Winchester Lake	US, DS
Fluridone	RD 999	Outlet to Minor Slough	Arrowhead Harbor Pump #20	DS
Diquat/Fluridone	CCC	Pond Adjacent to Cache Creek	Pond	DS

Notes:

US: Upstream location from the area being treated

DS: Downstream location from the area being treated.

Timing for Upstream and Downstream sampling of surfacewater is described in Figure 3.

As Table 4 indicates, five (5) different sample sites, referred to "Regional Area/Project Type" have been selected to represent a particular Discharger region or product use.

5.1 Slow or Non-Moving Water

For Fluridone use in Winchester Lake operated by RD 999 and for Fluridone/Diquat use in the pond operated by CCC, an upstream sample will be collected prior to application. A downstream sample will be collected between 45 and 60 days after the last portion of the lake/pond is treated. Additionally, for both locations, a down stream sample will be collected prior to water discharge from the lake/pond, if the discharge occurs before 45 days have elapsed since the last Fluridone or Fluridone/Diquat application.

5.2 Moving Water

The general locations of the main drain in RD # 108, the earthen-lined ditch used by YCFCWCD, and the outlet to Minor Slough are shown in the Discharger-specific maps in Appendix A. Once the Discharger determines that a pesticide application is needed in these conveyances, the exact locations of sample collection will be determined using guidance presented in Table 4 and Figure 3. Figure 3 gives approximate sample location and scheduling relative to the start of application.

As illustrated in Figure 3, the first sample is upstream sample #1 (US-1) and will be collected at a minimum of 25 feet upstream of the location that treatment stops. (Note that all treatments, except for Copper, are made going upstream). This will provide a "background" sample useful in assessing pretreatment conditions.

The second sample is the initial downstream sample (DS-Int) and will be collected downstream at or near the end of the conveyance at a time that is estimated to allow for treated water to reach this location. The rationale for this location is that it assesses the

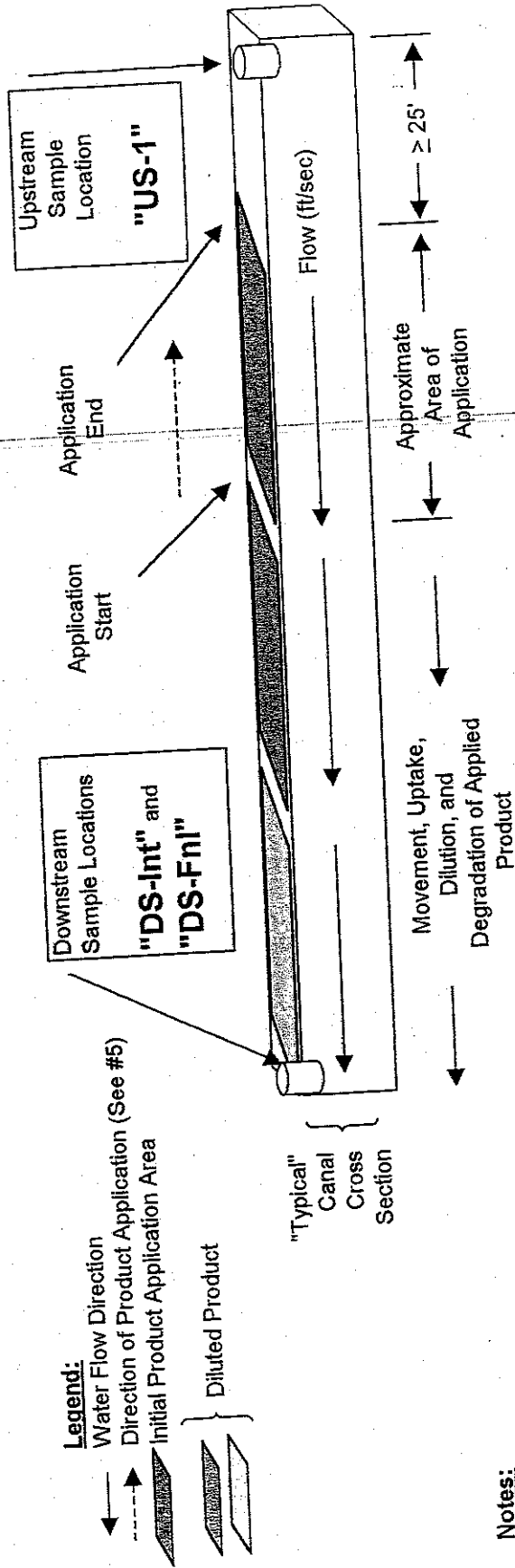
downstream pesticide concentration after uptake, dilution, and degradation occurs. The timing for the collection of this sample will be a site-specific estimation based on flow rates and length of the application area.

The third sample is the final downstream sample (DS-Fnl) and will be collected at the same location as the second sample, approximately 72 hours after the end of application. This will allow assessment of additional uptake, dilution, and degradation of the pesticide.

Samples as described in **Table 4** will be collected annually from each of the five (5) different regional area/project types.

Techniques for the collection, transportation, analysis, data review and quality assurance and control are presented in **Chapter 6**.

Figure 3. Surfacewater Sample Collection Schematic



Notes:

Stream Sample Instructions:

- 1.) Estimate stream flow estimated by averaging flow meter measurement (ft/sec) at center and edge of stream. Alternatively, estimate the time a floating object travels a known distance.
- 2.) Collect Upstream Surfacewater sample (US-1) at least 25 feet upstream of point of last application. Sample area consistent with area treated (i.e., if bank treated, sample close to bank)
- 3.) Collect Initial Downstream Sample (DS-Int) at or near the end of the conveyance approximately "X" minutes after the time that the end point of application is reached where:

$$X \text{ (min)} = [1 / \text{Flow Rate (ft/sec)}] \times [\text{Distance Between Application Start \& End of Canal(ft)}] \times [1/60]$$

- 4.) Collect Final Downstream Sample (DS-Fnl) at same location as Initial DS Sample and within 72 hours of completion of treatment. If Initial Downstream sample collection time equals or exceeds Final Downstream sample, time, collect only one sample.
- 5.) Applicable to Glyphosate. Copper applied with drip emitters at head of canal; Fluridone spot-applied as needed at various locations in slow or non-moving water.

6.0 Element 4: Quality Assurance Plan (QAP)

6.1 Purpose

The purpose of this chapter is to present guidelines for the collection and analysis of samples necessary to meet the Yolo RPMP objective of assessing adverse impacts, if any, to beneficial uses of water bodies treated with aquatic pesticides.

This chapter describes the techniques, equipment, analytical methods, and quality assurance and quality control procedures for sample collection and analysis. Guidance for the preparation of this chapter included: NPDES Storm Water Sampling Guidance Document (USEPA 1992); Guidelines and Specifications for Preparing Quality Assurance Project Plans (USEPA 1980); and U.S. Geological Survey, National Field Manual for the Collection of Water Quality Data (USGS 1995).

6.2 RPMP Contact

Sal Espinoza (Yolo County Flood Control & Water Conservation District) is the primary contact for this project. He can be reached at (530) 662-0265.

He will be responsible for receiving, reviewing, and providing feedback on project reports to RWQCBs. As necessary, he will be assisted by representative(s) from the three Dischargers taking part in the RPMP.

6.3 Surfacewater Sampling Techniques

All surface water samples will be grab samples and will be collected with an open-faced container placed directly into the water. As necessary, an intermediary sampling device (e.g., long-handled cup sampler) will be used for locations that are difficult to access. Appropriate cleaning technique is discussed in section 6.5.

During collection, the samples will be collected in a manner that minimizes the amount of suspended sediment and debris in the sample. Surface water grab samples will be collected directly by the sample container, or by an intermediary container in the event that the sample container cannot be adequately or safely used. Intermediary samplers will be either stainless steel or glass and washed thoroughly and triple rinsed before collection of the next sample. Alternatively, a disposable sampler can be used.

For fluridone sampling, the sample bottle will be placed inverted into the water elbow deep. The bottle will then be turned upright and allowed to fill completely as it is brought to the surface. Once full, but still under water, the cap will be screwed back on.

6.3.1 Sample Containers

Clean, empty sample containers with caps will be supplied in protective cardboard cartons or ice chests by the primary laboratory. The containers will be certified clean by either the laboratory or the container supplier. To ensure data quality control, the sampler will utilize the appropriate sample container as specified by the laboratory for each sample type. Sample container type, holding time, and appropriate preservatives are listed in **Table 5**. Each

container will be affixed with a label indicating a discrete sample number for each sample location. The label will also indicate the date and time of sampling and the sampler's name.

Table 5. Analyte-Specific Methods, Reporting Limits, Holding Times, Container Types, and Preservatives

Analyte	Method	Reporting Limit	Hold Time (Days)	Container	Preservative
Glyphosate (1)	EPA 547	20 ug/Liter	14	2 x 500 ml plastic HDPE	4°C
Copper, total (2)	EPA 200.7 or 200.8	Variable (2)	180	2 x 250 ml plastic HDPE	4°C, pH<2 w/ HNO ₃
Fluridone (3)	SePro FasTEST™	0.5 ug/Liter	7	2x 250 ml Amber HDPE	4°C
Diquat	EPA 549.2	0.4 ug/Liter	7	1 L Amber HDPE	4°C

- (1) Instruct lab to filter within 48 hours after received.
- (2) Detection Limit of Copper depends on water hardness and ranges from 2 ug/L (<100 mg/L Hardness as CaCO₃) to 20 ug/L (> 300 mg/L Hardness as CaCO₃).
- (3) See Reference to Netherland, et al.

6.3.2 Sample Preservation

Samples will be collected with bottles containing the correct preservative(s), refrigerated at 4° degrees Celsius (C), and transported to the analytical laboratory. Preservatives shall be added to sampling bottles before sampling occurs by the laboratory supplying the containers and performing the analysis. Refer to **Table 5**.

6.3.3 Sampling Equipment Cleaning

In the event that sampling equipment will be used in more than one location, the equipment will be thoroughly cleaned with a non-phosphate cleaner, triple-rinsed with distilled water, and then rinsed once with the water being sampled prior to it's first use at a new sample collection location.

6.3.4 Sample Packing and Shipping

All samples are to be packed and transported the day the samples are collected to provide ample time for samples to be analyzed within the required holding time.

Ice will be included in coolers containing samples that require temperature control. Samples will be packaged in the following manner:

1. Sample container stickers will be checked for secure attachment to each sample container.
2. The sample containers will be placed in the lined cooler. Bubble-wrap, suitable foam padding, or newspaper will be placed between sample containers to protect the sample containers from breakage during shipment and handling.

3. The Chain of Custody (COC) will be placed inside a plastic bag and placed inside the cooler. The COC will indicate the sample identification #, time and place of sample collection, the sample collector, the required analysis, turn around time, and location to which data will be reported.
4. The cooler will then be delivered to the overnight courier or directly to the laboratory.

6.4 Field Sampling Operations

6.4.1 Field Logbook

A bound logbook with numbered pages will be maintained by members of the sampling team to provide a record of sample location, significant events, observations, and measurements taken during sampling. Entries will be signed and dated. Field data will be recorded with permanent ink. Field logbooks are intended to provide sufficient data and observations to enable project team members to reconstruct events that occurred during the sampling. The field logbook entries will be legible, factual, detailed, and objective.

6.4.2 Alteration of Sampling Techniques

It is possible that actual field conditions may require a modification of the procedures outlined herein. Specifically, stream flow, rainfall, irrigation water use may pose access and/or sampling problems. In such instances, variations from standard procedures and planned sampling locations and frequencies will be documented by means of appropriate entry into the field logbook.

6.4.3 Flow Estimation

A flow meter calibrated according to the manufacturer's directions will be placed as close to the center of the stream or creek as possible and a reading taken in feet per second (ft/sec). Alternatively, the time a common floating object (branch, leaf, etc.) travels a known distance will be estimated and represented in ft/sec. A minimum distance of 25 feet will be used. Another alternative is the use of data from flow monitoring devices located in weirs and gates.

6.4.5 Chain-of-Custody (COC)

The COC record will be employed as physical evidence of sample custody. The sampler will complete a COC record to accompany each sample shipment from the field to the laboratory. The COC will specify: time, date, location of sample collection, specific and unique sample number, requested analysis, sampler name, required turn around time, time and date of sample transaction between field and laboratory staff, preservative, if any, and name of receiving party at the laboratory.

Corrections to the COC will be made by drawing a line through, initialing, and dating the error, and entering the correct information. Erasures are not permitted.

Upon receipt of the samples, laboratory personnel will check to insure that the contents of the ice chest(s) are accurately described by the COC. Upon verification of the number and type of samples and the requested analysis, a laboratory representative will sign the COC, indicating receipt of the samples.

The COC record form will be completed in duplicate. Upon sample delivery, one copy will be left with the laboratory and one copy will be kept by the sampler, three-hole punched, and placed in the field logbook.

6.4.6 Sample Label

The sample label consists of a unique number starting with a numeric representation of the date of collection followed by a unique alphanumeric sequence that represents the order of collection.

For example, the upstream sample (US) collected on August 25, 2002 (082502) in Reclamation District # 999 (RD108; the entity maintaining the facility) at Winchester Lake (WL; the facility name) would be labeled 082502-RD108-WL-US. The sample number will be used to track the sample and its associated analytical laboratory results. The sample label will also contain time of sampling, sampler name, and analysis requested. Prior to sampling, a water-resistant label will be completed with waterproof ink and will be affixed to the appropriate container.

6.4.7 Corrections to Documentation

Documents will not be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement or correction. If an error is made on a document used by an individual, that individual will make corrections by making a line through the error and entering the correct information. The erroneous information will not be obliterated. Corrections will be initialed and dated.

6.4.8 Document Control

A central file location will be established and used to store documentation such as the filed logbook and laboratory data.

6.4.9 Sample Kit

Prior to departing to the field to collect samples, the following equipment will be prepared for use:

- Laboratory-supplied sampling bottles (one set for each sample to be collected plus spares, plus QA/QC samples)
- Sample labels (one for each sample collected plus spares)
- Sharpie® Pen or other permanent, water-proof ink marker
- Chain of Custody forms
- Field data logbook
- Flow meter (optional)
- Zip lock style bags for paperwork
- Plastic tape to seal bottle tops
- Non-phosphate cleaner
- Deionized water
- Blue ice packs
- Clear Mailing Tape
- Plastic ice chest(s)

- Grab pole
- Gloves
- Rubber boots
- Stop or wrist watch

6.5 Quality Assurance and Quality Control

The purpose of quality assurance and quality control (QA/QC) is to assure and control the quality of data generated during sample collection and analysis as described earlier in this document. Quality assurance and quality control are measured in a variety of ways, as described below.

6.5.1 Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. It is a quantitative measure of the variability of a group of measurements compared to the average value of the group and is expressed as the relative percent difference (RPD). Sources of error in precision (imprecision) can be related to both laboratory and field techniques. Specifically, lack of precision is caused by inconsistencies in instrument setting, measurement and sampling techniques, and record keeping.

Laboratory precision is estimated by generating analytical laboratory matrix spike (MS) and matrix spike duplicate (MSD) sample results and calculating RPD. In general, laboratory RPD values of less than 25% will be considered acceptable.

Field precision is estimated by collecting field duplicates (FDs) in the field and calculating RPD. In general, field RPD values of less than 25% will be considered acceptable. Refer to the discussion of FDs in section 6.10.

6.5.2 Accuracy

Accuracy is a measure of how close data are to their true values and is expressed as percent recovery (%R), which is the difference between the mean and the true value expressed as a percentage of the true value. Sources of error (inaccuracy) are the sampling process, field contamination, preservation, handling, sample matrix effects, sample preparation, analytical techniques, and instrument error.

Laboratory accuracy is estimated using reference standards and matrix spike (MS) and matrix spike duplicates (MSD) samples. Acceptable accuracy is between 75 and 125%. Refer to the discussion of MS and MSD in section 6.10. Field accuracy cannot be measured in the RPMP as true field values are not typically known.

6.5.3 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness objective is that the sufficiently valid data is generated to allow for submittal to the RWQCB. Completeness will be assessed by comparing the number of valid sample results to the number of samples collected. The objective for completeness is $\geq 80\%$.

6.5.4 Representativeness

Representativeness refers to a sample or group of samples that reflects the predominant characteristics of the media at the sampling point. The objective in addressing representativeness is to assess whether the information obtained during the sampling and analysis represents the actual site conditions. Locations generally depicted in **Appendix A** show representative locations of where pesticide applications take place. As such, criteria for representativeness have been met.

6.6 Field Quality Assurance and Quality Control

6.6.1 Field Duplicate

The purpose of a field duplicate (FD) is to quantify the precision, or reproducibility, of the field sampling technique. It involves the duplication of the technique used for a particular field sample collection method and the subsequent comparison of the initial and duplicate values. This comparison is measured as the relative percent difference (RPD). RPD is calculated as follows:

$$RPD = [(Sample1 - Sample2) / (Average of Samples 1 and 2)] \times 100$$

An acceptable field RPD value is $\leq 35\%$.

The location of the FD will be determined during sampling activities. This FD is collected at the same time as the actual field sample and one FD per year will be collected.

6.6.2 Field Blank

The purpose of the field blank (FB) is to assure that the field sampling technique, equipment, or equipment cleaning technique or materials do not impart a false positive or negative result during the collection of the sample. A FB will be prepared with distilled water and allowed to come into contact with the sampling device in a manner identical to the actual sample. The only acceptable values for analytes in the FB is less than the detection limit for the compounds of interest, or an expected, previously determined, background value.

The location of the FB will be determined during sampling activities. It will be collected at the same time as the actual field sample and one FB per year will be collected.

A summary of the field and laboratory QA/QC samples being analyzed is presented in **Table 6**.

Table 6. Summary of QA/QC Sample Analysis, Actions, and Validation Criteria

<u>QA/QC Sample</u>	<u>Action Required</u>	<u>QA/QC Parameter Estimated</u>	<u>Value Required For Valid Data</u>
Field			
Field Blank (FB)	Collect in Field	False Negative/Positive	0 or no more than 20 % of known Background
Field Duplicate(FD)	" " "	Precision	RPD ≤ 35 %
Laboratory			
Matrix Spike (MS)	Prepared By Lab	Accuracy	75 < %R < 125 %
Matrix Spike Duplicate (MSD)	" " "	Precision	RPD < 25 %
Method Blank (MB)	" " "	False Negative/Positive	0 or no more than 20 % of known Background

6.7 Laboratory Quality Assurance and Quality Control

Laboratory precision and accuracy will be monitored by a series of laboratory-generated quality control samples. As long as sufficient sample volume is collected and submitted to the laboratory, no additional effort is required by field activities to generate laboratory quality control samples. Each set of field samples will have associated with it one each from the following set of laboratory quality control samples:

6.7.1 Method Blank

The purpose of the method blank (MB) is to assure that the analytical technique does not impart a false positive result during the preparation or analysis of the sample. A method blank will be prepared by the laboratory from high purity distilled or deionized water. The only acceptable values for analytes in the MB are zero or an expected, previously determined, background values.

6.7.2 Matrix Spike

The purpose of a matrix spike (MS) is to quantify accuracy and to assure that the analytical technique does not impart a false negative or positive result during the preparation or analysis of the sample. It involves the introduction of the analyte (or an analyte surrogate) of interest into the actual sample matrix and then quantitating it.

The amount detected divided by the amount added to the matrix is expressed as a percent recovery (%R). Acceptable values of %R range from 75% to 125%. Percent recovery is calculated as follows:

$$\%R = [(Spike\ Amount\ Detected - Sample\ Value) / Amount\ Spiked] \times 100$$

6.7.3 Matrix Spike Duplicate

The purpose of a matrix spike duplicate (MSD) is to quantify laboratory precision. An acceptable RPD is less than or equal to 25%. The MSD involves duplication of the MS resulting in two data points from which relative percent difference (RPD) is calculated as follows:

$$RPD = [(MS - MSD) / (\text{Average of MS and MSD})] \times 100$$

6.8 Data Validation

Data validation will be using data generated from the analytical laboratory and the field. Criteria for valid data are summarized in **Table 6**. References that can be used to assist in data validation include USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA 1994) and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 1999).

The purpose of data validation is to ensure that data collected are of sufficient quality for inclusion in reports to the RWQCB. In order to serve this purpose, the following information must be available in order to evaluate data validity:

1. Date of sample collection – required to uniquely identify sample and holding time.
2. Location of samples – required to identify sample.
3. Laboratory QA/QC procedures – required to assess analytical accuracy, precision, and sample integrity. A laboratory QA/QC sample set consists of a MS, a MSD, and a MB. A laboratory QA/QC sample set will be analyzed by the laboratory for each field sample batch. Sufficient sample volume and number will be supplied to the laboratory in order to prepare and evaluate the laboratory QA/QC sample set.
4. Analytical methods – required to assess appropriateness and acceptability of analytical method used.
5. Detection limits – required to assess lower limit of parameter identification.
6. Holding times, preservation, and dates of extraction and analysis – required to assess if samples were extracted and analyzed within the specified time limits and if sample was stored at the appropriate temperature.
7. Field QA/QC procedures – required to assess field precision and sample integrity. A field QA/QC sample set consists of FB and FD samples. A field QA/QC sample set will be analyzed by the laboratory for one sampling event per year. Sufficient sample volume and number will be collected in the field and supplied to each laboratory in order to prepare and evaluate the field QA/QC sample set.

6.9 Data Qualification

During the data validation process, data qualifiers will be used to classify sample data. The following qualifiers will be used:

- A - Acceptable. The data have satisfied each of the requirements and are quantitatively acceptable (i.e., valid) and will be used in reports.
- R - Reject. Data not valid. This qualifier will be used for samples that cannot be uniquely identified by date of collection or sample location or that fail holding time, detection limit

requirements, or criteria established in Table 6. Invalid data will not be presented in reports submitted to the RWQCB.

6.10 Corrective Action

6.10.1 Field or Laboratory QA/QC Exceedence

If previously described criteria for valid data are not met, then corrective action as follows will be taken:

1. The laboratory will be asked to check their quality assurance/quality control data and calculations associated with the sample in question. If the error is not found and resolved, then:
2. The extracts or the actual samples, which will be saved until the data are validated, will be reanalyzed by the laboratory if they are within holding time limitations. These new results will be compared with the previous results. If the error is not found and resolved, then:
3. If field analytical equipment is used, then calibration records will be reviewed. If the error is not found, then:
4. The sampling procedure and sample preparation will be re-checked and verified. If the procedures appear to be in order and the error is not resolved, then:
5. The data will be deemed invalid and not used.
6. Upon discovery of the source of an error, every attempt will be made to address the cause of the error and remedy the problem.

6.11 Data Reporting

The results of sampling and analysis will be summarized to the RWQCB in monthly reports and presented in the Annual Report. As data are gathered, plots of concentration vs. time will be produced to assist in identification of trends.

7.0 Element 5: Evaluation of Alternative Pest Control Methods

The Dischargers have assessed the effectiveness of one or more of the following techniques as alternatives or supplements to the control of aquatic pests:

7.1 Mechanical Removal

Mechanical removal includes hand or motor-driven cutting, pulling chain through water, brushing concrete-lined channels, or using an excavator.

Generally, these techniques are very labor intensive per unit length of canal or creek treated. Mechanical removal places staff at risk of slip, trip and fall hazards and insect and snake bites, risks the spilling of motor oil and fuel from two-cycle motorized brush cutters, and can increase air pollution.

The Discharger estimates that the cost per mile of mechanically treated water way is significantly higher than the cost of labor, product and equipment of the application of aquatic pesticide. The increased cost of mechanical aquatic weed abatement does not include the cost of the aforementioned risks (pollution abatement, workman's compensation claims, etc.), nor does it take into account the downstream re-establishment of weed fragments released during mechanical removal. Weed fragment re-establishment poses a real risk of further decreases in flow and increases in sediment build-up.

In some instances, however, the use of mechanical techniques may be necessary due to the presence of aquatic resources sensitive to the use of aquatic pesticides. The Dischargers have estimated that mechanical removal is 10 to 25 times more expensive than using chemical controls. This additional expense does not include the cost for disposal or for obtaining permits.

Environmental impacts due to the use of mechanical techniques include the creation of water-borne sediment and turbidity due to people and equipment working in the water. This suspended sediment can adversely effect aquatic species by lowering dissolved oxygen and preventing light penetration. Downstream deposition of sediment may cause additional problems including, but not limited to, new areas for weed establishment, division and re-establishment of aquatic weeds, and adverse impacts to stream hydrology resulting in bank erosion. In addition, gaining access to water in order to accomplish mechanical removal requires that potentially beneficial habitat maybe disturbed in route to the target pests. This disturbance may interrupt native species nesting and breeding. The costs for trucking and waste disposal are not included. Waste must be taken to traditional landfills and cannot be taken to green waste disposal due to the concern that redistribution of the material may occur and subsequently result in re-establishment.

7.2 Use of Dye to Limit Light Penetration

This technique is most effective in water that is not moving so that dilution does not occur and limit the effectiveness of the dye. When present in sufficient quantity, dye can effectively limit the amount of light reaching submerged aquatic weeds and algae, slowing or preventing their growth. Because water is typically moving in the supply and return conveyances, the use of dyes is not effective.

7.3 Native Species Establishment

After the removal of non-native invasive species, the introduction and re-establishment of native species has been successful at select locations. This technique provides competition for non-desirable species and reduces the need for weed abatement. Limitations to this approach include availability of suitable native species, availability of labor to plant native species, and safe access to banks for work crews. Further, this technique is subject to regulatory agency (i.e., CDFG, COE, etc) approval and may not be feasible in older, pre-existing facilities.

7.4 Biocontrols

None are used at this time. As options become available, they will be evaluated and incorporated, as appropriate.

7.5 Controlled Burns

This option has only limited applicability due to concerns about air quality and potential loss of control in areas with nearby dry weeds and high value crops. Further, burning may remove desirable vegetation that is useful for bank stabilization and erosion control.

7.6 Grazing

Like burning, this option has limited applicability for aquatic weeds. Impacts to water quality from animal feces, increases in turbidity and bank erosion, and impacts to desirable species make this option unfeasible in most cases. Grazing is also highly costly.

7.7 Tilling or Discing

This option is not suitable for the control of aquatic weeds because it would increase bank erosion and likely impact desirable species and habitat.

7.8 Habitat Modification

After the removal of non-native invasive species, the introduction and re-establishment of native species has been successful at select locations. This technique provides competition for non-desirable species and reduces the need for weed abatement. Limitations to this approach include availability of suitable native species, availability of labor to plant native species, and safe access to banks for work crews.

7.9 Drawdown and Freeze

As feasible, this technique is used during winter months when no water is being conveyed. Canals are dry and expose weeds to freezing temperatures, killing them.

7.10 No Controls

As feasible, this technique is used when possible. For example, consistent with the IPM program used by the Dischargers, a threshold must be reached prior to treatment. Prior to reaching this threshold, no control is done.

8.0 Element 6: Evaluation of BMP Effectiveness

The Discharger regularly implements the following Best Management Practices (BMPs) to eliminate or reduce the discharge of pollutants and minimize the areal extent and duration of impacts to water quality. During implementation, the effectiveness of the BMPs are continually evaluated and refined as needed to enhance protection of surface water.

8.1 Site Scouting

Prior to treatment, the Discharger's Pest Control Advisor (PCA) scouts sites to evaluate the extent to which acceptable aquatic weed thresholds have been exceeded. Thresholds are based primarily on the maintenance of flow and the prevention of siltation.

If a location is deemed to have exceeded a threshold, or given weed population is anticipated to exceed a threshold based on site and weather conditions, or other information, an aquatic pesticide application is considered. If the application can be made without adversely impacting the water quality, then an application is made.

8.2 Consideration of Alternatives to Aquatic Pesticides

If aquatic weed thresholds can be maintained at acceptable levels with efficient use of alternative control techniques, then these techniques will be considered and implemented as feasible. Several alternative aquatic pest control techniques were discussed in the preceding chapter.

8.3 Written Recommendations Prepared by PCA

Prior to application, a PCA licensed by California Department of Pesticide Regulation (DPR) scouts the area to be treated, makes a positive identification of pest(s) present, checks applicable product label(s) for control efficacy, and prepares a written recommendation, including rates of application, and any warnings or conditions that limit the application so that non-target flora and fauna are not adversely impacted. Licensed PCAs must complete continuing education to stay licensed, and therefore are up-to-date on the latest techniques for pest control.

8.4 Applications Made According to Label

All aquatic pesticide applications are made according to the product label in accordance with regulations of the U.S. EPA, CalEPA, DPR, and the local Agricultural Commissioner. The Discharger regularly monitors updates and amendments to the label so that applications are always in accordance with label directions.

8.5 Applications Made by Qualified Applicator Certificate Holders

Qualified Applicator Certificate holders (QACs) licensed by DPR, or other trained and qualified personnel, make the applications recommended by the PCA. Licensed applicators have knowledge of proper equipment loading, nozzle selection, calibration, and operation so that spills are minimized, precise application rates are made according to the label, and only target plants are treated. Licensed QACs must complete continuing education to stay licensed, and

therefore are up-to-date on the latest techniques for pest control.

8.6 Use of Adjuvants

As appropriate, the PCA will consider and use adjuvants (surfactants, emulsifiers, pH control agents, drift retardants, etc.) to increase the efficacy of the aquatic pesticide so that the least possible material is used in the most efficient manner possible to control the pest. Adjuvants also reduce the unintentional movement of aquatic pesticide applications to off-locations that may have sensitive receptors.

The Discharger is in regular contact with the manufacturer's representatives to gain knowledge and assess new or modified adjuvants that will improve efficacy or further decrease off-target movement.

8.7 Application Restrictions Based on Site Conditions

As needed, the PCA, QAC, or other trained and qualified personnel will modify treatment techniques accordingly. For example, wind speed and air temperature have significant impacts on the transport of pesticides. As needed, restrictions or prohibitions are placed on aquatic pesticide applications to prevent impact to non-target sensitive species that may be downwind or downstream of the application area. Other factors considered by the PCA include, but are not limited to day length, existing or anticipated precipitation, current and anticipated tide and water exchange, and water depth and flow.

8.8 Evaluation of Effectiveness

The effectiveness of BMPs will be continuously evaluated during the year, as well as in-depth evaluation at the end of the year. The following data will be used to evaluate BMP effectiveness:

- Results of sampling and analysis as described herein, and
- Feedback from field staff, including efficacy, staff safety and efficiency

After data from surfacewater quality monitoring has been reviewed and results indicate that a pesticide was present at a time and location that are not protective of water quality, BMPs used in that area will be reevaluated and modified as needed to address potential cause(s) for the presence of the pesticide detection.

Note that the presence of a pesticide does not in and of itself suggest that a beneficial use has been impaired or that water quality has been adversely effected. Criteria used to evaluate protectiveness include, but are not limited to review of published beneficial uses (Refer to **Table 2**), actual beneficial uses based on site-specific conditions, uses, and location, and numeric criteria, if any, described in the appropriate RWQCB Basin Plan, or described in "A Compilation of Water Quality Goals" (CVRWQCB 2000).

9.0 References

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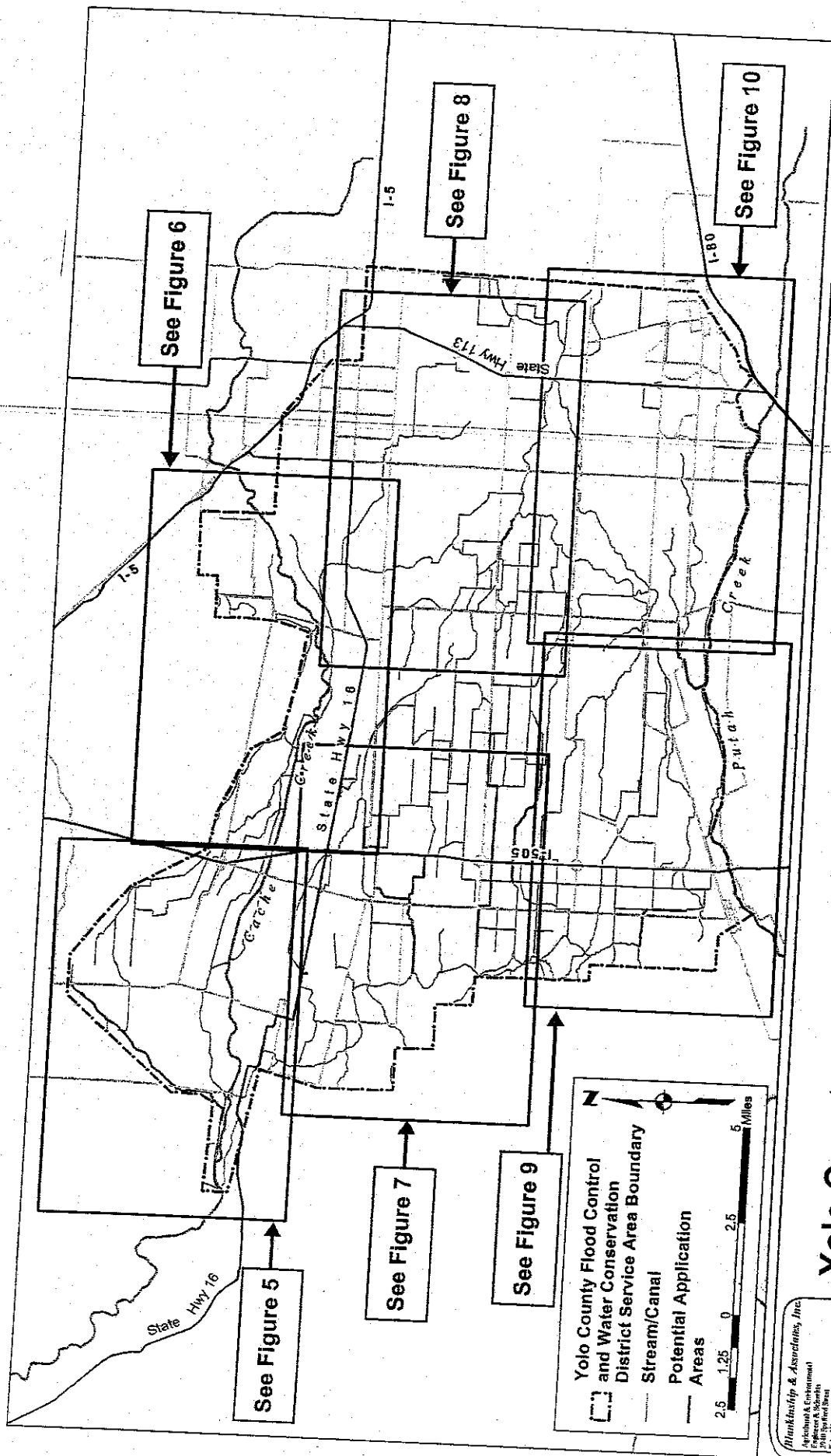
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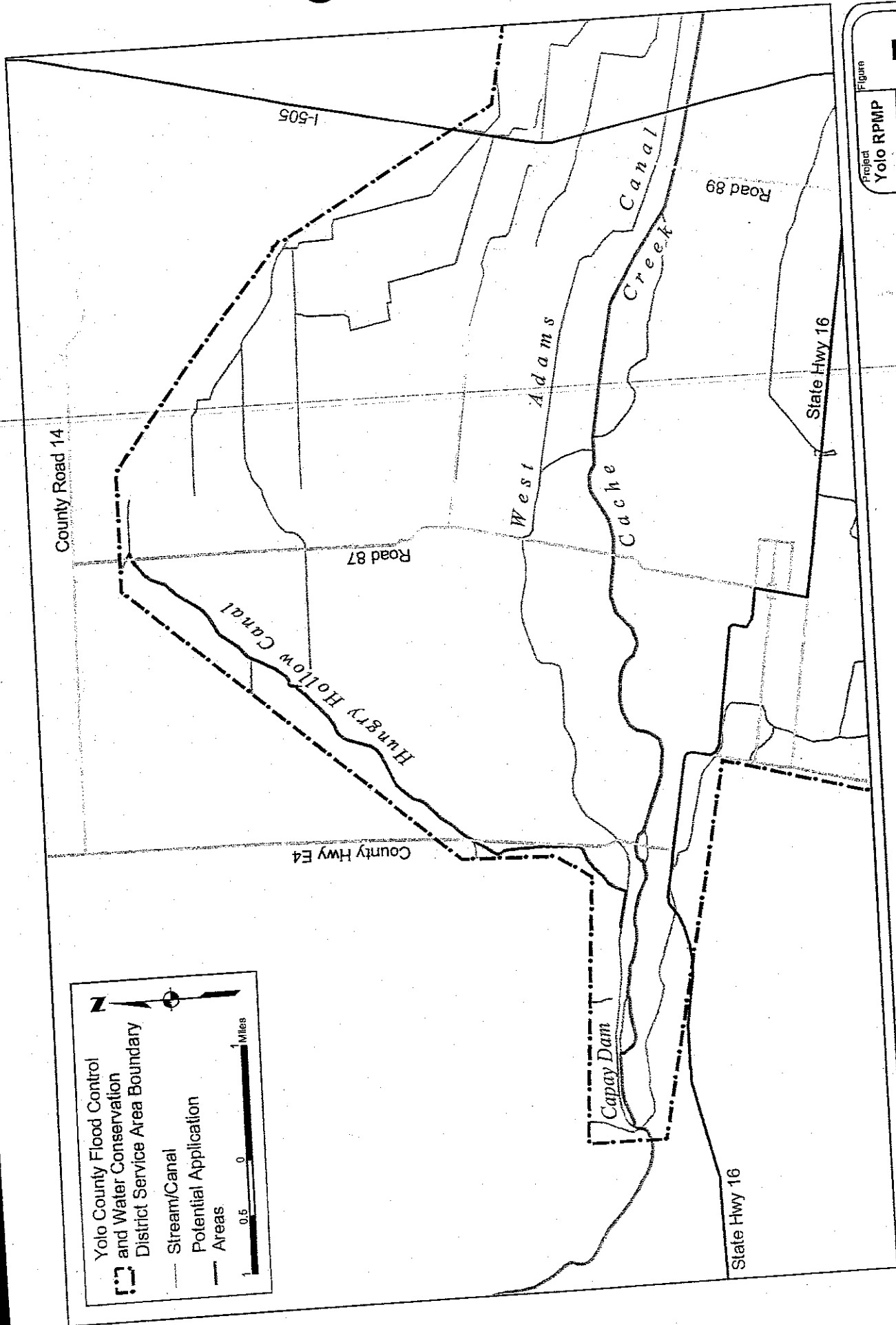
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<http://water.usgs.gov/owq/FieldManual/mastererrata.html>



Yolo County Flood Control & Water Conservation District Map

Project: YOLO RPMP
 Date: July 30, 2002
 Scale: As Shown
 Figure: **4**

Blankenship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 1100 North Street
 Davis, California 95616
 (916) 833-7379 FAX (916) 833-7380

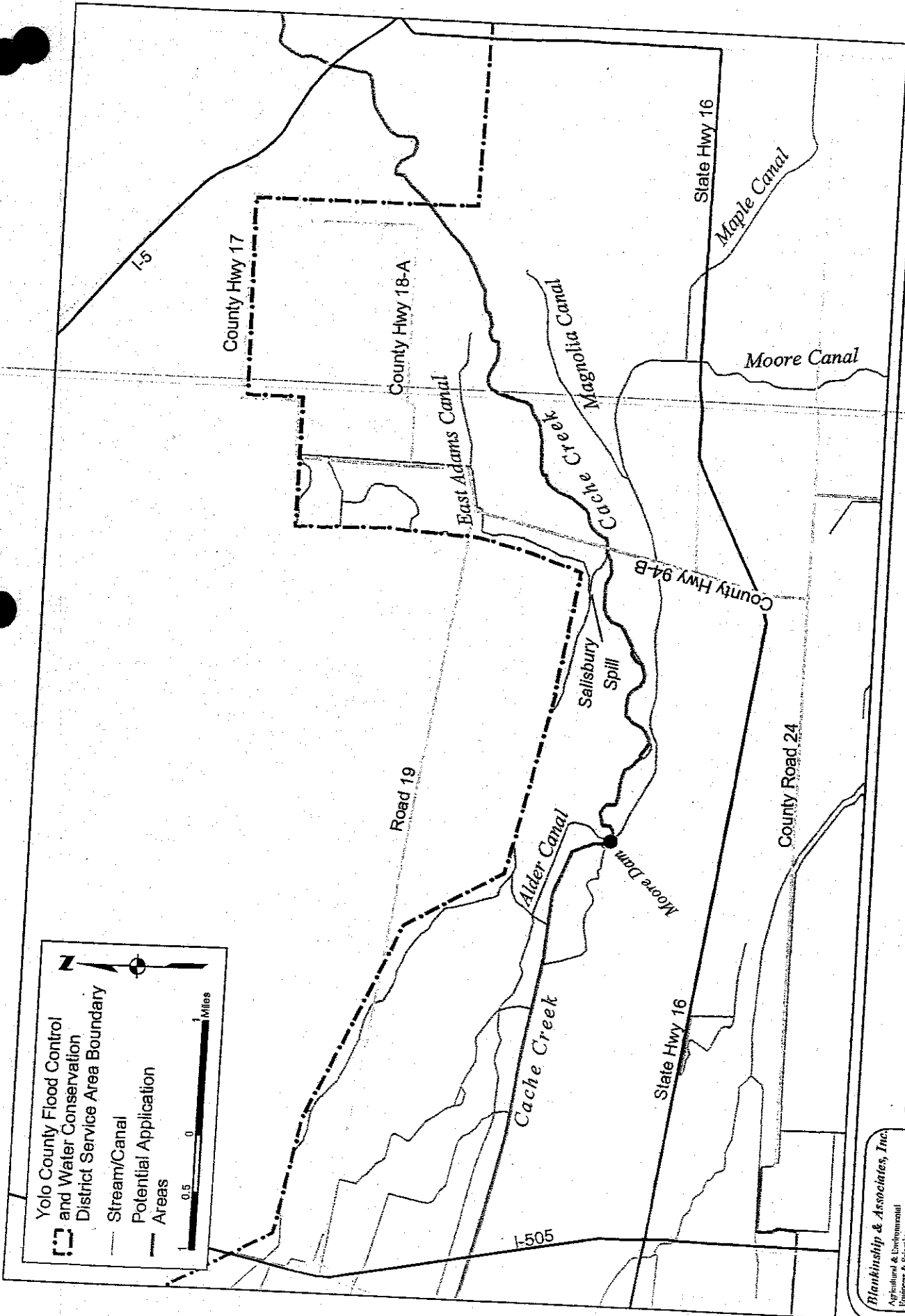


Project	Yolo RPMP
Date	July 30, 2002
Scale	As Shown

Figure 5

Yolo County Flood Control & Water Conservation District

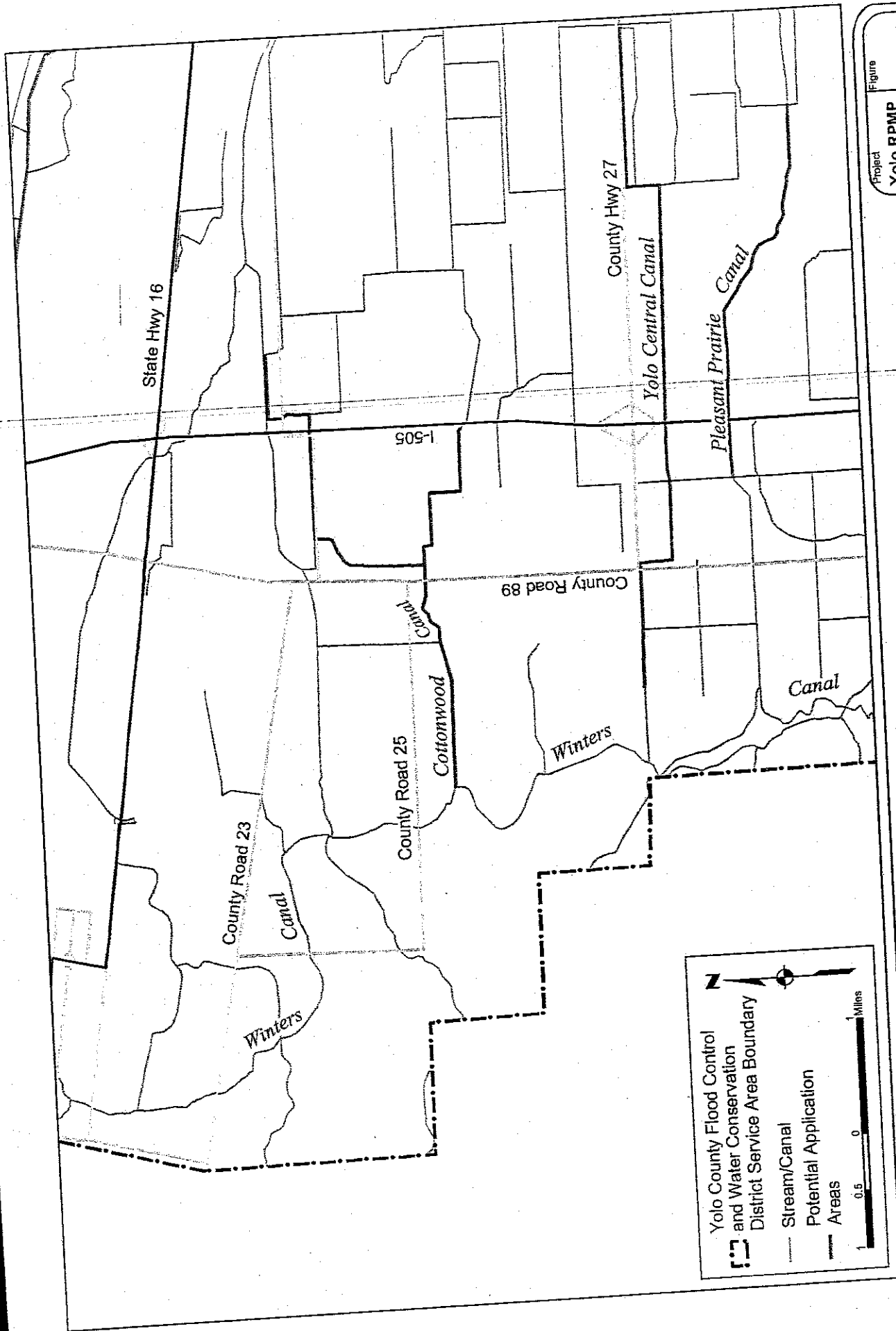
Blankenship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 2840 Spinnaker Street
 Davis, California 95616
 Ph: (530) 757-4091 Fax: (530) 757-0940



Project	Yolo RPMP
Date	July 30, 2002
Scale	As Shown
Figure	6

Yolo County Flood Control & Water Conservation District

Blankinship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 207 Stanford Street
 Suite 110
 Davis, California 95616
 Tel: (530) 757-0941 Fax: (530) 757-0940



Yolo County Flood Control and Water Conservation District Service Area Boundary

 Stream/Canal

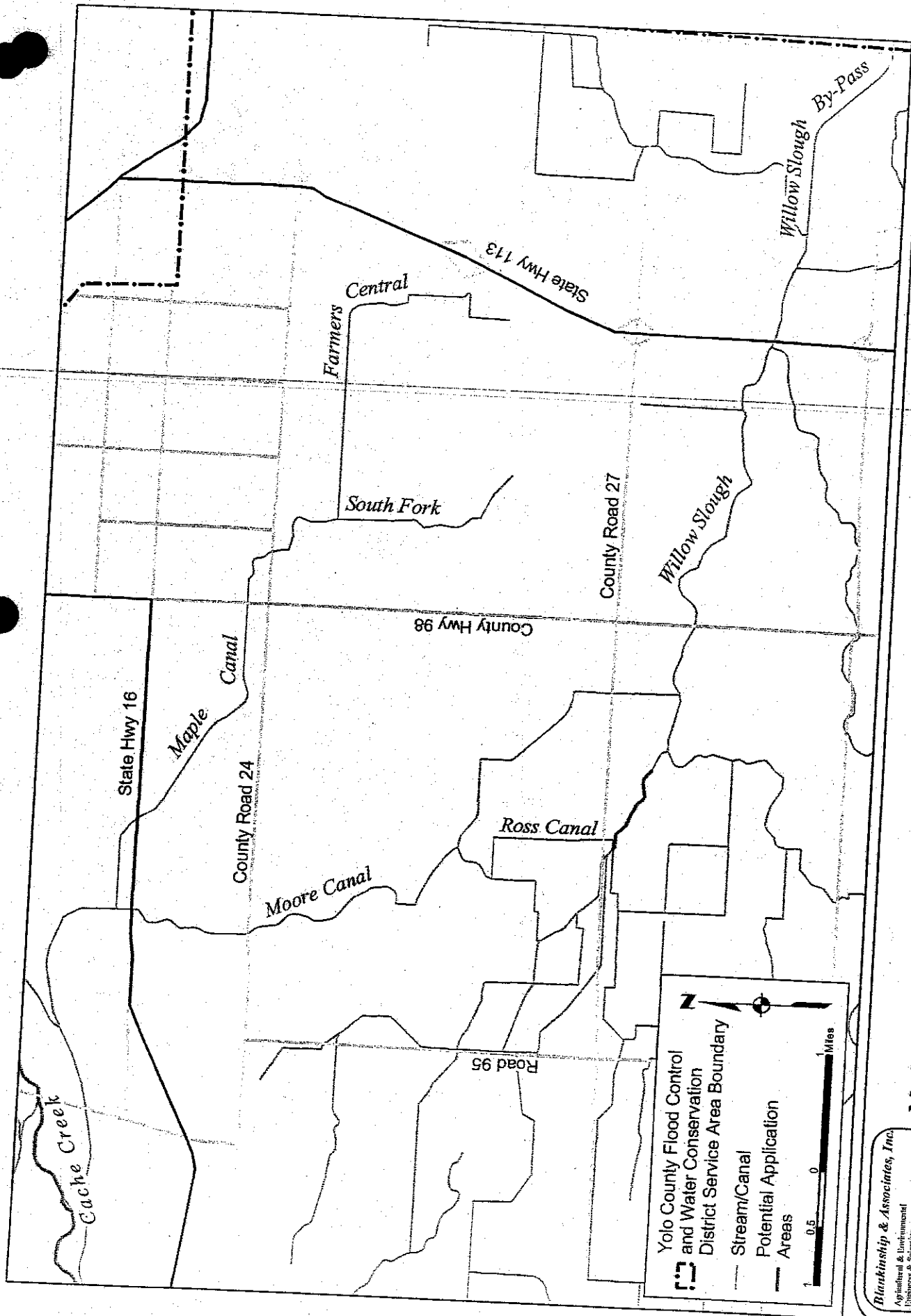
 Potential Application Areas

 1 0.5 0 1 Miles

Project	Yolo RPMP	Figure	7
Date	July 30, 2002		
Scale	As Shown		

Yolo County Flood Control & Water Conservation District

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 Engineers & Scientists
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Yolo County Flood Control and Water Conservation District Service Area Boundary

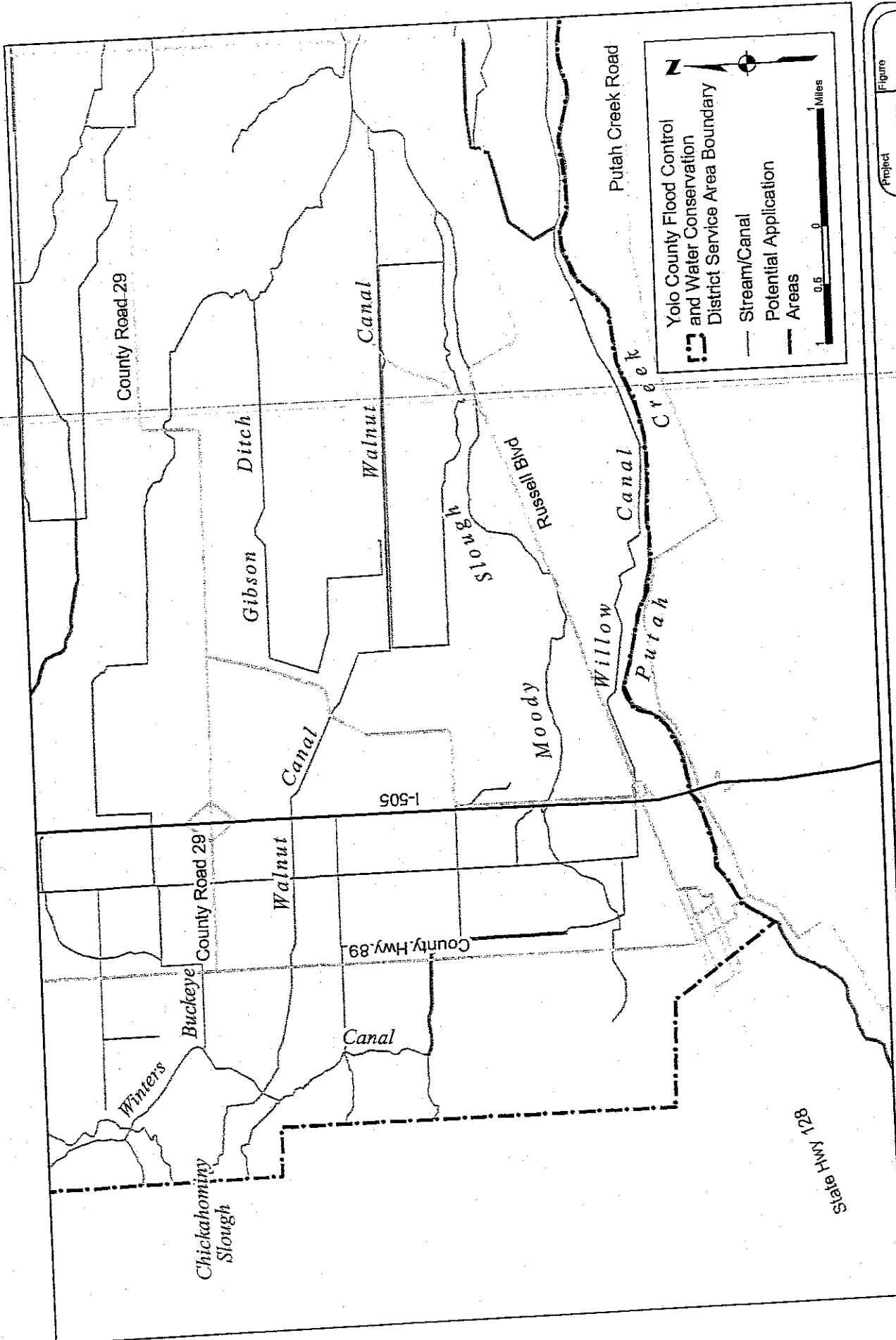
 — Stream/Canal

 Potential Application Areas

Blankinship & Associates, Inc.
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 Engineers & Scientists
 2940 Spaulford Street
 Suite 110
 Davis, California 95616
 Tel: (530) 757-4941 Fax: (530) 757-4940

Yolo County Flood Control & Water Conservation District

Project	Yolo RPMP
Date	July 30, 2002
Scale	As Shown
Figure	8

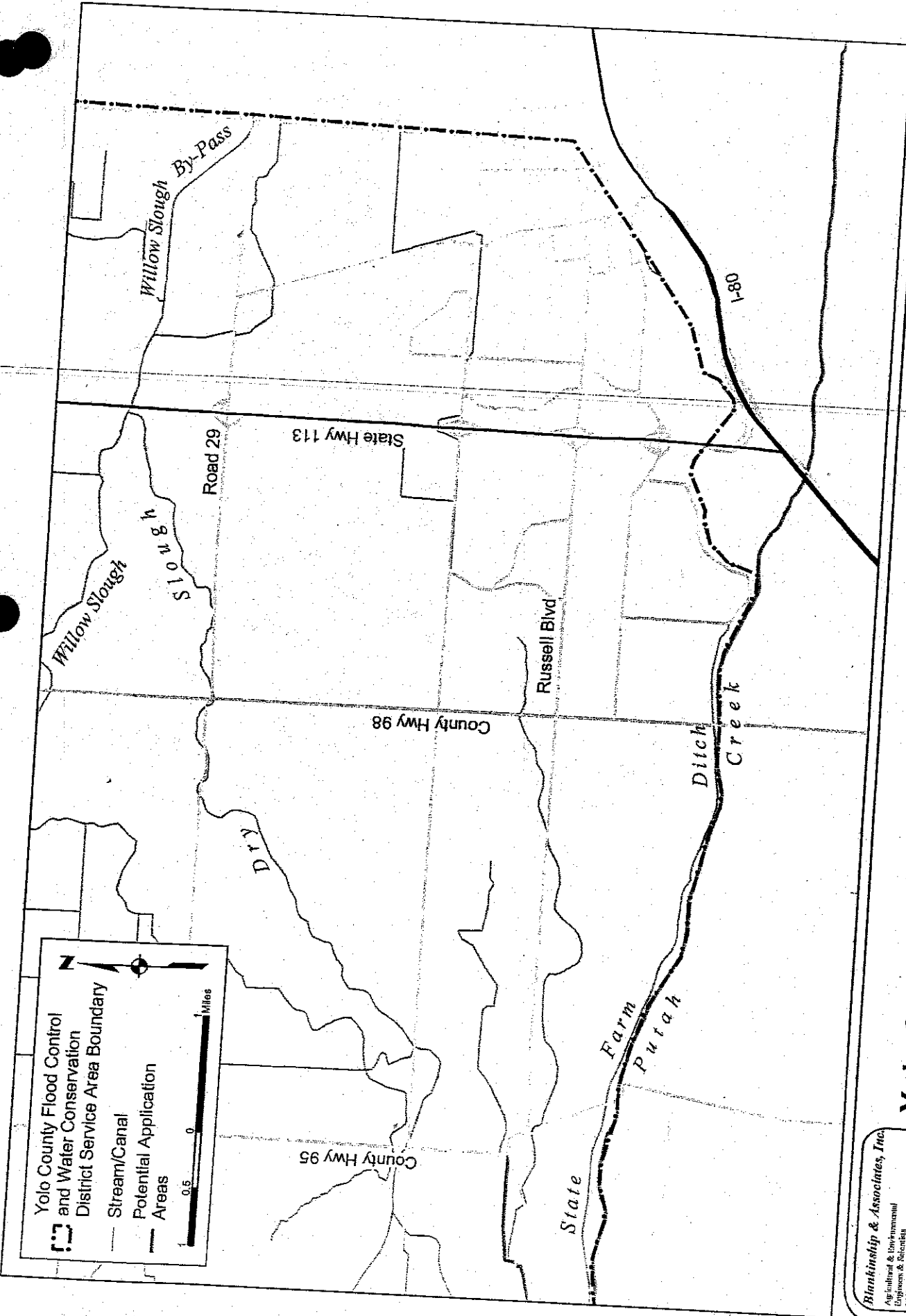


Project: Yolo RPMP
 Date: July 30, 2002
 Scale: As Shown

Figure 9

Yolo County Flood Control & Water Conservation District

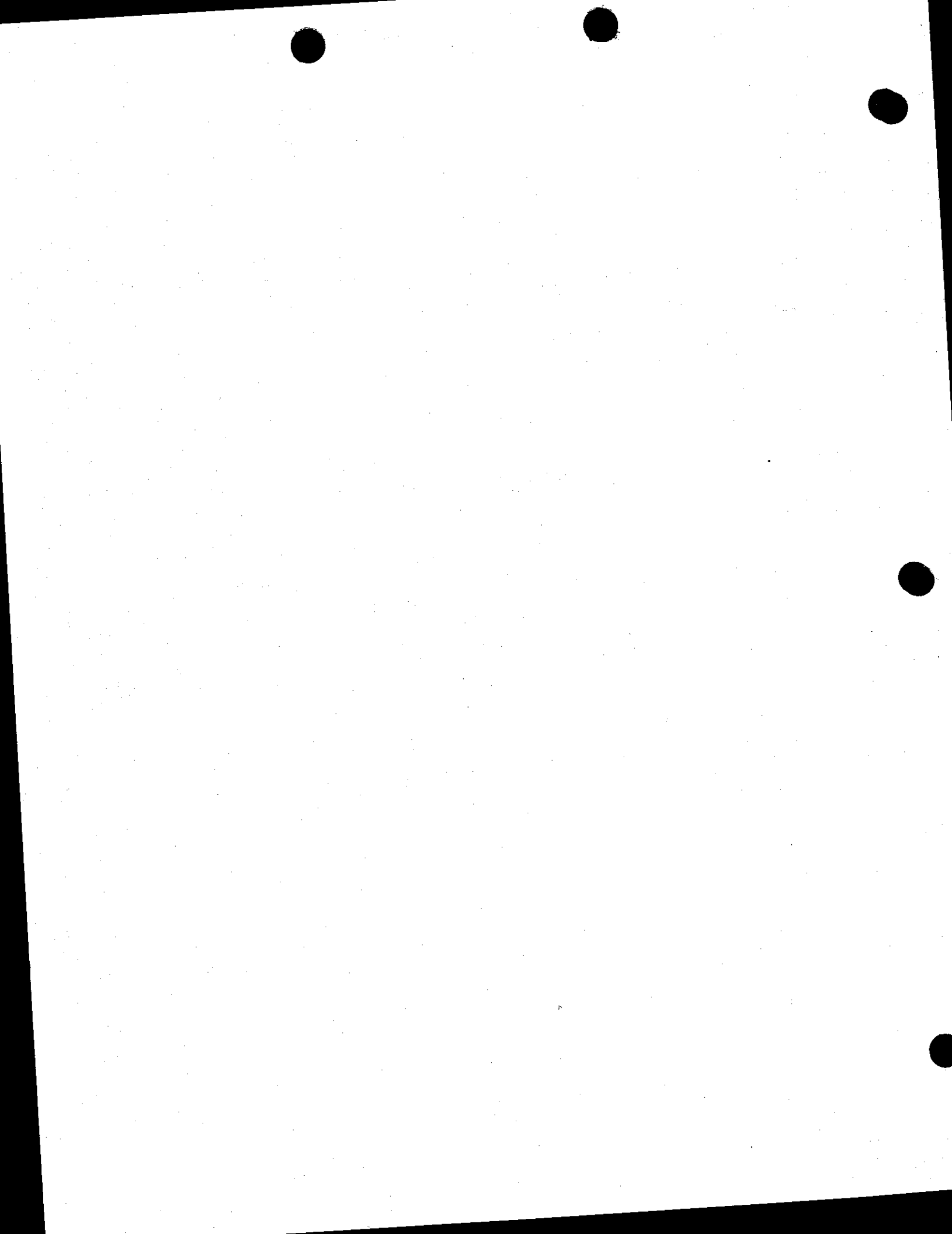
Blankinship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 2040 Spafford Street
 Suite 110
 Davis, California 95616
 Ph: (530) 757-0981 Fax: (530) 757-0940



Yolo County Flood Control & Water Conservation District

Project	Yolo RPMP
Date	July 30, 2002
Scale	As Shown
Figure	10

Blankinship & Associates, Inc.
 Agricultural & Environmental
 Engineers & Scientists
 2940 Rutherford Street
 Suite 110
 Davis, California 95616
 Ph: (530) 757-0941 Fax: (530) 757-0940



Appendix D

BE SAFE . . .

- play at playgrounds . . .
- play at parks . . .
- learn to swim . . .
- swim in pools . . .
- swim where there are lifeguards . . .
- make sure your parents know where you are . . .
- watch out for younger children . . .
- set a good example for younger children
- PARENTS, see the Red Cross, the YMCA or the YWCA in your community and be sure your children learn to swim! You could save your child's life with early swimming instruction! Know where your small children are at ALL times! Keep them away from canals!

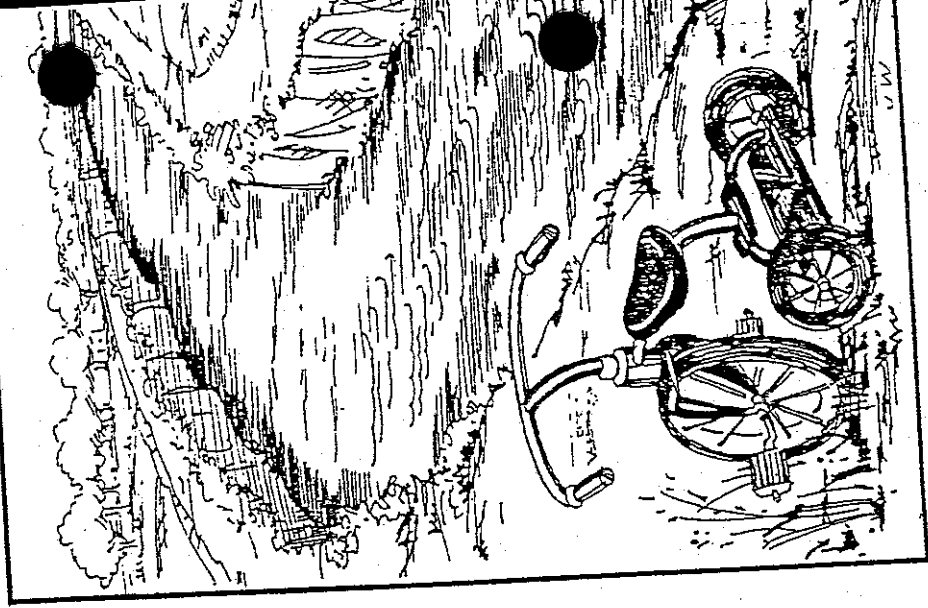
if Someone Falls in a Canal . . .

- don't jump in — you might be in trouble too . . .
- encourage the person to keep his head above the water — to move with the current to the edge — to hold on to weeds
- if possible throw the person something to hang on to that floats — or something to help pull him out with such as a rope . . .
- attract attention and call for help . . .

While this pamphlet is directed primarily at the dangers of playing in or near the canals, children should be constantly warned that any body of water, a lake, a river, a pool or a pond, can be dangerous!

Yolo County Flood Control &
Water Conservation District
34274 State Highway 16
Woodland, CA 95695-9371
(530) 662-0265

DON'T GO NEAR the CANAL

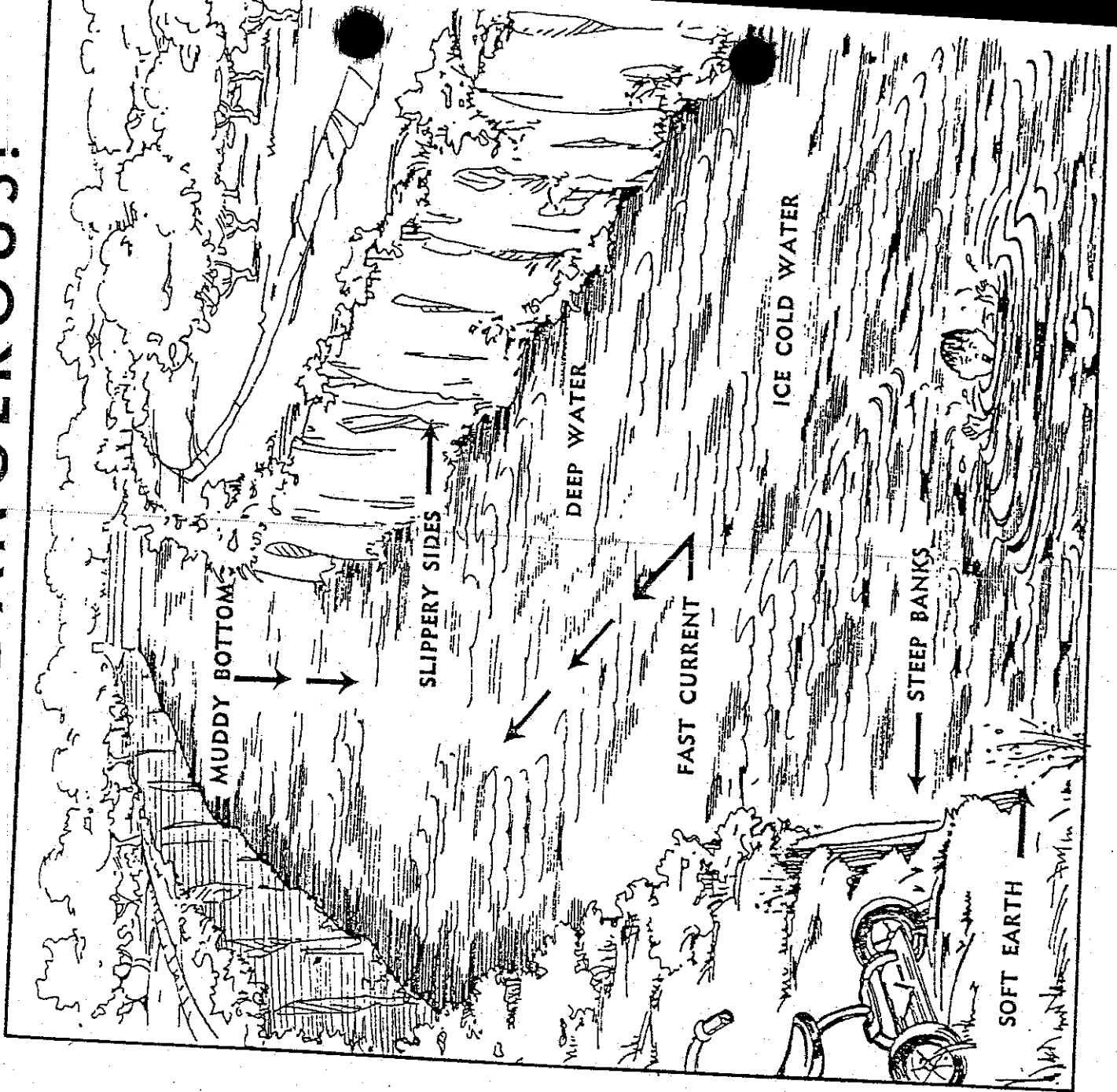


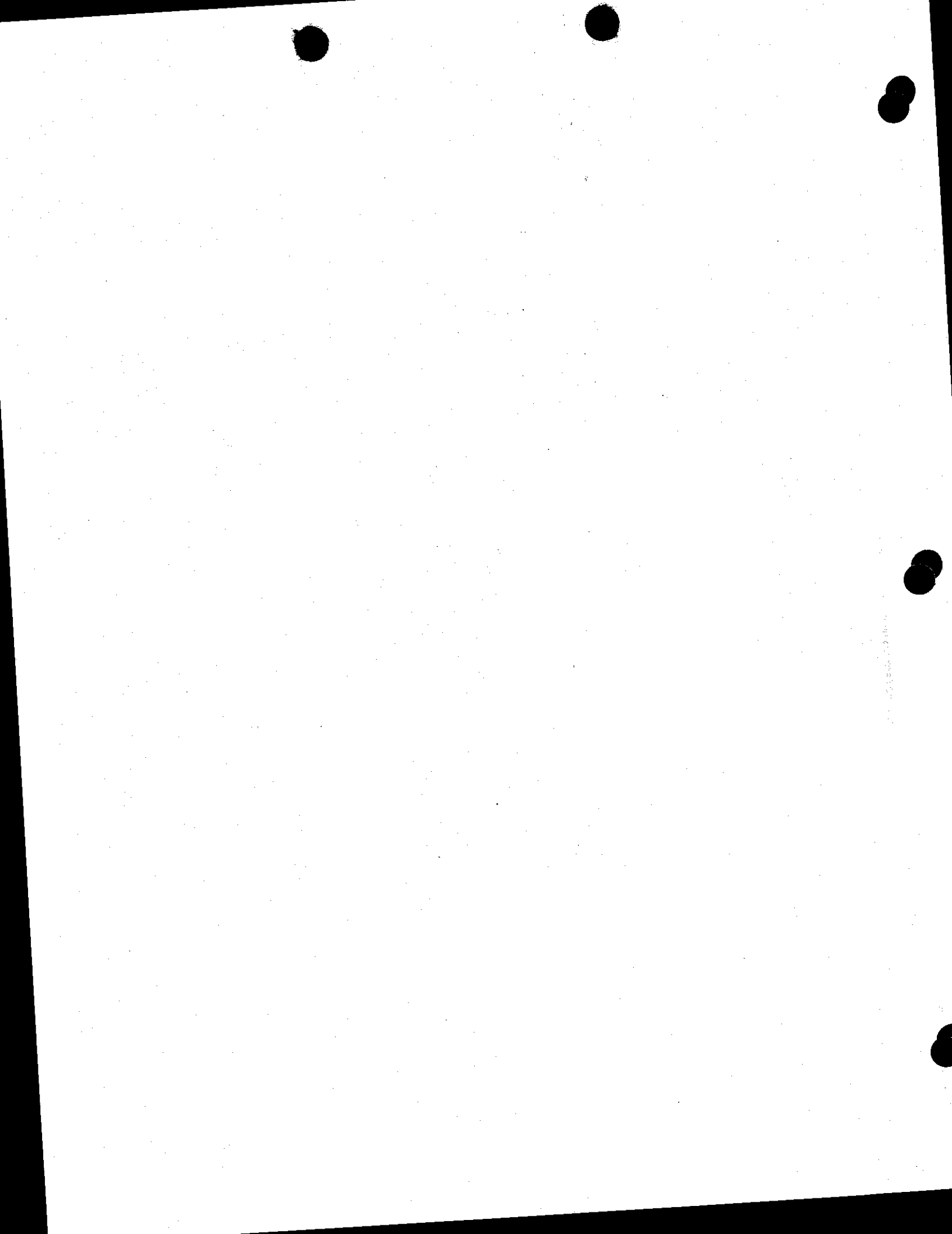
the CANALS are DANGEROUS!

CANALS ARE NOT
A SAFE PLACE TO

- SWIM
- FISH
- PLAY

- you can not stand up on the muddy bottom . . .
- slippery sides give no handholds or footholds . . .
- the canal water is deep — over your head . . .
- the fast current rapidly carries you away . . .
- ice cold water tires you quickly . . .
- you can not climb the steep bank . . .
- soft earth can cave in under your weight . . .





DEPARTMENT OF FOOD AND AGRICULTURE

1220 N Street, Room A-357

Sacramento, CA 95814

Telephone: (916) 654-0768

Facsimile: (916) 653-2403



January 30, 2004

Mr. Philip Isorena
Chief, Regulation Unit
Division of Water Quality
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Subject: APPLICATION FOR A SECTION 5.3 CATEGORICAL EXCEPTION FOR
COPPER HERBICIDE USE

Dear Mr. Isorena:

This letter is to apply for a categorical exception for copper herbicide use for the California Department of Food and Agriculture (CDFA) Hydrilla¹ Eradication Program. The exception would be under Section 5.3², Item 1 "for ... pest management ... by public entities to fulfill statutory requirements." As I stated in my letter dated January 27, 2004, the CDFA Hydrilla Eradication Program is mandated by statute³ to eradicate hydrilla. Copper based aquatic herbicides are necessary for the CDFA Hydrilla Eradication Program to fulfill this statutory requirement.

It is the policy of the CDFA Hydrilla Eradication Program to inform potentially affected public and government agencies prior to copper based aquatic herbicide application. In addition, the CDFA Hydrilla Eradication Program will file, with the Executive Officer of the Central Valley Regional Water Quality Control Board, the following items prior to making any application⁴:

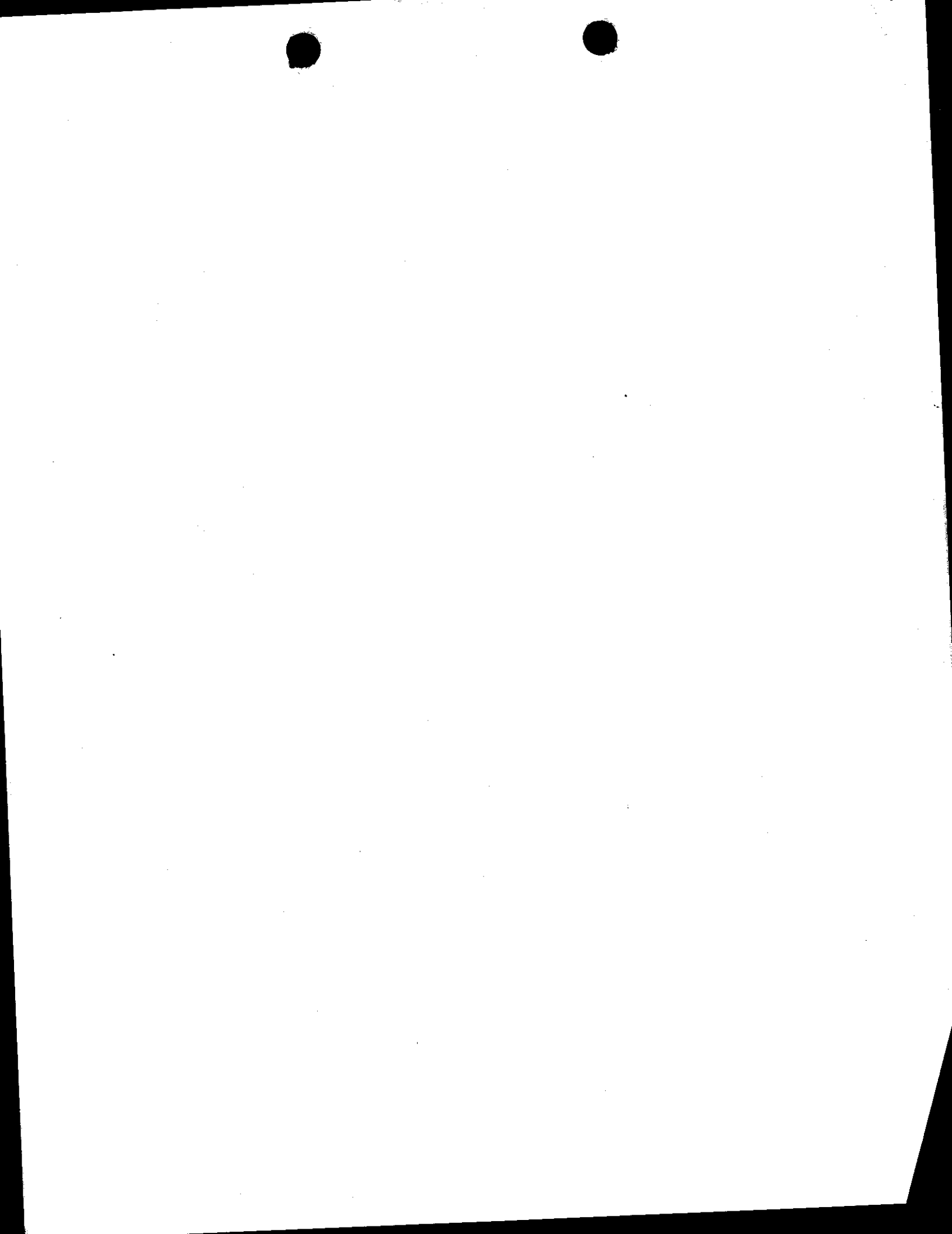
- 1) A detailed description of the proposed action (Attachment 1),
- 2) Pesticide label for Komeen[®] (Attachment 2),
- 3) A time schedule (Attachment 3),
- 4) A monitoring plan (this will be the CDFA Hydrilla Eradication Program's National Pollution Discharge Elimination System permit water monitoring plan), and

¹ *Hydrilla verticillata*.

² *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, State Water Resources Control Board, California Environmental Protection Agency.

³ California Food and Agriculture Code, Section 6048.

⁴ Items 5 through 7 in the *Policy* are not applicable to the CDFA Hydrilla Eradication Program's herbicide use.



Mr. Philip Isorena
Page 2
January 30, 2004

5) California Environmental Quality Act documentation (Attachment 4),

In addition, at the completion of the project, the CDFA Hydrilla Eradication Program will have a qualified biologist evaluate if the beneficial uses of the water have been restored.

Please contact me if you have any questions about this application for a Section 5.3 categorical exception for copper herbicide use.

Sincerely,



for Nathan Dechoretz
Chief
Integrated Pest Control Branch
Plant Health and Pest Prevention Services

Attachments

Description of Proposed Action

The California Department of Food and Agriculture (CDFA) Hydrilla Eradication Program uses copper based aquatic herbicides to provide rapid control of the in-water portions of mature hydrilla plants¹. Applications are made within seven days of finding hydrilla in any waterway in the state. In 2003, the CDFA Hydrilla Eradication Program only made copper based aquatic herbicide applications in Clear Lake in Lake County² and in Bear Creek in Calaveras County³. In 2004, the CDFA Hydrilla Eradication Program expects to make similar applications.

The CDFA Hydrilla Eradication Program makes all applications according to product labels registered with the California Department of Pesticide Regulation. Application rates are one part per million, as per the label (see Komeen® brand label, Attachment 2). Applications are made by surface application or by sub-surface injection, depending upon the site. All applications are made under the supervision of a Qualified Applicator, licensed by the California Department of Pesticide Regulation.

In Clear Lake, after a hydrilla find, the CDFA Hydrilla Eradication Program applies copper based aquatic herbicides to a five-acre circle around the find in order to control any undetected hydrilla plants. In Bear Creek, after a hydrilla find, the CDFA Hydrilla Eradication Program applies copper based aquatic herbicides to one-quarter acre plots around the find. If hydrilla were to be found in other sites in 2004, application areas would be determined on a case-by-case basis, but would not exceed five acres per find. In general, multiple applications are not made at the same location in any given year because the copper based aquatic herbicide applications are followed by fluridone aquatic herbicide applications that control any new hydrilla plants.

¹ Copper based aquatic herbicides are contact herbicides; they offer no residual control.

² For hydrilla eradication, the CDFA Hydrilla Eradication Program used 24 pounds elemental copper in Clear Lake in 2003.

³ The CDFA Hydrilla Eradication Program used 4.6 pounds of elemental copper in Bear Creek in 2003.



Komeen[®]

AQUATIC HERBICIDE



Griffin

For use in Slow Moving or Quiescent Bodies of Water Including: Golf Course, Ornamental, Fish, and Fire Ponds; Fresh Water Lakes, Fish Hatcheries and Potable Water Reservoirs. Areas treated with Komeen may be used for fishing, swimming, drinking and watering livestock immediately after treatment.

ACTIVE INGREDIENT

*Copper as elemental

INERT INGREDIENTS

TOTAL	8%
	92%
	100%

*Derived from Copper-Ethylenediamine Complex and Copper Sulfate Pentahydrate
One Gallon Contains 0.8 Pounds of Elemental Copper

KEEP OUT OF THE REACH OF CHILDREN
CAUTION

FIRST AID**IF SWALLOWED:**

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.
- Remove contact lenses, if present, after the first five minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15 to 20 minutes.
- Call a poison control center or doctor for treatment advice.

IF INHALED:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.
- Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
For medical emergencies involving this product, call toll free 1-888-324-7598.

See Label for Additional Precautions and Directions for use.

GRIFFIN L.L.C.
VALDOSTA, GEORGIA 31601

Specimen Label

GCN 122002 CPC 060557

EPA REG. NO. 1812-312



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed. Avoid contact with skin and eyes. Wash thoroughly with soap and water after handling. Do not apply this product in a manner as to directly expose workers or other persons.

ENVIRONMENTAL HAZARDS

This product may be toxic to fish. Trout and other species of fish may be killed at application rates recommended on this label. Generally, fish toxicity is reduced as water hardness increases. Consult State Fish and Game Agency before applying this product to public waters.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage and disposal. Store in a cool, dry place

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

GENERAL INFORMATION

Komeen provides effective control of Hydrilla (*Hydrilla verticillata*), Brazilian Elodea (*Egeria densa*), Southern/Northern Naiads (*Najas* sp.), Coontail (*Ceratophyllum demersum*), Common Elodea (*Elodea canadensis*), Water Lettuce (*Pistia stratiotes*) and Water Hyacinth (*Eichhornia crassipes*). Under certain water quality conditions, such as low water hardness, Komeen may also control Eurasian Watermilfoil (*Myriophyllum spicatum*), Sago Pondweed (*Potamogeton pectinatus*), and American Pondweed (*Potamogeton nodosus*). Komeen may be applied to slow moving or quiescent bodies of water including: potable water reservoirs and recreation lakes; golf course, ornamental, fish and fire ponds.

Komeen may be tank mixed with other herbicides, such as fluridone, diquat and endothall, for control of a broader weed spectrum (refer to the directions for use for specific directions). Observe all precautions and limitations on the labels of all products used with Komeen.

The effectiveness of Komeen is based upon its penetration into plant tissues; therefore, proper placement of the product is essential. When weeds are actively growing, apply Komeen to the area where the greatest concentration of foliage is located in a manner that will deposit the herbicide on leaf surfaces. The activity of Komeen may be reduced if silt or algae are present in the water or cover the weeds. If algae are present or covers the weeds, the effectiveness of Komeen may be improved by tank mixing with an algaecide, such as K-Tea.

Komeen may be applied by aircraft, sprayer or spray boat as a surface spray, as a subsurface spray through weighted hoses, in an invert emulsion, or mixed with a polymer, as appropriate (see specific instructions and use chemicals cleared for application to growing crops). As a surface or subsurface application, Komeen may be applied diluted or undiluted, whichever is most suitable to ensure uniform coverage of the area to be treated.

Komeen requires a minimum of 12 to 24 hours of contact with the target weeds in order to provide effective control. If the treatment has been successful, the aquatic weeds will drop below the surface of the water within 3 to 7 days after treatment. If this effect is not observed, Komeen may be reapplied 10 to 14 days after the initial application. Once weeds drop below the surface, it can take up to 6 weeks to realize the full effect of the treatment.

Undiluted Komeen or concentrations above 1.0 ppm Cu⁺⁺ may be injurious to crops, grass, ornamentals and other foliage. Do not apply in such a way that the concentrated product comes in contact with crops, ornamentals, grass or desirable plants. Apply only as specified on this label.

In areas heavily infested with aquatic weeds or if water temperature is high, treatment can result in oxygen loss from decomposition of dead vegetation, which can cause fish suffocation. To minimize this hazard, do not treat more than 1/2 of the water body in a single operation. Add only enough Komeen for the actual area being treated. Wait 10 to 14 days before treating the remaining area. Begin treatment along the shore and proceed outward in bands to allow fish to move into untreated areas.

WATER USE RESTRICTIONS

If treated water is a source of potable water, the residue of copper must not exceed 1 ppm.



Application Rates for Aquatic Weed Control in Quiescent or Slow Moving Water

Weed Pest	Copper Level Required For Control (ppm)*
<i>Hydrilla verticillata</i> (Hydrilla)	0.75 -1.0
Suppression of	
<i>Eichhornia crassipes</i> (Water Hyacinth)	0.75 -1.0
<i>Egeria densa</i> (Brazilian Elodea)	0.50 -0.75
<i>Najas</i> sp. (Southern/Northern Naiads)	0.50 -1.0
<i>Ceratophyllum demersum</i> (Coontail)	0.50 -1.0
<i>Elodea canadensis</i> (Common Elodea)	0.50 -1.0
<i>Myriophyllum spicatum</i> ** (Eurasian Watermilfoil)	0.75 -1.0
<i>Potamogeton pectinatus</i> ** (Sago Pondweed)	0.75 -1.0
<i>Potamogeton nodosus</i> ** (American Pondweed)	0.75 -1.0
<i>Pistia stratiotes</i> (Water Lettuce)	0.75 -1.0

* Use lower rate in light infestations and higher rate for heavier infestations.

** Control only in low water hardness.

APPLICATION RATE CALCULATION

For large bodies of water, determine the size (in acres) and the average depth (in feet) of the area to be treated. Application rates are calculated by using the following formula to obtain the appropriate copper concentration:

Desired Concentration of Cu⁺⁺ (ppm) x Average Depth of Water (feet) X 3.34 = Gallons of Komeen Per Surface Acre

To calculate the area and average depth of a lake or pond, use the following formulas. All measurements (length, width, radius, depth) should be in feet.

Area of a square or rectangle (ft²) = length x width

Area of a circle (ft²) = radius x radius x 3.14

Average Depth (ft) = sum of all depth measurements ÷ number of measurements

The more measurements taken, the more accurate the average depth will be.

1 gallon = 4 quarts or 8 pints or 16 cups or 128 fluid ounces

1 quart = 2 pints or 4 cups or 32 fluid ounces

1 acre = 43,560 square feet

1 acre-foot = 43,560 cubic feet = 325,762 gallons = 2,720,000 pounds

Average Water Depth of Treatment Site (feet)	Gallons of Komeen per Surface Acre to Achieve the Desired Copper Concentration		
	0.5 ppm	0.75 ppm	1.0 ppm
1	1.7	2.5	3.3
2	3.3	5.0	6.7
3	5.0	7.5	10.0
4	6.7	10.0	13.4
5	8.4	12.5	16.7
6	10.0	15.0	20.0
7	11.7	17.5	23.4
8	13.4	20.0	26.7
9	15.0	22.5	30.1
10	16.7	25.1	33.4

For smaller bodies of water, determine the size (in square feet) and the average depth (in feet) of the area to be treated.

Average Water Depth of Treatment Site (feet)	Fluid Ounces of Komeen per 1,000 Square Feet to Achieve the Desired Copper Concentration		
	0.5 ppm	0.75 ppm	1.0 ppm
1	5.0	7.5	10.0
2	10.0	15.0	20.0
3	15.0	22.5	30.0
4	20.0	30.0	40.0
5	25.0	37.5	50.0
6	30.0	45.0	60.0
7	35.0	52.5	70.0
8	40.0	60.0	80.0
9	45.0	67.5	90.0
10	50.0	75.0	100.0

METHODS OF APPLICATION

SPRAY BOAT

Surface Application: Surface applications may be made near shorelines or in shallow water (4 feet or less).

Subsurface Application: In deep water (4 feet or more), make a subsurface application of Komeen at recommended rates through weighted trailing hoses where the greatest concentration of foliage exists, and where deposit on leaf surfaces will be assured. Do not drag hoses on the bottom.

Invert Application: Komeen will invert easily using either tank mix or bi-fluid mixer techniques. Invert applications should be made through weighted hoses dragged below the surface of the water. The invert emulsion will form tiny droplets which will adhere to the submerged vegetation and release the herbicide in close proximity to the plant. Do not drag hoses on the bottom.

The emulsifier should release Komeen at a rate fast enough to be quickly absorbed by the plant tissue but not so fast that it can be washed away from the treatment area. The invert emulsion should have a heavy viscous consistency much like mayonnaise.

Apply Komeen in an appropriate invert system. The ratios given below should be used only as a guide in the preparation of a Komeen invert emulsion. It is best to test the invert system to be used prior to application to ensure proper results. The tightness and weight of the invert may be altered by slight changes in the suggested ratios.

Approximate ratios for tank mix systems:

80 gallons water : 3 gallons invert oil : 8 gallons Komeen.

Approximate ratios for bi-fluid mixer systems:

60 gallons water : 3 gallons invert oil : 16 gallons Komeen.

In areas of heavy weed growth, invert application may produce streaking effect due to localized control where the hoses were drug. For such areas, a direct application is preferred. Repeating an application of Komeen to a treated area within a short time after the first treatment may not increase effectiveness.

Polymer Application (Except CA): A polymer may be added to Komeen or a Komeen/Water premix to improve sinking, deposition and retention of the spray. Consult the manufacturer's recommendations regarding the use of a polymer for improved aquatic weed control.



SPRAY EQUIPMENT

Surface Application: Surface application may be effective near shorelines or in shallow water.

Polymer Application (Except CA): Apply the recommended rate of Komeen in 100 to 400 gallons of total spray solution per surface acre. Add the recommended rate of sinking agent to the spray solution. Maintain constant agitation during addition of the polymer and continue through application. The polymer adheres to Komeen and forms strings that sink and stick to the aquatic vegetation. When treating slow moving water, the spray rig should move at a slow pace (4 to 5 mph) counter to the flow of water. Apply the spray solution to the area of densest foliage.

AIRCRAFT APPLICATION

Polymer Application (Except CA): Apply the recommended rate of Komeen in 20 gallons of total spray solution per surface acre. Add the recommended rates of a drift control or sinking agent to the spray solution. Maintain constant agitation during addition of the polymer and continue through application. When treating slow moving water, apply the spray solution counter to the flow of water.

TANK MIX

Komeen + Diquat Tank Mix: Komeen can be mixed with diquat (diquat dibromide (1,2-a:2'1'-c) pyrazinedium dibromide 35.3%) and be applied by helicopter for control of Bladderwort, Curlyleaf Pondweed, Leafy Pondweed, Richardson Pondweed, Small Pondweed, Cattail, Common Elodea, Duckweed, Water Lettuce, Eurasian Watermilfoil, Floatingleaf Pondweed, Coontail, Common Salvinia, Southern Naiad, Slender Naiad, Sago Pondweed, Pennywort, Hydrilla and Water Hyacinth in accordance with the more restrictive of the label limitations and precautions. No label dosage rates should be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing. Mix 20 gallons of Komeen with 10 gallons of diquat and 2 gallons of Nalquatic per 100 gallons of water. Apply at the rate of 20 gallons per acre (equivalent to 4 gallons Komeen, 2 gallons diquat and 0.4 gallons Nalquatic per surface acre). Algae on plant surfaces may interfere with uptake of herbicides. Use K-Tea algaecide prior to this application to remove excess algae and improve control.

Komeen + Endothall Tank Mix (Except CA): Komeen can be mixed with endothall (dipotassium salt of endothall 40.3%) and be applied as a uniform surface spray or injected under the water's surface for control of Najas Elodea, Coontail, *Potamogeton*, Watermilfoil, *Zannichellia*, *Vallisneria*, *Cladophora*, *Pithophora*, *Spirogyra*, *Chara*, American Pondweed and Sago Pondweed in accordance with the more restrictive of the label limitations and precautions. No label dosage rates should be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing. Mix 20 gallons of Komeen with 15 gallons of endothall in 100 gallons of water. Apply at the rate of 20 gallons per surface acre (equivalent to 4 gallons Komeen, 3 gallons endothall). Algae on plant surfaces may interfere with uptake of herbicides. Use K-Tea algaecide prior to this application to remove excess algae and improve control.

Komeen + Fluridone Tank Mix (Except CA): Komeen can be mixed with 41.7% fluridone, such as Avast!, and be applied as a uniform surface spray or injected under the water's surface for control of Common Duckweed, Spatterdock, Bladderwort, Fanwort (*Cabomba*), Watermilfoil, Paragrass, Common Elodea, Brazilian Elodea, Najas Elodea, Naiad, Coontail, American Pondweed and Sago Pondweed in accordance with the more restrictive of the label limitations and precautions. No label dosage rates should be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing. Mix 20 gallons of Komeen with 1.5 quarts of Avast! in 100 gallons of water. Apply at the rate of 20 gallons per surface acre (equivalent to 4 gallons Komeen, 0.3 quarts Avast!). Algae on plant surfaces may interfere with uptake of herbicides. Use K-Tea algaecide prior to this application to remove excess algae and improve control.

WARRANTY STATEMENT

GRIFFIN warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application, all of which are beyond the control of GRIFFIN. In no case shall GRIFFIN be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. The exclusive remedy of any buyer or user of this product for any and all losses, injuries, or damages resulting from or in any way arising from the use, handling, or application of this product, whether in contract, warranty, tort, negligence, strict liability, or otherwise, shall not exceed the purchase price paid for this product or at GRIFFIN'S election, the replacement of this product. GRIFFIN MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

100902

Avast! is a registered trademark of Griffin L.L.C.

Griffin and Design are a registered trademark of Griffin Corporation.

K-Tea is a trademark of Griffin Corporation.

Komeen is a registered trademark of Griffin Corporation.

Nalquatic is a registered trademark of Nalco Corporation.



Time Schedule for Application of Copper Based Aquatic Herbicides

Because copper based aquatic herbicides are contact herbicides, the California Department of Food and Agriculture (CDFA) Hydrilla Eradication Program only applies them for hydrilla eradication after hydrilla plants are found in a waterway in any given year. Because it is impossible to predict in advance when hydrilla plants might be found, it is not possible to provide an exact time schedule for any applications. However, it is possible to provide general parameters. Hydrilla starts growing from tubers in the spring after the water temperature exceeds 10 degrees Centigrade (mid to late May), and hydrilla plants dissipate before the water reaches below 10 degrees Centigrade in the fall (October/November). In 2003, the CDFA Hydrilla Eradication Program found hydrilla in Clear Lake in Lake County on June 25. The program found hydrilla in Bear Creek on May 21⁴. A similar pattern is anticipated in 2004.

⁴ The CDFA Hydrilla Eradication Program also found hydrilla in a pond in Redding on June 2, 2003, but this was not followed by a copper application.



DEPARTMENT OF FOOD AND AGRICULTURE

A.G. KAWAMURA, Secretary

1220 N Street, Room A-357
Sacramento, CA 95814
Telephone: (916) 654-0768
Facsimile: (916) 653-2403

Attachment 4



January 27, 2004

Mr. Philip Isorena
Chief, Regulation Unit
Division of Water Quality
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Subject: COMPLIANCE OF THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE'S HYDRILLA (*Hydrilla verticillata*) ERADICATION PROGRAM WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

Dear Mr. Isorena:

The California Department of Food and Agriculture (CDFA) Hydrilla Eradication Program has operated under the National Pollutant Discharge Elimination System Permit Number CAG99003 since January 2002. The CDFA Hydrilla Program has conducted extensive monitoring of its aquatic herbicide use in concordance with the requirements of this permit. This letter defining the compliance of the CDFA Hydrilla Program with the California Environmental Quality Act (CEQA) is also to fulfill a requirement of the current and future permits.

The CDFA has evaluated the ongoing eradication projects in the CDFA Hydrilla Program and has determined that these projects are exempt from CEQA, as per the Public Resources Code, Section 21080 (b)(4). The basis of this determination is that 1) the CDFA Hydrilla Program is a mandated program and 2) the CDFA Secretary has declared, as each eradication project began, that an emergency situation existed based upon the possible environmental and economic damage that could be inflicted on the State of California by uncontrolled infestations of hydrilla.

In the California Food and Agriculture Code, Section 6048, the CDFA Secretary is specifically mandated by statute to eradicate hydrilla wherever feasible¹. Additionally, in the California Food and Agriculture Code, Section 403, the CDFA is mandated to prevent the spread of noxious weeds. Hydrilla is listed as both a federal² and state³ noxious weed.

¹ A Hydrilla Scientific Advisory Panel was convened after each hydrilla outbreak. These panels have always found hydrilla eradication to be feasible.

² Code of Federal Regulations, Title 7, Part 360.

³ California Code of Regulations, Section 4500.

Mr. Philip Isorena
Page 2
January 27, 2004

On September 13, 1985, Governor Deukmejian proclaimed a "State of Emergency" in Shasta County due to hydrilla⁴. On June 1, 1988, CDFA Director Jack Parnell issued a "Statement of Decision" that the hydrilla infestations in Bear Creek in Calaveras County be eradicated. On June 27, 1989, CDFA Director Henry Voss issued a "Statement of Decision" that the hydrilla in Eastman Lake be eradicated. This "Statement of Decision" was followed in August 1989 by Governor Deukmejian proclaiming a "State of Emergency" in Eastman Lake in Madera County and the west fork of the Chowchilla River in Mariposa County because of hydrilla. On August 12, 1994, CDFA Secretary Voss declared an "Emergency Situation" in Clear Lake in Lake County due to hydrilla. On July 15, 1996, CDFA Deputy Secretary A. J. Yates declared an "Emergency Situation" in the Riverview Golf Course ponds, and a nearby pond, in Shasta County due to hydrilla.

Although the CDFA has determined that the CDFA Hydrilla Program is exempt from the CEQA, the CDFA has coordinated all eradication activities with various federal, state, and local regulatory agencies to insure no long-term significant environmental impacts occur to California's environment. Coordinating agencies are: the United States Fish and Wildlife Service, United States Bureau of Indian Affairs, California Department of Fish and Game, California Department of Health Services, California Department of Pesticide Regulation, California State Water Resources Control Board, and the Central Valley Regional Water Quality Control Board.

The CDFA consulted the California Department of Fish and Game's National Diversity Data Base and the California Department of Pesticide Regulations' County Bulletins for known occurrences of federal and state listed threatened and endangered species in each project area. No threatened or endangered species are known to occur in any project area.

Please contact me if you have any questions about the compliance of the CDFA Hydrilla Program with the CEQA.

Sincerely,

Original signed by

Nathan Dechoretz
Chief
Integrated Pest Control Branch
Plant Health and Pest Prevention Services

cc D. Mayhew, Director

⁴ Terminated October 23, 1989.



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Memorandum

To: Mr. Jim Maughan
State Water Resources Control Board

Date: March 25, 2004

Place: 1220 'N' Street, Room A-357

Phone: [Click here and type your phone number]

From: Department of Food and Agriculture

J Robert Carlton Leavitt, Ph.D.
Integrated Pest Control Branch

Subject: Contingency Plans

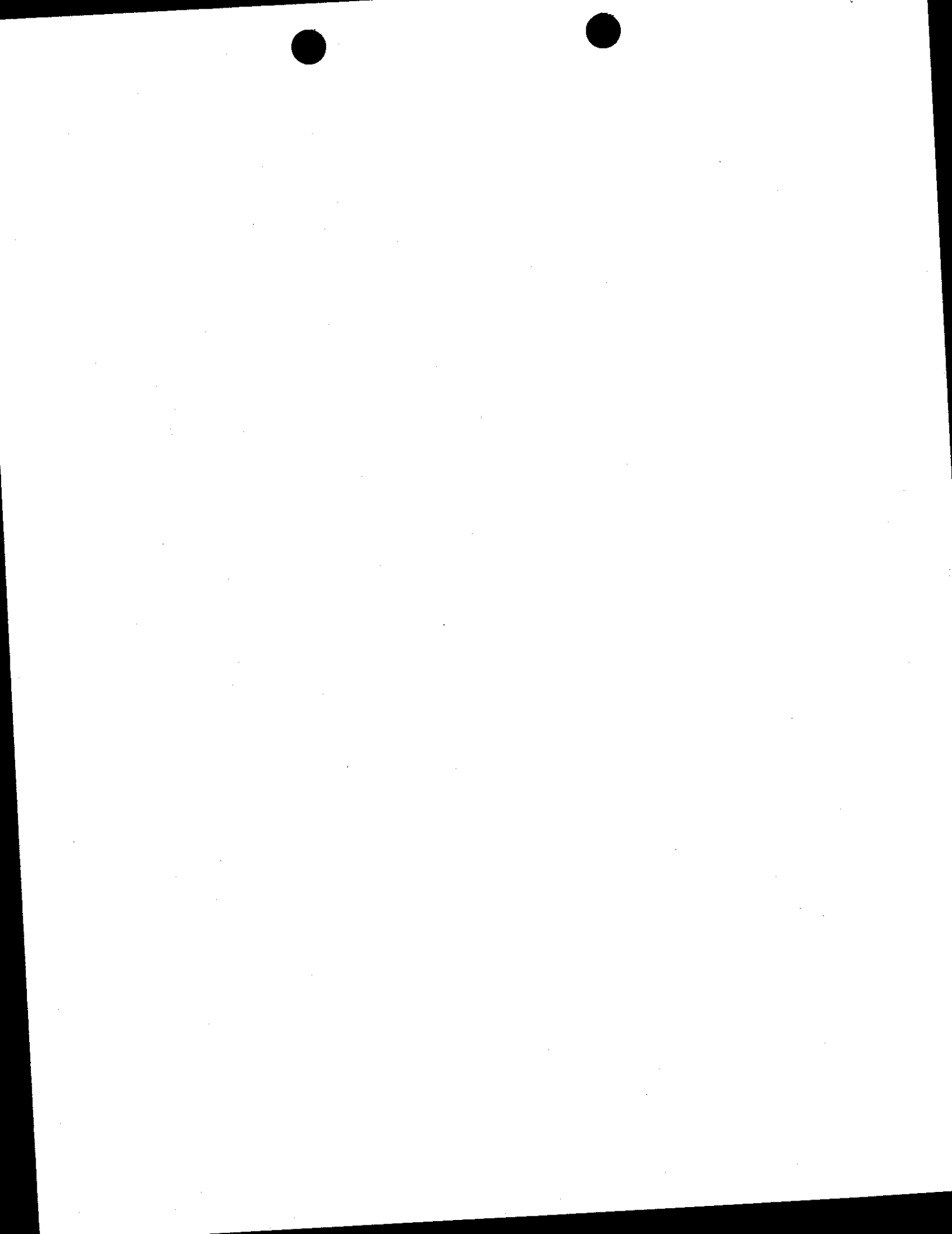
The California Department of Food and Agriculture is responsible for the eradication of hydrilla from California's waterways. The CDFA has used chemical control of mature plants with chelated copper aquatic herbicides as one method to fulfill this responsibility. In 1996 and 1997, the CDFA conducted extensive monitoring studies on the use of chelated copper herbicides in Clear Lake. In addition, the last two years the CDFA has conducted monitoring studies on chelated copper aquatic herbicides in Clear Lake and in Bear Creek (Calaveras County) as a part of the National Pollution Discharge Elimination System General Permit.

The CDFA has applied for a section 5.3 categorical exception to continue to use chelated copper aquatic herbicides under the General Permit, once it is adopted. As a component of this application, the CDFA has examined various contingencies should it not be able to use chelated copper herbicides. These contingencies are as follows:

- 1) Use of diquat dibromide aquatic herbicide. The CDFA is studying the use of diquat dibromide as a substitute for chelated copper aquatic herbicides. Diquat dibromide is not ideal because it has drinking water and irrigation water restrictions that copper does not, but the CDFA continues to study this option.
- 2) Small scale dredging. This is feasible in many waterways in the state, but may not be feasible in Clear Lake because of the mercury in the hydrosol. The CDFA continues to study this option as well.

I have attached a copy of the CDFA Hydrilla Eradication Program Best Management Practices, which also describe the various eradication methods used by the program, and the site-specific situations in which they are used.

Regards,



DRAFT

APPENDIX I

California Department of Food and Agriculture

Hydrilla Eradication Program

Best Management Practices

BEST MANAGEMENT PRACTICES

The California Department of Food and Agriculture (CDFA) Hydrilla (*Hydrilla verticillata*) Eradication Program's Best Management Practices are designed to ensure worker and public safety, environmental compatibility, protection of Threatened and Endangered Species, and maximize treatment efficacy and efficiency.

WORKER SAFETY AND ENVIRONMENTAL COMPATIBILITY

Herbicide Use

All herbicide applications should take place only after local stakeholders have been notified. Planned applications may be reviewed by affected local government agencies.

The CDFA Hydrilla Eradication Program only uses herbicides, surfactants, and other adjuvants that are registered for use in an aquatic environment by the California Department of Pesticide Regulation.

In order to ensure proper aquatic herbicide applications, the CDFA Hydrilla Eradication Program requires that all applications be made under the supervision of an applicator certified for aquatic herbicide applications by the California Department of Pesticide Regulation (CDPR) (Qualified Applicator Certificate or Qualified Applicator License).

The CDFA Hydrilla Eradication Program requires that all applicators follow the herbicide label directions for personal protective equipment¹ when loading, mixing, or applying herbicides. At a minimum, all applicators will wear eye protection, gloves², long sleeve shirts, long pants, and shoes with socks.

In order to avoid inadvertent or accidental soil or water contamination with aquatic herbicides, the CDFA Hydrilla Eradication Program follows the storage, transport, and spill control procedures recommended by the CDPR and the United States Environmental Protection Agency.

In order to ensure the use of correct application rates, the CDFA Hydrilla Eradication Program follows all label directions as to application rates and timings. Surface acreages are determined using Global Positioning System/Geographic Information System technology. Water depths are determined by using depth meter sticks in shallow water and by calibrated weighted ropes or depth finder in deeper waters.

In order to ensure the use of correct application volumes, the CDFA Hydrilla Eradication Program routinely cleans and calibrates all herbicide application equipment.

In order to avoid spray drift, the CDFA Hydrilla Eradication Program follows all label directions and all CDPR guidelines as to acceptable application weather conditions. For instance, aqueous spray applications are not made in winds above 10 miles per hour, or in temperature inversions (unless they are applied through subsurface injection).

¹ Neither the Komeen® herbicide label nor the Sonar® SRP herbicide labels require the use of specific PPE.

² Eye protection and gloves required by California Code of Regulations Section 6738 (b).

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The CDFA Hydrilla Eradication Program obtains all applicable permits from the local County Agricultural Commissioner before any herbicide application. All applicable records are maintained, and all required reports will be filed with the County Agricultural Commissioner (including the Monthly Pesticide Use report), as required.

All transport or shipment of herbicides and other chemicals by program personnel will be in compliance with California Department of Transportation, and U.S. Department of Transportation, laws, regulations, and guidelines. Packages containing herbicides and other chemicals, and vehicles transporting them will be properly labeled and/or placarded.

The enforcement of all State pesticide storage, transport, and application laws and regulations is under the direction of the local County Agricultural Commissioners, who have the right to inspect the CDFA Hydrilla Eradication Program for compliance at any time. In addition, the enforcement of all Federal pesticide storage, transport, and application laws and regulations on Federal property is the responsibility of the appropriate Federal agency, who have the right to inspect the CDFA Hydrilla Eradication Program for compliance at any time (such as the United States Corps of Engineers at Eastman Lake). The CDFA Hydrilla Eradication Program cooperates with these inspections, and immediately corrects any deviations found.

Physical Removal Treatments

All applicable permits will be obtained from the California Department of Fish and Game, for streambed alteration, before dredging.

For hand removal of plants, all reasonable care will be made to extract the tubers and the plant crown from the hydrosol when the plant is removed.

All plant material will be disposed of in a manner that hydrilla cannot sprout and re-grow from tubers or other plant parts.

Dredging and hand removal of plants will be performed by trained personnel only.

THREATENED AND ENDANGERED SPECIES

In order to avoid inadvertent or accidental take of listed species, the CDFA Hydrilla Eradication Program consults on an annual basis with the local county Agricultural Commissioners as to the presence of any Threatened and Endangered Species in or near the project areas.

The CDFA Hydrilla Eradication Program conducts annual training sessions for seasonal crews on threatened and endangered species. The training sessions are presented by personnel from the California Department of Pesticide Regulation, and include identification of threatened and endangered species in survey and treatment areas, and mitigation measures.

OUTREACH AND EDUCATION

Public Awareness is essential to the CDFA Hydrilla Eradication Program in order to expand detection efforts to areas where CDFA staff may not be able to survey, and halt

the spread of hydrilla. Survey efforts may be enhanced by door-to-door distribution of educational materials in "high-risk" areas near the focal point of an infestation.

In order to educate the public on the value of the CDFA Hydrilla Eradication Program, biologists from the CDFA and local County Departments of Agriculture give public speeches and presentations on hydrilla biology and control. The CDFA Integrated Pest Control Branch and other parties produce pamphlets that are distributed to public agencies and weed management area groups, to help the public identify hydrilla and know where to report its occurrence.

Communication with other agencies and experts; keeping abreast of new tools is an integral part of our CDFA Hydrilla Eradication program. This may include new herbicides, herbicide formulations, herbicide application equipment or methods; biological control agents, physical and mechanical removal equipment and methods, and survey and assessment equipment and methods.

WORKING WITH THE PUBLIC

In order to maintain the best possible working relationship with private landowners and the public, local County Departments of Agriculture are consulted when hydrilla surveys are conducted within their jurisdiction. CDFA staff then work with the County Departments of Agriculture to develop a plan to address the survey findings, and perform any required eradication work.

In order to maintain the best possible working relationship with the public, CDFA staff makes it a policy to stop control activities in order to answer program related questions from interested or concerned citizens.

In order to maintain the best possible working relationship with private landowners, CDFA notifies landowners when hydrilla is detected on their property, and consent is sought for the CDFA staff to eradicate these plants from their lands.

In order to maintain the best possible working relationship with private landowners (and the public), efforts are made as a courtesy, to notify landowners when herbicide treatments are being conducted in nearby areas, adjacent to their lands.

TREATMENT EFFICACY AND EFFICIENCY

It is the policy of the CDFA Hydrilla Eradication Program to use the most appropriate eradication tools, or combination of tools, at each site. In order to adopt the appropriate tools, the following site characteristics are considered:

- 1) Site accessibility; the more difficult the access, the less weight and amount of equipment that can be safely carried to the site. In addition, it is more difficult to transport large volumes of plant matter away from the site for disposal. In this situation, the use of pellet or liquid formulation of fluridone herbicide might be more appropriate due to their low toxicity and ease of portage.
- 2) Site location; a hydrilla infestation next to a river that can flood would require immediate action. This would favor burying, excavating, and fumigating as control methods.

- 3) Water clarity; only relatively clear water sites are appropriate for divers and diver assisted dredging.
- 4) Water depth; the deeper the water the more appropriate the use of pellet herbicide formulations or sub-surface injection of liquid herbicides. This would allow release of the herbicide directly on the plants and decrease the dilution factor.
- 5) Water Quality; the pH (acidity) and turbidity affect the choice of herbicide. Diquat is ineffective in turbid water, and alkalinity can affect the efficacy of copper aquatic herbicides. In addition algae can obscure hydrilla from visual observation and effect herbicide uptake. Sometimes applications of algaecides, or physical methods such as raking, or high-pressure water injection, may be necessary to remove silt or algae from leaf surfaces prior to herbicide application for hydrilla eradication, to improve herbicide uptake.
- 6) Water uses; the use of the water in the water body has a major effect in determining the proper control method. For instance if the water is used for irrigation of crops or potable water for humans or livestock some herbicides may not be used or may require a specific holding time of the water prior to it's use.
- 7) Water flow; the faster the water flow the more appropriate the use of copper aquatic herbicides applied through metering devices or gravity flow devices. Metering in the copper herbicide at low rates allows for longer exposure of the hydrilla plants to the herbicide and improves efficacy. Very slow water exchange or convection currents in large water bodies being partially treated might be more acceptable for the slow release pellet formulation of fluridone at low rates with periodic applications, as in Clear Lake.
- 8) Water control; in water bodies where the level of water can be easily controlled, the use of draw down to expose plants and tubers to drying and prevent further tuber formation can be used. Fumigation of soils can be considered when the water body is in draw down.
- 9) Hydrosol type; heavy clay soil makes dredging with a suction dredge difficult. In addition, organic, mucky soils affect the use of slow release pellet herbicides (they become buried in the soft soil, and the active ingredient inactivated by the organic matter). Use of an aqueous solution or a different faster release pellet formulation might be considered. In water bodies with hard, solid bottoms, such as asphalt or gunite, physical removal is very effective.
- 10) Weed size; large hydrilla plants or plant mats may require either hand pulling, mechanical control, or use of copper aquatic herbicides for rapid control before tubers can form. Large hydrilla plants can be treated with fluridone, but the length of time required for control can be several weeks to months. Therefore, the use of copper aquatic herbicides to knock down top-growth followed by the use of fluridone, which works quickest at the new growing points on hydrilla, is often used in the program.



- 11) Tuber bank (a section of hydrosol infested with hydrilla tubers, analogous to a "seed bank"); the most direct way to remove hydrilla tubers from a tuber bank is dredging. In addition, the number of tubers in the tuber bank can be slowly exhausted by persistent, frequent aquatic herbicide application. This will reduce the tuber population by controlling the germinated plants before they grow large enough to produce new tubers.
- 12) Size of infested area; small infestations can be controlled with hand or mechanical control methods; larger infestations tend to require herbicide use, or biological control methods, as are used in the Imperial Irrigation District canal with the triploid grass carp.
- 13) Plant density; the lower the density of plants, the more appropriate is physical removal (hand digging).
- 14) Dissolved oxygen; the use of aquatic herbicides to rapidly control a large mass of hydrilla (or any other aquatic vegetation) filling an entire water body can reduce the dissolved oxygen levels in the water body to levels unable to support fish and other aquatic organisms. Therefore, no more than (approximately) a third of the surface area of a given water body is treated with the use of rapid-action aquatic herbicides, such as copper, at a time.
- 15) Non-target plants; the more sensitive the non-target plants, the more care is taken in the selection of herbicides, herbicide rates, and timing of application, and the more consideration given to mechanical or other non-chemical control methods. A lower rate of an herbicide might control hydrilla without affecting non-target plants, or timing of the application after the non-target plant has reproduced or completed its life cycle may avoid plant damage.
- 16) Biological control methods; if the infested waterway is an area where the triploid grass carp can be used according to the California Fish and Game code, and the waterway can be enclosed by screens and gates so that the triploid grass carp cannot escape into the wild, this biological control agent can be used. All applicable permits will be obtained from the California Department of Fish and Game before release. The stocking rates used in an eradication project, such as the CDFA Hydrilla Eradication Program, are much higher than those used in a classical biological control program. In addition, several other biological control agents, including a tuber eating weevil and a stem-mining fly, have been tested in the past on a small scale, under controlled and quarantine conditions, but proved to be ineffective as an eradication tool in California.

EFFICACY MONITORING

Visual Assessment: A visual assessment of beneficial and adverse effects will be conducted during surveys of treatment locations in order to assess treatment success, and adjust treatment methods as necessary. Photographs will be taken at the beginning and end of each field season, where applicable, to document changes in plant density, size, maturity, and area coverage.



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All hydrilla plant infestations will be mapped using global positioning system technology and references to landmarks.

GENERAL ADMINISTRATIVE PRACTICES

Daily Activity Log: Project personnel will fill in daily activity logs accurately describing their activities.

Equipment Maintenance Log: A logbook should be kept to record daily, weekly, and monthly maintenance, service or repairs of program equipment.

Calibration Log: A logbook will be maintained with the calibration of all herbicide application equipment.



SECTION 3. WATER QUALITY ANALYSES (2003 SAMPLE ANALYSIS PLAN)

3.1 Introduction, Conceptual Model, and Hypotheses

3.1.1 Herbicides Used and General Treatment Protocols

The CDFA, Integrated Pest Control Branch conducts the Hydrilla Eradication Program. This program consists of various projects previously described in this document.

The two aquatic herbicides used by the Hydrilla Eradication Program are fluridone slow release pellets (Sonar[®] SRP brand), and copper ethylenediamine complex (Komeen[®] brand). Both herbicides are registered by both the United States Environmental Protection Agency (USEPA) and the California Department of Pesticide Regulation (CDPR) as per the table below.¹

	USEPA registration no.	CDPR registration no.
Sonar SRP	67690-3	67690-3-AA
Komeen	1812-312	1812-312-ZA

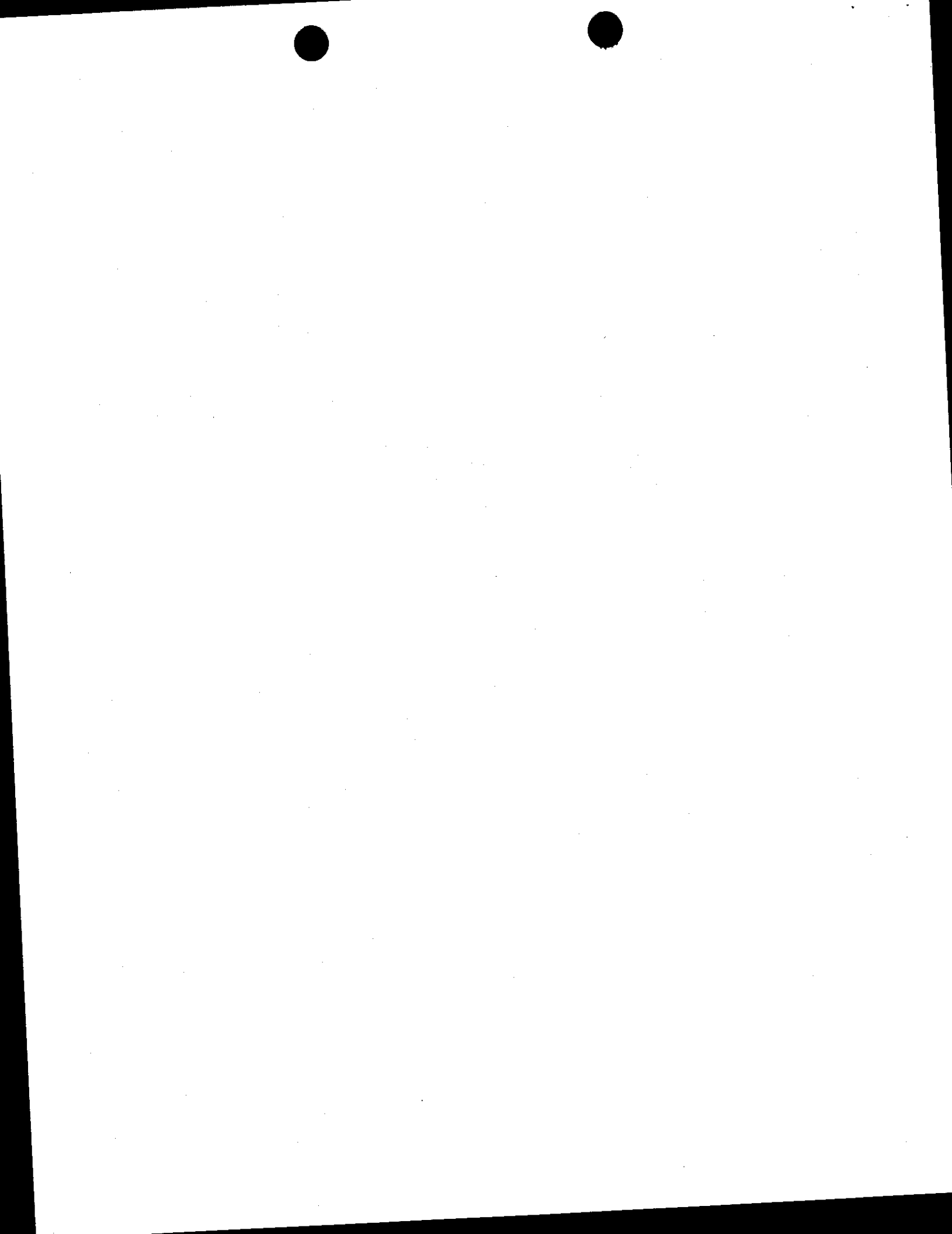
In the Hydrilla Eradication Project, fluridone slow release pellets are applied in pulses (applications) during the growing season so that the cumulative total rate for the year does not exceed the maximum label rate. The Hydrilla Eradication Program considers this series of applications a "treatment." In the two fluridone projects that will be part of this Water Monitoring Plan, the treatments are as shown in the table below.²

	Fluridone-single application rate in ppb	Maximum calculated depth	Maximum number of applications	Fluridone-maximum cumulative application rate per season in ppb
Clear Lake	20	5 feet	7	140
Rother's Pond	50	-	3	150

The fluridone treatments described above give cumulative application rates that are within those allowed by the Sonar[®] SRP label (Appendix III). The maximum label rate for fluridone in lakes and large ponds is 150 ppb throughout the water column (SePRO Corporation 2000). This 150 ppb may be applied in pulses (applications) as long as the yearly sum of the applications is

¹ Small amounts of fluridone liquid suspension (Sonar[®] AS brand) are also used by the program in several small, isolated ponds in Yuba County, which are not a part of this plan.

² It should be noted that these application rates of 20 ppb and 50 ppb are nominal application rates. That is, the total amount of fluridone in the slow release pellets added to the water column, if instantly and evenly dissolved in the water column, would give 20 ppb or 30 ppb. As the formulation is a slow release pellet, the actual water concentrations vary depending upon distance from the pellets and time after application.



not greater than 150 ppb. However, the maximum fluridone rate for any single application, within ¼ mile of a potable water intake, is 20 ppb.

In contrast, copper aquatic herbicide is applied in a single pulse (application) of one part per million (ppm) when large plants or mats of hydrilla are found. It is not applied on a regularly scheduled basis. Copper is only applied in the immediate area around the find (typically five acres in Clear Lake and several tens of square meters in ponds). Typically, copper is not applied more than once per location per year. For this reason, the Hydrilla Eradication Program considers a single application (pulse) of copper a "treatment." The maximum label rate for Komeen® is one ppm (Griffin LLC 2002).

3.1.2 Beneficial Uses of the Hydrilla Eradication Program Waters

"Beneficial Use" of water has been defined by the Central Valley Regional Water Quality Control Board as follows: "State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) '...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves' (Water Code Section 13050(f))" (Central Valley Regional Water Quality Control Board 1998).

3.1.3 Beneficial Use Protective Water Quality Limits

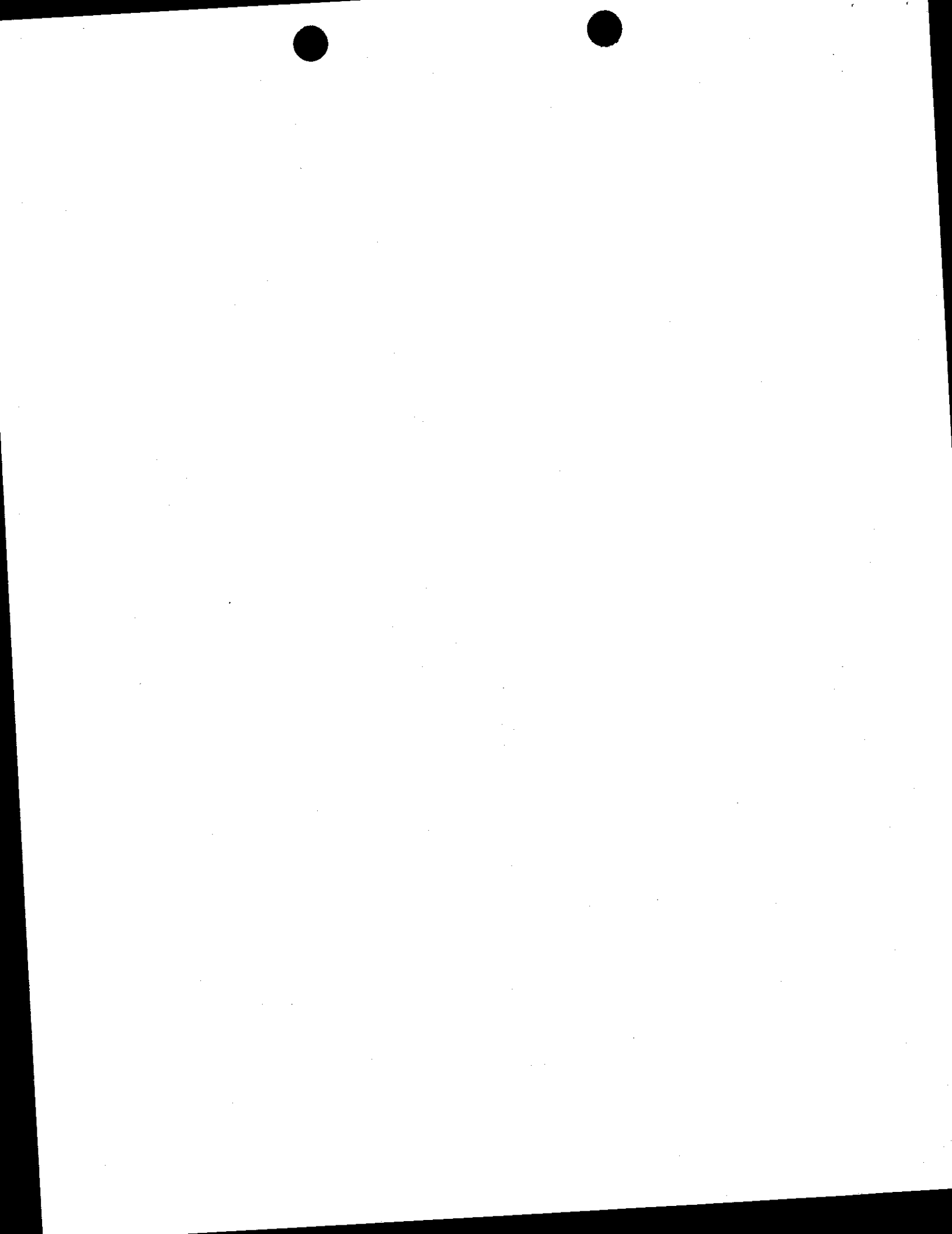
3.1.3.1 Definition of Beneficial Use Protective Water Quality Limit

The Beneficial Use Protective Water Quality Limit is defined as the lowest water concentration of a water constituent that is known to affect any of the beneficial uses described above. Water containing constituent concentrations below the Beneficial Use Protective Water Quality Limit can be used for any beneficial purpose, without restriction. The Beneficial Use Protective Water Quality Limit is defined in *A Compilation of Water Quality Goals* as "The most limiting relevant numerical water quality limit for a constituent or parameter of concern in a specific body of groundwater or surface water at a specific site. This limit is chosen to determine compliance with all applicable water quality objectives for the protection of designated beneficial uses. ... In no case is this limit more stringent than the true background concentration of the constituent of concern" (Marshack, Jon D. 2000).

3.1.3.2 Beneficial Use Protective Water Quality Limit for Fluridone

The USEPA has not established a Maximum Contaminant Level (MCL) for fluridone in potable water (Washington State Department of Health 2000). However, for registration purposes, the Sonar® label establishes the maximum allowable concentration of fluridone in potable water as 150 ppb (SePRO Corporation 2000). The USEPA, Integrated Risk Information System reference dose for fluridone as a drinking water level is 560 ppb (Marshack, Jon D. 2000). In New York State, the drinking water standard for fluridone has been set at 50 ppb, but this is a default level the state uses for organic chemicals not specifically regulated (McLaren/Hart Environmental Engineering Corporation 1995).

According to the Sonar® SRP label, water with fluridone residues below 10 ppb can be used to irrigate all tree crops, established row crops or turf but not to irrigate potatoes, tomatoes, other *Solanaceae* crops or newly seeded grasses. Water with fluridone residues below five ppb can be used to irrigate all crops without restriction (SePRO Corporation 2000). However, these



levels may be very conservative as the Food and Agricultural Organization of the United Nations has not set any Water Quality Control Goal for agricultural use of fluridone treated water (Marshack, Jon D. 2000).

There are no other impacts to "Beneficial Use" of treated water listed on the Sonar® SRP label. There are also no indications of impacts to "Beneficial Use" of treated water in the *SONAR Guide* (SePRO Corporation 2002a, Appendix III). Toxicology test results reported in the *SONAR Guide* indicate that fluridone is of low toxicity to invertebrates, fish, and waterfowl with Lethal Dose to 50 percent of the Test Population (LD₅₀) values far higher than the maximum label use rates (Appendix III).

In a 1997 study by the CDFG using laboratory water, the 96-hour Lethal Concentration to 50 percent of the Test Population (LC₅₀) for fluridone on crayfish was 105.9 ppm. The 96-hour LC₅₀ for snails was 130.8 ppm. These LC₅₀ values are approximately 700 to 860 times higher than the maximum label rate for fluridone (Trumbo 1998, Appendix V).

In addition, there are no water quality goals set for freshwater aquatic life by the USEPA, National Recommended Ambient Water Quality Criteria (Marshack, Jon D. 2000). Also, there are no water quality goals set for freshwater aquatic life by the California Toxics Rule Criteria (Marshack, Jon D. 2000).

Therefore, for the purposes of this water monitoring study, the Beneficial Use Protective Water Quality Limit for fluridone is defined as five ppb based on the most restrictive quality goal, which is for irrigation of *Solanaceae* Family crops and newly seeded grasses.

3.1.3.3 Beneficial Use Protective Water Quality Limit for Copper

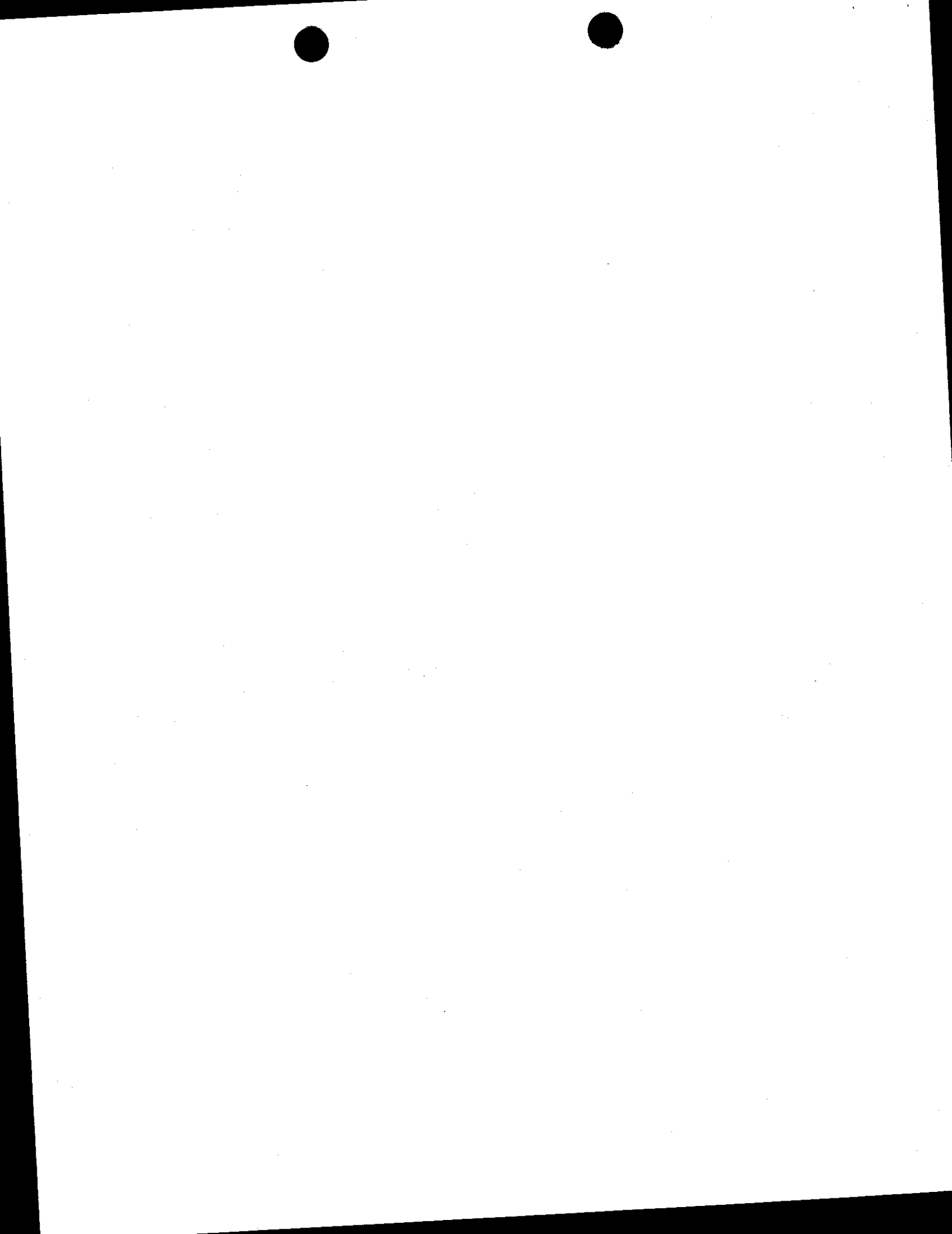
The USEPA has established a Maximum Contaminant Level Goal for copper in drinking water at 1.3 ppm (USEPA Office of Water 2001). This is a target level and not an enforceable level. The California Department of Health Services has established an enforceable "action level" for copper in drinking water of 1.3 ppm (California Department of Health Services 2001). The same Department has also established a Secondary Maximum Contaminant Level for copper in drinking water of one ppm (California Department of Health Services 2000).

There is no restriction on the Komeen® label as to application to water used for drinking or recreation. The label states (Griffin LLC 2002):

- 1) "Komeen® may be applied to slow moving or quiescent bodies of water including: potable water reservoirs and recreation lakes;"
- 2) "Areas treated with Komeen® may be used for fishing, swimming, drinking and watering livestock immediately after treatment."

However, the Komeen® label does declare that water with concentrations of one ppm cuprous ion (Cu⁺⁺) "may be injurious to crops, grass, ornamentals and other foliage" if used as irrigation water. In addition, the Food and Agricultural Organization of the United Nations has established a water quality goal of 200 ppb for water used in agriculture (Marshack, Jon D. 2000).

There are no other impacts to "Beneficial Use" of treated water listed on the Komeen® label. In fact the Komeen® label states that the product can be used to directly treat "Golf Course, Ornamental, Fish, and Fire Ponds; Fresh Water Lakes, Fish Hatcheries" (Griffin LLC 2002).



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This implies that water treated at the maximum label rate of one ppm is non-toxic to fish and aquatic life.

In 1996 and 1997, the CDFG monitored the effects of the CDFA's copper ethylenediamine herbicide treatments at Clear Lake on fish and aquatic invertebrates (Trumbo 1997, Appendix V). The study author concluded that water samples collected from treated sites four to six hours posttreatment produced significant mortality of cladocerans in 96-hour acute toxicity tests, but that this toxicity dissipated within four days after treatment (eight days in 1997). Monitoring studies in treated areas did not reveal a detrimental impact on resident fish populations, nor provide strong evidence of impacts to benthic or littoral invertebrate populations, but impacts to zooplankton were indicated. In 1997, toxicity tests using Clear Lake water on crayfish gave a 96-hour LC_{50} for copper of 32 ppm (approximately 600 times higher than the four to six hour mean copper concentration found after treatment). Toxicity tests on snails gave 96-hour LC_{50} of 0.64 ppm (approximately the same as the four to six-hour mean copper concentration found after treatment), indicating a possible transient effect on snails. In both years, water from treated sites produced variable mortality to fathead minnows.

In addition, the California Toxics Rule and USEPA, National Recommended Water Quality Criteria have established water quality goals for copper to protect freshwater aquatic life. These goals vary depending upon water hardness, but generally vary from 10 ppb to 50 ppb copper (Marshack, Jon D. 2000, Appendix IV).

The hardness of the water in Clear Lake in 1996 was 100 milligrams to 150 milligrams calcium carbonate per liter when measured by the CDFG as a part of the copper dissipation study described above. Water hardness at the Lakeport City Pier from 1956 to 1966 ranged from 82 milligrams to 158 milligrams calcium carbonate per liter, with lowest value occurring in the winter (Lallatin, Richard D. and William W. Wood 1966). In the 2002 CDFA Water Monitoring Program, water hardness in Clear Lake ranged from 132 milligrams to 195 milligrams calcium carbonate per liter (CDFA, unpublished results).

In Bear Creek, in the 2002 CDFA Water Monitoring Program, the water hardness in the Hesseltine ponded area ranged from 175 milligrams to 550 milligrams calcium carbonate per liter (CDFA, unpublished results).

At these water hardness levels, the water quality goals to protect freshwater aquatic life would be approximately 20 ppb.

Therefore, for the purposes of this water monitoring study, the Beneficial Use Protective Water Quality Limit for copper is defined as 20 ppb (depending on water hardness). This is based on the most restrictive water quality goal, which is for freshwater aquatic life.

3.1.4 Proposed Monitoring Studies by Site Type and Herbicide

The different site types treated by the Hydrilla Eradication Program fall into three categories:

- 1) Small ponds that drain into "waters of the United States": the Redding infestations, Bear Creek ponds, and Costa ponds.
- 2) Lakes and large ponds that drain into "waters of the United States": Clear Lake.
- 3) Ponds, canals, and streams that do not drain into "waters of the United States."

The Hydrilla Eradication Program has chosen one project from each of the first two categories to represent that category in the proposed monitoring studies.

Copper and fluridone are both used in Clear Lake. In addition, fluridone is used in the Redding ponds, the Bear Creek ponds, and the Costa ponds. Copper is used in Clear Lake and the Bear Creek ponds.

Four monitoring studies are planned at three projects, which represent the combination of site type and herbicide, as follows:

- 1) Fluridone slow release pellet in ponds, to be done at the Redding Golf Course 30-acre (Rother's) pond
- 2) Fluridone slow release pellet in lakes, to be done at Clear Lake
- 3) Copper ethylenediamine in lakes, to be done at Clear Lake
- 4) Copper ethylenediamine in ponds, to be done at Bear Creek (Hesseltine ponded area)

As part of its standard practice, the CDFA will monitor copper and fluridone applications to water bodies that do not drain into "waters of the United States." However, this monitoring is independent of the Water Monitoring Plan described in this document.

3.1.5 Expected Results (Hypotheses)

Dissipation of both fluridone slow release pellets and copper ethylenediamine in water has been studied extensively by the respective product registrants as well as by various University, Federal, and State laboratories. In particular, the CDFA has conducted or commissioned monitoring studies for both fluridone and copper.

3.1.5.1 Expected Results for Fluridone

Many dissipation studies done on fluridone are summarized in the *SONAR Guide* (SePRO Corporation 2002). In this guide it states, "Under field conditions, Sonar[®] gradually disappears from treated water. The half-life of fluridone ranges from five days to 60 days with an average 20 days depending on a number of environmental factors. In lakes, reservoirs, canals and rivers, where only a portion of the body of water is treated, dilution rapidly decreases Sonar[®] concentrations. Sonar[®] disappears from the aquatic environment by: photodegradation, plant metabolism, fish metabolism, and hydrosoil adsorption/desorption." The guide continues on to state that the primary process of fluridone dissipation in water is photodegradation.

In the Generic Environmental Impact Statement for fluridone for New York State in which various studies are reviewed, the authors also conclude that the primary process of fluridone dissipation in water is photodegradation (McLaren/Hart Environmental Engineering Corporation

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1995). The authors state those factors that effect sunlight penetration into the water column should also affect the degradation rate of fluridone. These include "geographic location, date of application, water depth, turbidity, weather, and weed cover (West et al., 1983)."

In 1998, the CDFA monitored fluridone concentrations in water in the Clear Lake project (CDFA, unpublished results). SePRO Corporation conducted a chemical analysis using an enzyme linked immuno sorbent assay (ELISA) method (see Section 4 of this document for a description of the method). Fluridone slow release pellets were applied at weekly intervals and water samples were taken preapplication and zero, one, two, and four days after application from two management units (59 and 17). Of the 160 total samples, the fluridone concentration in most samples was either less than one ppb or below the level of detection. Only one sample tested above the Beneficial Use Protective Water Quality Limit (five ppb) and that was in unit 59 one day after the seventh application.

In 2001, the CDFA again monitored fluridone concentrations in water in the Clear Lake project (CDFA, unpublished results) using the ELISA method. Water samples were taken on June 25 and on August 21 and 22. In general, there had been six applications before the second sampling date. Fluridone concentrations were below the Beneficial Use Protective Water Quality Limit (five ppb) in all samples.

Also in 2001, the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), Exotic and Invasive Weed Laboratory at University of California, Davis, monitored the concentrations of fluridone in pore water and bottom water (within five centimeters of the bottom) in Clear Lake after fluridone applications by the Hydrilla Eradication Program (Anderson, Lars W.J. and Chris Piroso 2001). In the bottom water, the fluridone concentrations were varied from 3.8 to 177 ppb. It was concluded that this variability was due to the patchy nature of pellet distribution. However, these results only relate to the bottom water immediately adjacent to Sonar[®] SRP pellets, and are not characteristic of the water column as a whole.

In the 2002 CDFA Water Monitoring Program, fluridone concentrations were measured in two projects, the Redding six-acre pond and Clear Lake (CDFA, unpublished results). Water samples were analyzed for fluridone by the CDFA Center for Analytical Chemistry using the ELISA method described above (approximately 10 percent of the samples were also analyzed by the Center using a GC-MS confirmation method).

In the Redding six-acre pond in 2002, the cumulative application rate was 90 ppb (three applications of 30 ppb). Sampling stations were located upstream of the treated ponds- sampling water coming into the ponds from the Sacramento River, between the six-acre pond and the next small pond, and at the outlet of the pond-system (water flowing back into the Sacramento River). Sampling times ranged from one hour before each application to 60 days after the final application. All samples from the first sampling station (river water) were non-detects for fluridone at all sampling times. The fluridone concentration in all samples from the two downstream stations was below the Beneficial Use Protective Water Quality Limit (five ppb).

In the Clear Lake project in 2002, the cumulative application rate in the management unit studied was 140 ppb (seven applications of 20 ppb.) Sampling stations were at the center of the treated unit, 30 meters from the side of the unit toward the middle of the lake, and 100 meters from the unit toward the middle of the lake. Sampling times ranged from one day before each application to 30 days after the final application. Water sampling depths were

30 cm below the lake surface and at 30 cm above the lake bottom. The fluridone concentration in all samples was below the Beneficial Use Protective Water Quality Limit (five ppb).

Also in the Clear Lake project in 2002, the fluridone concentration in the water was measured at the main inlet (Rodman's Slough) and outlet (Cache Creek) of the lake. Samples were taken monthly from April through October. The fluridone concentration in all samples was either non-detected or below the Beneficial Use Protective Water Quality Limit (five ppb).

In addition, it has been shown that the slow release pellet formulation of fluridone gives a maximum release in the surrounding water (flow model) about seven days after application (SePRO Corporation 2002b, Appendix III). In this model, fluridone concentrations reach approximately four ppb seven days after application and persist at this level for some time before slowly declining.

Based on the above results, it is hypothesized that in the Clear Lake project and the Redding Golf Course Pond project, the concentration of fluridone in water in and adjacent to treated plots and downstream will be lower than the Beneficial Use Protective Water Quality Limit (five ppb) by four days after treatment.

3.1.5.2 Expected Results for Copper

In 1996 and 1997, the CDFG studied copper ethylenediamine herbicide dissipation in Clear Lake as a part of the toxicity study described above (Trumbo 1997 and 1998). In 1996, the conclusion was copper concentrations were generally below 10 ppb by one day posttreatment and two ppb within four days. In 1997, copper concentrations had declined to approximately five ppb by eight days (the first sampling time) after application.

In the 2002 CDFA Water Monitoring Program, copper concentrations were measured in two projects, Bear Creek and Clear Lake (CDFA, unpublished results). All samples were analyzed by the CDFA Center for Analytical Chemistry using the neocuproine method (Clesceri, Greenberg, and Trussell 1989).

In the Bear Creek project in 2002, the copper application rate was one ppm in a small, infested area near the center, near the shore, of the Hesseltine ponded area. Sampling stations were located upstream, in the pond center, and downstream. Sampling times ranged from three hours before application to 14 days after application. The copper concentration in all samples was either non-detected or below the Beneficial Use Protective Water Quality Limit (20 ppb).

In the Clear Lake project in 2002, copper dissipation was monitored around one application site at a one-ppm application rate. Sampling stations were located in the center of the treated area, 10 meters from the side of the treated area toward the center of the lake, and 400 meters from the treated area toward the center of the lake. Sampling times ranged from one hour before application to 14 days after the application. Sampling depths were 30 cm below the lake surface and 30 cm above the lake bottom. The copper concentration in all but one sample was below the Beneficial Use Protective Water Quality Limit (20 ppb). In the one sample, taken two hours after application, 10 meters toward the center of the lake, 30 cm above the bottom the copper concentration was 132 ppb.

Based on the above results, it is hypothesized that in the Clear Lake project and the Bear Creek ponds, the concentration of copper in water in and adjacent to treated plots and downstream will



be lower than the Beneficial Use Protective Water Quality Limit (20 ppb) by 24 hours after treatment.

3.2 Thermoclines and Summer Stratification

Most lakes have the possibility of summer stratification with the development of a thermocline (Lundquist, John B. 1975). The development of thermoclines and summer stratification can reasonably be expected to effect the distribution on applied aquatic herbicides in the water column, resulting in compartmentalization of the herbicides. In particular, after application of fluridone slow release pellets, fluridone would be expected to concentrate in the lower, denser water strata, but not in the upper, lighter water. It is also possible that the distribution of copper aquatic herbicide could also be effected.

The only study location where the water is deep enough, and the water body large enough, to develop a thermocline is Clear Lake.

However, in 2002, the water temperature at Clear Lake was measured in 30 cm increments from the lake surface to the bottom in the monitored management unit. No evidence of a thermocline developed (CDFA, unpublished results). This is reasonable considering the relatively shallow depths of the lake, and the frequent winds.

Nonetheless, in 2003, at Clear Lake water temperatures will be monitored for the development of thermocline and summer stratification. Water temperatures will be taken at 30 cm intervals from the water surface to the bottom. The temperatures will be graphed versus depth, and the depth of rapid temperature decline will be identified as the thermocline. These water temperature readings will start within one week before the first herbicide application, and will be repeated monthly until August 1 after which they will be repeated every two weeks until sampling ceases.

3.3 Monitoring Plans

Pursuant to the general guidelines provided by the Central Valley Regional Water Quality Control Board General Permit, we offer the following Monitoring Program.

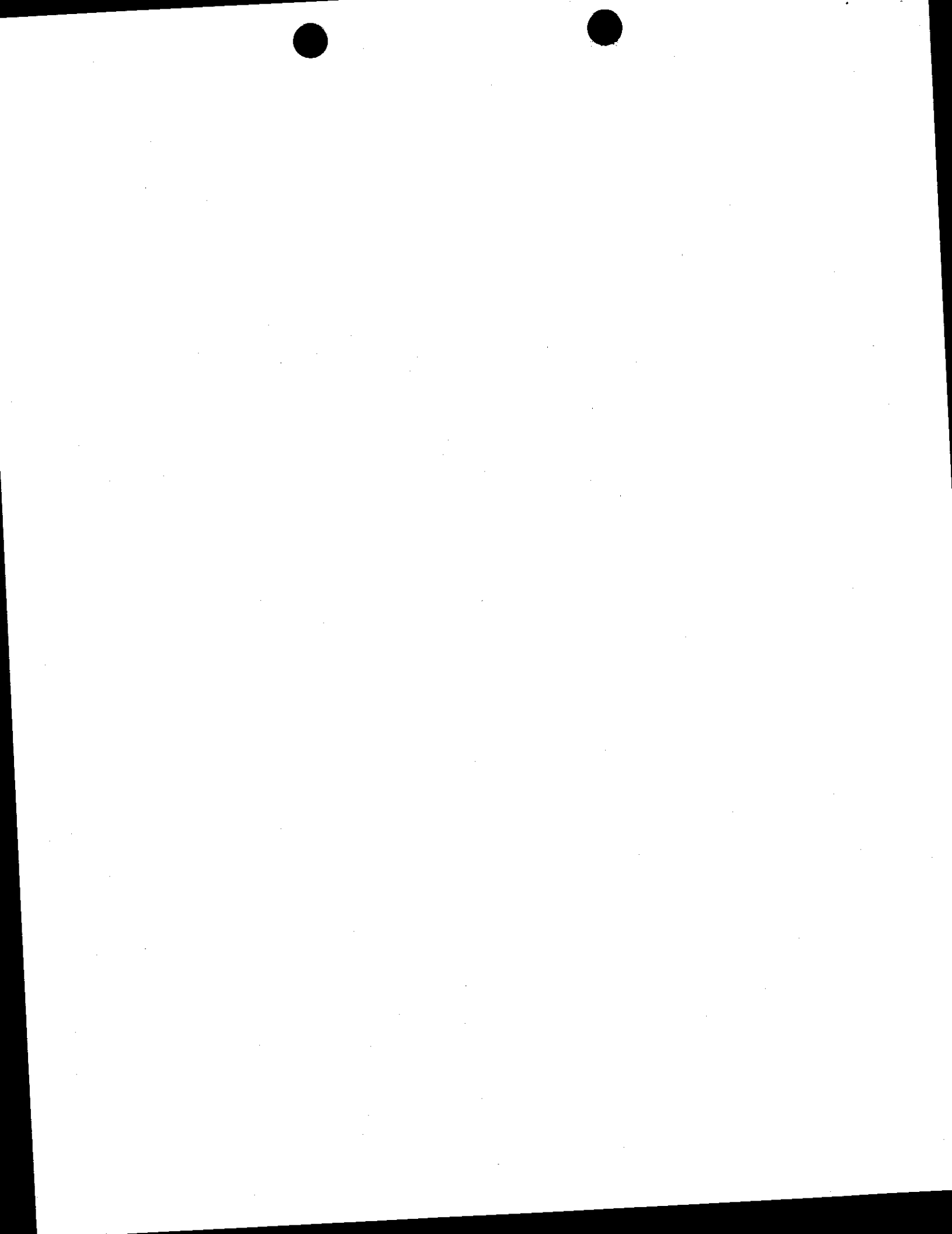
3.3.1 Fluridone in Ponds: Redding

The 30-acre pond (Rother's pond) will be treated with fluridone slow release pellets (three applications of 50 ppb) and monitored.³

The sampling locations are:

- 1) In a small canal leading from the Sacramento River to Rother's pond (inflow gate), about three meters from the river;
- 2) In the outlet stream between the 30-acre pond (Rother's pond) and the six-acre pond,
- 3) In the outlet stream past the second small pond, before the water re-enters the Sacramento River.

³ The six-acre pond and two small ponds will also be treated to a cumulative rate of 90 ppb.



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The sampling timeline is:

- 1) Preseason: before applications begin (early May)
- 2) Preapplication: one to four hours before application # 1
- 3) Postapplication: four days after application # 1
- 4) Postapplication: seven days after application # 1
- 5) Preapplication: one to four hours before application # 2
- 6) Postapplication: four days after application # 2
- 7) Postapplication: seven days after application # 2
- 8) Preapplication: one to four hours before application # 3
- 9) Postapplication: four days after application # 3
- 10) Postapplication: seven days after application # 3
- 11) Posttreatment: 14 days after last treatment to large pond
- 12) Posttreatment: 30 days after last treatment to large pond
- 13) Posttreatment: 60 days after last treatment to large pond
- 14) Posttreatment: 90 days after last treatment to large pond
- 15) Posttreatment: 120 days after last treatment to large pond

The sampling depth is:

For sample stations number 1 and 3, samples should be taken from the middle of the water column in the inflow gate and in the outlet stream. For sample station number 2, samples should be taken from 30 cm below the water surface, near the side.

Sampling rule: For the posttreatment samples, sample retrieval and sample analysis will cease when samples from all locations test below the Beneficial Use Protective Water Quality Limit for two timings in a row.

3.3.2 Fluridone in Lakes: Clear Lake

There are 80 management units in the Hydrilla Eradication Program in Clear Lake, as previously described. For this reason, this monitoring program will be divided into two parts. The first is "spot" treatment sampling in which the treatment applied to one management unit will be monitored. This management unit will represent the other units. The second part is "system-wide" sampling in which the fluridone concentrations in water upstream and downstream from the lake are monitored. This will represent the cumulative effect of all the treatments in the lake.

3.3.2.1 Spot Treatment Sampling

Management unit number (to be decided) will be treated with 140 ppb fluridone slow release pellet (seven applications of 20 ppb). This management unit was selected because it is representative, and will be treated with the maximum rate used by the Program.

The sampling locations are:

- 1) The center of the treatment area;
- 2) 10 meters from the unit toward the center of the lake;
- 3) 30 meters from the unit toward the center of the lake.

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The sampling timeline is:

- 1) Preseason sample (early May)
- 2) Preapplication sample one to twenty-four hours before application # 1
- 3) Postapplication sample four days after application # 1
- 4) Preapplication sample one to twenty-four hours before application # 2
- 5) Postapplication sample four days after application # 2
- 6) Preapplication sample one to twenty-four hours before application # 3
- 7) Postapplication sample four days after application # 3
- 8) Preapplication sample one to twenty-four hours before application # 4
- 9) Postapplication sample four days after application # 4
- 10) Preapplication sample one to twenty-four hours before application # 5
- 11) Postapplication sample four days after application # 5
- 12) Preapplication sample one to twenty-four hours before application # 6
- 13) Postapplication sample four days after application # 6
- 14) Posttreatment sample 14 days after application # 7
- 15) Posttreatment sample 21 days after application # 7
- 16) Posttreatment sample 30 days after application # 7
- 17) Posttreatment sample 60 days after application # 7
- 18) Posttreatment sample 90 days after application # 7
- 19) Posttreatment sample 120 days after application # 7

The sampling depths are:

Samples should be taken approximately 30 cm above the lake bottom. Water temperature readings should be monitored in order to determine if there is stratification in the lake. If a thermocline develops, subsequent water samples will be taken from both 30 cm below the lake surface and 30 cm above the lake bottom.

Sampling rule: For the posttreatment samples, sample retrieval and sample analysis will cease when samples from all locations test below the Beneficial Use Protective Water Quality Limit for two timings in a row.

3.3.2.2 System-wide Sampling

The sample locations are:

- 1) Rodman Slough (upstream from the irrigation pumps);
- 2) Cache Creek (downstream past the Highway 53 overpass).

The sample timeline is:

Samples should be taken at monthly intervals throughout the year starting before the first fluridone treatment (mid-April) until 60 days after the last fluridone application (mid-October).

The sampling depths are:

Samples should be taken near the middle of the water column, as fluridone should be well mixed in the water column by the time it reaches Lower Lake.

Sampling rule: For the posttreatment samples, sample retrieval and sample analysis will cease when samples from all locations test below the Beneficial Use Protective Water Quality Limit for two timings in a row.

3.3.3 Copper in Lakes: Clear Lake

For the reason that copper treatments in Clear Lake are not regularly scheduled as a part of the Hydrilla Eradication Program, but rather in response to "hydrilla finds," only a limited amount of copper aquatic herbicide is actually used; therefore, only "spot" treatment sampling is needed.

This monitoring will not be done if no hydrilla plants are detected in Clear Lake in 2003, and no copper aquatic herbicide is used by the CDFA Hydrilla Eradication Project at this location.

The samples may be taken at any convenient period through the treatment season, as a copper treatment is a single application.

The sample locations are:

- 1) At the center of the treatment area;
- 2) 10 meters from the treatment area towards the center of the lake;
- 3) 30 meters from the treatment area towards the center of the lake;

The sample timeline is (one sample from each location):

- 1) Preseason sample: early May (or when hydrilla is first detected)
- 2) Pretreatment: between one and four hours before treatment
- 3) Posttreatment: two hours after treatment
- 4) Posttreatment: one day after treatment
- 5) Posttreatment: four days after treatment
- 6) Posttreatment: seven days after treatment
- 7) Posttreatment: 14 days after treatment

The sampling depths are:

Samples should be taken approximately 60 cm below the water surface and 30 cm above the bottom.

Sampling rule: For the posttreatment samples, sample retrieval and sample analysis will cease when samples from all locations test below the Beneficial Use Protective Water Quality Limit for two timings in a row.

3.3.4 Copper in Ponds: Hesseltine Pond (Bear Creek)

For the reason that copper treatments in Hesseltine pond (and similar ponds) are not regularly scheduled as a part of the Hydrilla Eradication Program, but rather in response to "hydrilla finds," only a limited amount of copper aquatic herbicide is actually used; therefore, only "spot" treatment sampling is needed.

This monitoring will not be done if no hydrilla plants are detected in Bear Creek in 2003, and no copper aquatic herbicide is used by the CDFA Hydrilla Eradication Project at this location.



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The samples may be taken at any convenient period through the treatment season, as a Komeen® treatment is a single application.

The sample locations are:

- 1) In Bear Creek, upstream of Hesseltine pond;
- 2) The center of the treatment area;
- 3) In Bear Creek, downstream of Hesseltine pond.

The sample timeline is (one sample from each location):

- 1) Preseason sample: early May
- 2) Pretreatment: between one and four hours before treatment
- 3) Posttreatment: two hours after treatment
- 4) Posttreatment: one day after treatment
- 5) Posttreatment: four days after treatment
- 6) Posttreatment: seven days after treatment
- 7) Posttreatment: 14 days after treatment

The sampling depths are:

All samples should be taken near the middle of the water column.

Sampling rule: For the posttreatment samples, sample retrieval and sample analysis will cease when samples from all locations test below the Beneficial Use Protective Water Quality Limit for two timings in a row.

3.3.5 Other Water Quality Parameters

This monitoring plan is designed to demonstrate that water treated with aquatic herbicides as a part of the CDFA, Hydrilla Eradication Program are returned to full "Beneficial Use." Therefore, the primary target of the monitoring program is to follow the dissipation of the aquatic herbicides themselves. However, certain other water quality parameters will also be measured at each sampling time in order to demonstrate the general water quality. These are:

- 1) pH
- 2) Dissolved Oxygen
- 3) Hardness (required for copper samples only)
- 4) Temperature (also need to for the thermocline determinations described above)

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United States Environmental Protection Agency Office of Water 2001. National Primary Drinking Water Regulations. Consumer Factsheet on: COPPER. Drinking Water and Health: Contaminant Specific Fact Sheets for Consumers. U.S. Environmental Protection Agency, Washington, D.C. www.epa.gov/safewater/dwh/c-ioc/copper.html

Washington State Department of Health 2000. Fluridone (Sonar) Fact Sheet. Environmental Health Programs, Office of Environmental Health and Safety, Olympia, Washington 98504-7825, <http://www.doh.wa.gov/ehp/ts/fs.htm>

West, S.D., R.O. Burger, G.M. Poole, and D.H. Mowrey. 1983. Bioconcentration and field dissipation of the aquatic herbicide fluridone and its degradation products in aquatic environments. J. Agric. Food Chem. 31:579-585

SECTION 4A. QUALITY ASSURANCE PLAN (2003)

4.1 Introduction

The objectives of the Quality Assurance Plan are to assure that:

- The sample retrieval, analysis, and data summarization and reporting are done with the best available methods and techniques;
- There is third party assurance that the Monitoring Plan and Quality Assurance Plan are conducted as described in this document; and
- Any deviations from the plan are documented and explained.

It is the objective of this plan to meet the spirit of Good Laboratory Practice (GLP), but it is not the objective of this plan that the CDFA, Hydrilla Eradication Program, Water Monitoring Plan be carried out strictly according to GLP.

4.2 Quality Assurance Plan

4.2.1 Principal Investigator

The Principal Investigator for this study is J Robert Leavitt, Ph.D., Senior Environmental Research Scientist (Supervisor), the California Department of Food and Agriculture, Plant Health and Pest Prevention Services Division, Integrated Pest Control Branch, 1220 "N" Street, Room A-357, Sacramento, CA 95814; phone: (916) 654-0768. Email rleavitt@cdfa.ca.gov.

4.2.2 Methods of Herbicide Analyses in Water Matrix, Analytical Tolerances, and Quality Assurance

All fluridone water samples will be analyzed by the CDFA Center for Analytical Chemistry, Pesticide Monitoring and Compliance Laboratories Program (the Center), as described below. All copper samples will be analyzed by the Center and a subset will be analyzed by the California Department of Fish and Game, Fish and Wildlife Water Pollution Control Laboratory (the Fish and Game Laboratory), as described below.

The Center is accredited by ISO 17025. The Fish and Game Laboratory is accredited by the California Department of Health Services Environmental Laboratory Accreditation Program (Certificate No. 1622).

4.2.2.1 Laboratory Contact Information

Laboratory	Primary Contact Person	Phone	Email	Secondary Contact Person
The Center	Elaine Wong	(916) 262-2062	ewong@cdfa.ca.gov	Carolinda Benson
The Fish and Game Laboratory	Dave Crane	(916) 358-2859	dcrane@ospr.dfg.ca.gov	Martice Vasquez



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The address of the Center is 3292 Meadowview Road, Sacramento, CA 95832.

The address of the Fish and Game Laboratory is 2005 Nibmus Road, Rancho Cordova, CA 95670.

4.2.2.2 Fluridone Analysis Methods

All fluridone samples will be analyzed quantitatively for fluridone using an enzyme linked immuno sorbent assay (ELISA) developed by the SePRO Corporation (Netherland, Honnell, et al. 2002, SePRO Corporation 2002a, SePRO Corporation 2002b, SePRO Corporation 2003, Appendix VI) and purchased by the Center. As a confirmation of the ELISA method, approximately 12 percent of the samples will be collected in quadruplicate and the second duplicate pair will be also analyzed quantitatively for fluridone and for structure confirmation using a gas chromatography/mass spectrometry (GC/MS) method (modified USEPA method 525.2, USEPA 1995).¹

Fluridone Method	Laboratory	Percent of samples to be analyzed	Reporting Level	Target Percent Recovery	Minimum Detection Level
ELISA	the Center	100%	5 ppb	90%-110%	0.1 ppb
GC/MS	the Center	12%	7 ppb	90%-110%	5 ppb

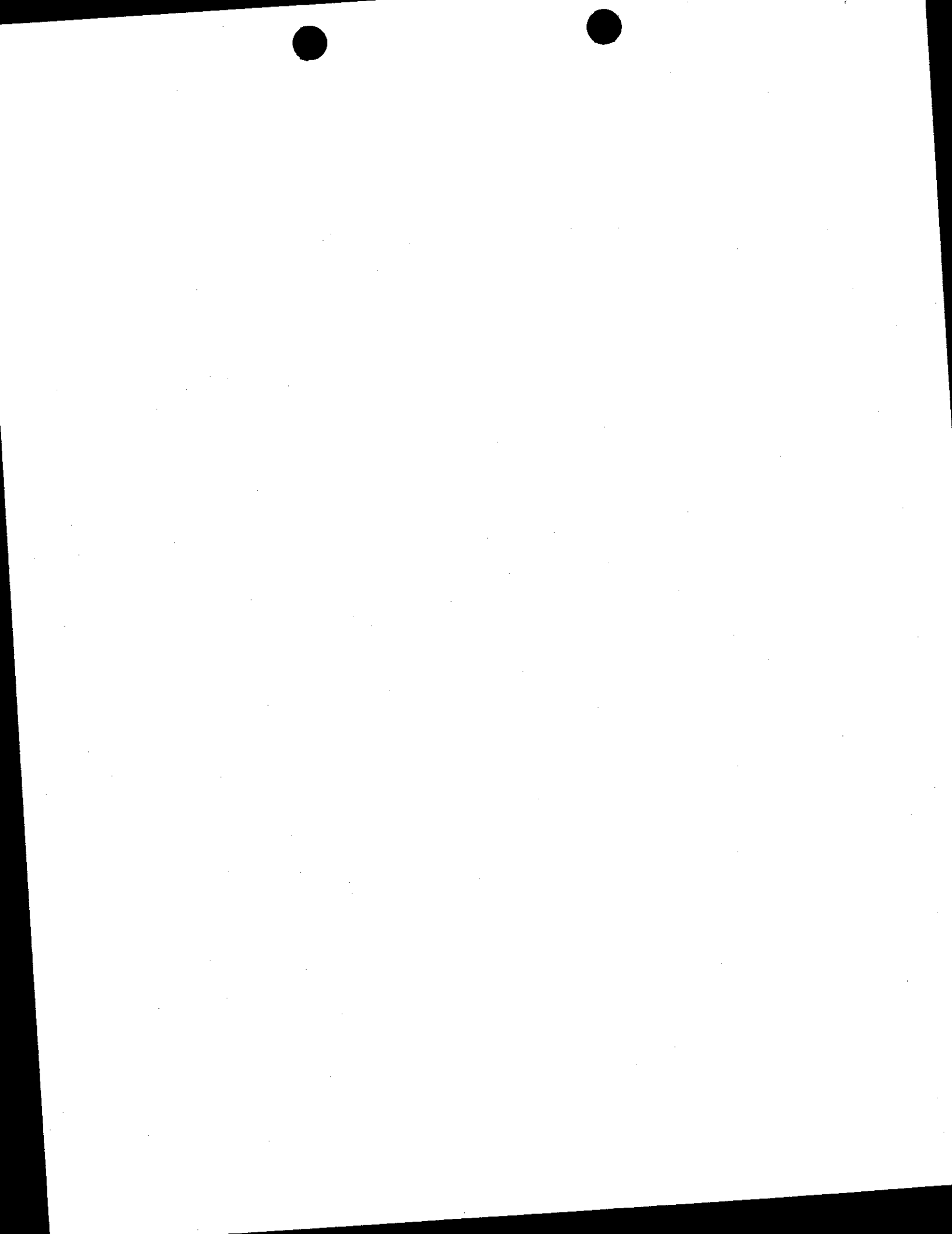
The quantitative results will be reported as ppb fluridone (+/- 1% for ELISA method; +/- 20% for GC/MS method).

4.2.2.3 Copper Analysis Methods

All copper samples will be analyzed quantitatively for total copper using a neocuproine method (Standard Method 3500-Cu D, Clescer, Greenberg, and Trussell 1989, Appendix VIIa). As a confirmation of the neocuproine method, approximately 12 percent of the samples will be collected in quadruplicate and the second duplicate pair will also be analyzed quantitatively for total copper using an atomic absorption, furnace technique method (Method CuGFAA.H20, Crane, Mekebri, and Nguyen 2002, Appendix VIIb).

Copper Method	Laboratory	Percent of samples to be analyzed	Reporting Level	Target Percent Recovery	Minimum Detection Level
Neocuproine	the Center	100%	20 ppb	90%-110%	10 ppb
Atomic absorption	the Fish and Game Lab	12%	20 ppb	90%-110%	1 ppb

¹ The modification will be the substitution of a liquid:liquid extraction step for the liquid:solid extraction step described in method 525.2. (The method was developed for analyzing drinking water, a relatively pure matrix. It is expected that the raw water samples obtained from this study will contain particulate matter that will clog the solid phase extraction disk used in the liquid:solid step. In addition, for the reason that these samples are for confirmation purposes only, the use of deuterated internal standards and surrogates is unnecessary.)



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The quantitative results will be reported as ppb total copper (+/- 20% for Neocuproine method).

4.2.2.4 Laboratory Quality Assurance

The Center's Quality Assurance Officer(s) will conduct internal audits of the laboratory procedures, data summarization, and of the final report, according to the laboratory's Standard Operating Procedures.

The Fish and Game Laboratory's Quality Assurance Officer(s) will conduct internal audits of the laboratory procedures, data summarization, and of the final report, according to the laboratory's Standard Operating Procedures.

4.2.3 Methods for Retrieving Water Samples for Aquatic Herbicide Analyses, Quality Specifications, and Quality Assurance

Samples will be retrieved, stored, recorded, and shipped to the appropriate laboratory using the following methods and precautions. Any deviation from these methods and precautions must be recorded and explained.

4.2.3.1 Field Contact Information

	Primary Contact Person	Phone	Email	Secondary Contact Person
CDFA-Headquarters	Robert Leavitt	(916) 654-0768	rleavitt@cdfa.ca.gov	Frank Zarate
CDFA-Redding	Carri Pirosko	(530) 545-9119	cpirosko@cdfa.ca.gov	Ed Finley
CDFA-Clear Lake	Frank Zarate	(707) 263-1649	fzarate@cdfa.ca.gov	Bob Hesterberg
CDFA-Bear Creek	Florence Maly	(559) 445-5031	fmaly@cdfa.ca.gov	Frank Zarate

The physical address of the CDFA Sacramento headquarters is: 1215 "O" Street, Room A-357, Sacramento, CA 95814. The mailing address is 1220 "N" Street, Room A-357, Sacramento, CA 95814.

4.2.3.2 Sample Size / Bottle / Prewash / Post Treatment

Sample type	Analysis method	Minimum Sample Size	Container type	Prewash	Post Treatment
Fluridone	ELISA	250 ml	Amber HDPE ²	Rinse three times with sample ³	None
Fluridone	GC/MS	1000 ml	Amber Glass	None ⁴	None
Copper	Neocuproine	250 ml	HDPE	None	None
Copper	Atomic Absorption	250 ml	HDPE	None ⁵	None ⁶

4.2.3.3 Sample Numbering

- Each sample container will be numbered using a two-letter code (initials) of the person in charge of collecting the sample, a one-letter code for the type of sample (F=fluridone, C=copper), a consecutive three-digit number, and a single letter for the aliquot (duplicate through quadruplicate).
- Use a separate number for top and bottom water samples.
- For example, the first fluridone water sample from Robin Breckenridge would be numbered RBF001A, the duplicate RBF001B.
- For example, the first copper water sample from Florence Maly would be numbered FMC001A, the duplicate FMC001B.

4.2.3.4 Method for the 12 Percent Subsets

All samples will have at least duplicates. For the sampling events for which samples will be used for more than one analytical method (subsets), the samples will be taken in quadruplicates.

The sampling events for which quadruplicates are needed (subsets), will be chosen systematically after a random start. Starting with the preseason samples, randomly choose a

² High Density Polyethylene (like Nalgene brand).

³ If not possible because of turbidity or other concerns, rinse with distilled water (ASTM Type II).

⁴ If bottles are pre-cleaned and EPA Certified. If not, prerinse twice with acetone followed by three rinses with distilled water. (Acetone will be provided by the Center. Return used acetone in glass bottles to The Center for disposal.) If acetone is not available, prerinse three times with sample.

⁵ If bottles are pre-cleaned and EPA Certified. If not, prerinse with acidified distilled water (ASTM Type II).

⁶ No post treatment if samples are delivered to the Fish and Game Laboratory within 3 days of collection. If this is not possible, the sample should be acidified to pH < 2 with nitric acid. (Nitric acid ampoules – 1 ml – can be ordered from Eagle Picher, catalogue number ACN-1QSP, part number PN03241.) LABEL BOTTLES : ACIDIFIED YES OR NO



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number between one and eight and take the first subset with that sampling event. Take a quadruplicate (subset) sample every 8 samples after that.

4.2.3.5 Field Sample Technique and Equipment

See: Standard Field Sampling Procedures, Section 4A.

4.2.3.6 Quality Specifications for Water Samples

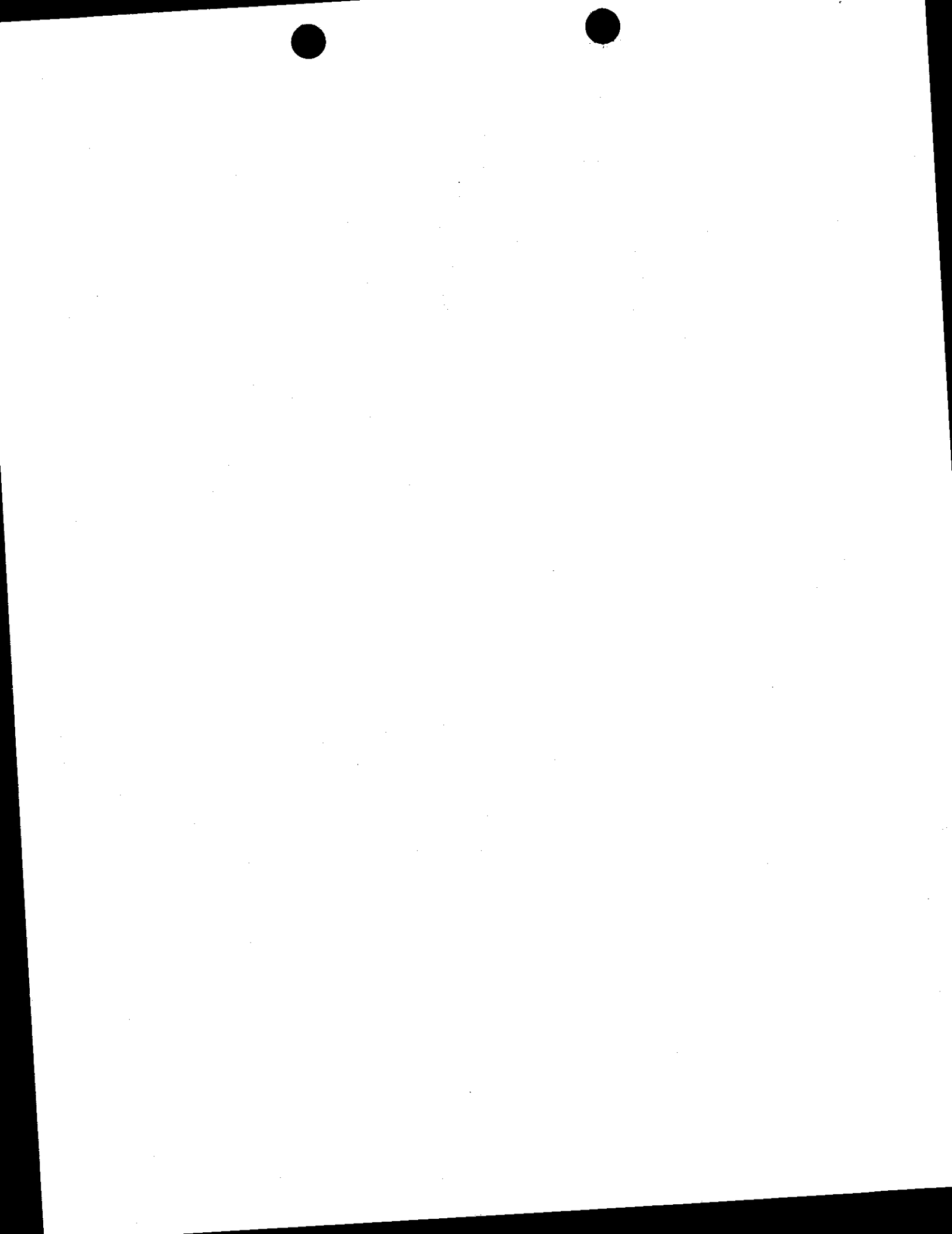
Water samples for determination of aquatic herbicide residues will be retrieved according to the Water Monitoring Plan (Section 3 of this document). All data will be determined as accurately as possible using the instruments described below. Data readings within the tolerances established below will be considered acceptable. Deviations from these tolerances must be recorded and explained.

Parameter	Tolerance	Method
Location	+/- five meters	GPS
Depth	+/- one meter	Measuring poles
Time in hours	+/- 1 hour	Clock
Time in days	+/- 1 day	-

All locations, depths, and timings will be recorded on appropriate forms (see below). Any deviations will be recorded and explained.

4.2.3.7 Submitting Samples to the Laboratories

- *Samples for the Center:* Samples will be submitted to the Delivery window at the Center within seven working days of taking sample. The Delivery window is open Monday through Friday from 8:00 am to 4:00 pm. Shipments should be addressed to: Worker Safety and Product Compliance Section, Attention: Elaine Wong. Samples can be delivered in person or by overnight express.
- *Samples for the Fish and Game Laboratory:* Samples will be submitted to the sample log-in area at the Fish and Game Laboratory within seven working days of taking sample. The sample log-in area is open Monday through Friday from 8:00 am to 5:00 pm. Shipments should be addressed to: Fish and Wildlife Water Pollution Control Laboratory, Attention: Martice Vasquez. Samples can be delivered in person or by overnight express.
- Samples must be delivered cold (by packing in a cooler with ice packs between each bottle or some other method).
- Samples must be accompanied by the original (white copy) of the "Water Sampling Data Sheet for the Hydrilla Eradication Program" form and the original filled out



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(white copy) of the "Chain of Custody" (COC) form, being sure to note the sample numbers that are submitted in the shipment. Both forms must be signed or initialed, as appropriate. If the samples are shipped to the lab, the pick-up person will sign the COC before receiving the shipment. If the samples are delivered to the lab, the delivering person will have receiving person sign the COC form before turning over the shipment.

- If possible, email the laboratory contact person at least 24 hours before delivering samples.

4.2.3.8 Data Storage

All data will be recorded on supplied forms. At the end of each day, all data forms will be double copied (alternately, the forms will be provided in triplicate). The original will accompany the samples from field sampling through analysis and will be stored by the appropriate laboratory. The first copy will be stored in the provided three ring binders, and locked in a file cabinet at the site (Redding office, Clear Lake office, etc.) when the binder is not in use in the field. The third copy will be sent to the Sacramento office.

4.2.3.9 Methods for Determination of Other Water Quality Parameters

Water quality parameters such as pH, dissolved oxygen, and temperature will be measured by appropriate instrumentation within the manufacturer's tolerances (YSI Environmental model). Hardness will be measured by a titration technique (Hach brand Method 8213, Digital titrator with EDTA method for total hardness). These parameters will be measured at the same sites where water samples for aquatic herbicides are retrieved afterward (within 0.5 hours). These parameters will be measured at the same depths from which the water samples for aquatic herbicides are retrieved, within +/- 1.0 meter. Data and deviations will be recorded on specified forms and/or lab notebooks.

All instrumentation and techniques will be calibrated regularly using appropriate methods.

4.2.3.10 Field Quality Assurance

A Quality Assurance Officer provided by the Central Valley Regional Water Quality Control Board will provide third party validation of the procedures of the CDFA, Hydrilla Eradication Program, Water Monitoring Plan. A Quality Assurance Officer will validate at least one representative "critical phase" of the sample retrieval, storage, recording, and shipping. In addition, the Quality Assurance Officer provided by the Central Valley Regional Water Quality Control Board can audit the laboratory procedures at the Center or the Fish and Game Laboratory, if so desired.

4.2.4 Methods for Data Summarization, Analysis, Review, and Reporting

The Center will provide the CDFA Sacramento Headquarters (Robert Leavitt) with monthly updates on the laboratory analysis and a final analytical report when the analyses are complete.

Sacramento Headquarters will produce a final report for the Central Valley Regional Water Quality Control Board after the sample analyses have been completed. All raw data will be



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included in the final report. The final report will also contain narrative, numerical summaries, and maps as appropriate. A Quality Assurance Officer will also review the final data reports.

4.2.4 Storage of Water Samples

The laboratories should store all water samples for a minimum of three months, or until data has been reviewed by the Principal Investigator.

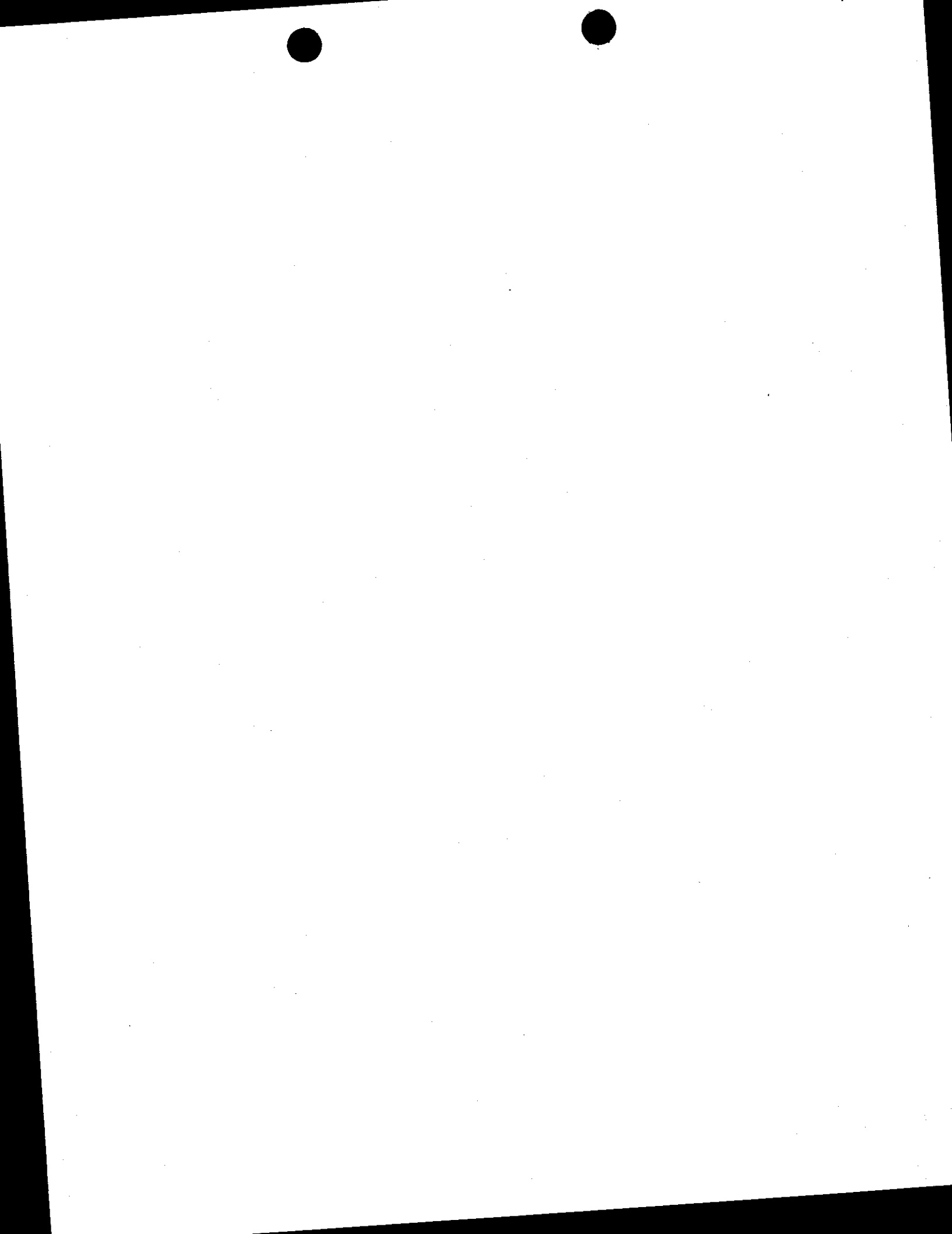
4.3 Curriculum Vitae of Lead Personnel

Carolinda Benson, Agricultural Chemist with the CDFA, Center for Analytical Chemistry. In addition, Ms. Benson conducted the fluridone analysis using the ELISA method and the GC/MS method for the 2002 CDFA Water Monitoring Plan.

Holly Kyo Chuek, Agricultural Chemist II with the CDFA, Center for Analytical Chemistry. She has been in this position since April 1988. She has been in various positions with increasing responsibilities at the Center for Analytical Chemistry since February 1982. Ms. Chuek graduated with a B.S. in Chemistry from Rangoon Art and Science University, Rangoon, Burma in 1969. Ms. Chuek has extensive experience performing analyses for pesticide active ingredients following the USEPA, Association of Official Analytical Chemists, and Association of American Pesticide Control Officials guidelines. She is experienced in using traditional wet chemistry methods and instrumentation (gas chromatography, high pressure liquid chromatography, and mass spectrometry). In addition, Ms. Chuek conducted the copper analysis using the neocuproine method for the 2002 CDFA Water Monitoring Plan.

David Crane, Senior Environmental Scientist (Supervisor), California Department of Fish and Game, Water Pollution Control Laboratory. Mr. Crane has been the Laboratory Director at the DFG laboratory for seven years and has over twenty-four years of experience in environmental analytical chemistry. Mr. Crane holds a MS degree in chemistry and has extensive experience in the analysis of inorganic, pesticide, PCB, and petroleum hydrocarbon environmental pollutants including several years of gas chromatography-mass spectrometry experience. Mr. Crane has had formal training in QA/QC principles and procedures and CLP laboratory auditing. Mr. Crane has coordinated several interlaboratory calibrations and has represented the DFG laboratories at intercalibration workshops. Mr. Crane supervises a staff of thirty chemists, biologists and support personnel.

J Robert Leavitt, Senior Environmental Research Scientist (Supervisor), CDFA, Integrated Pest Control Branch. Dr. Leavitt received a Ph.D. in Agronomy from Michigan State University in 1978 with an emphasis in pesticide science. He then was Assistant Professor in the Agronomy Department of the University of Nebraska where he did pesticide environmental and dissipation studies until 1980. He joined E.I. DuPont de Nemours and Co., Inc. in 1980 where he held various research and development positions until late 1999. In 2000, Dr. Leavitt joined the California Department of Pesticide Regulation where he was an Evaluation Scientist. He joined the CDFA in 2001 and supervises the core noxious weed control programs, including the Hydrilla Eradication Program. Dr. Leavitt has numerous journal articles and abstracts published, full listings of which are available upon request. Dr. Leavitt is also a California licensed Pest Control Advisor (for Weed Control) and Qualified Applicator (for Research and



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Demonstration and Aquatic Pesticides). In addition, Dr. Leavitt was the Principal Investigator for the 2002 CDFA Water Monitoring Plan. Dr. Leavitt supervises a staff of thirty biologists, specialist, and technicians.

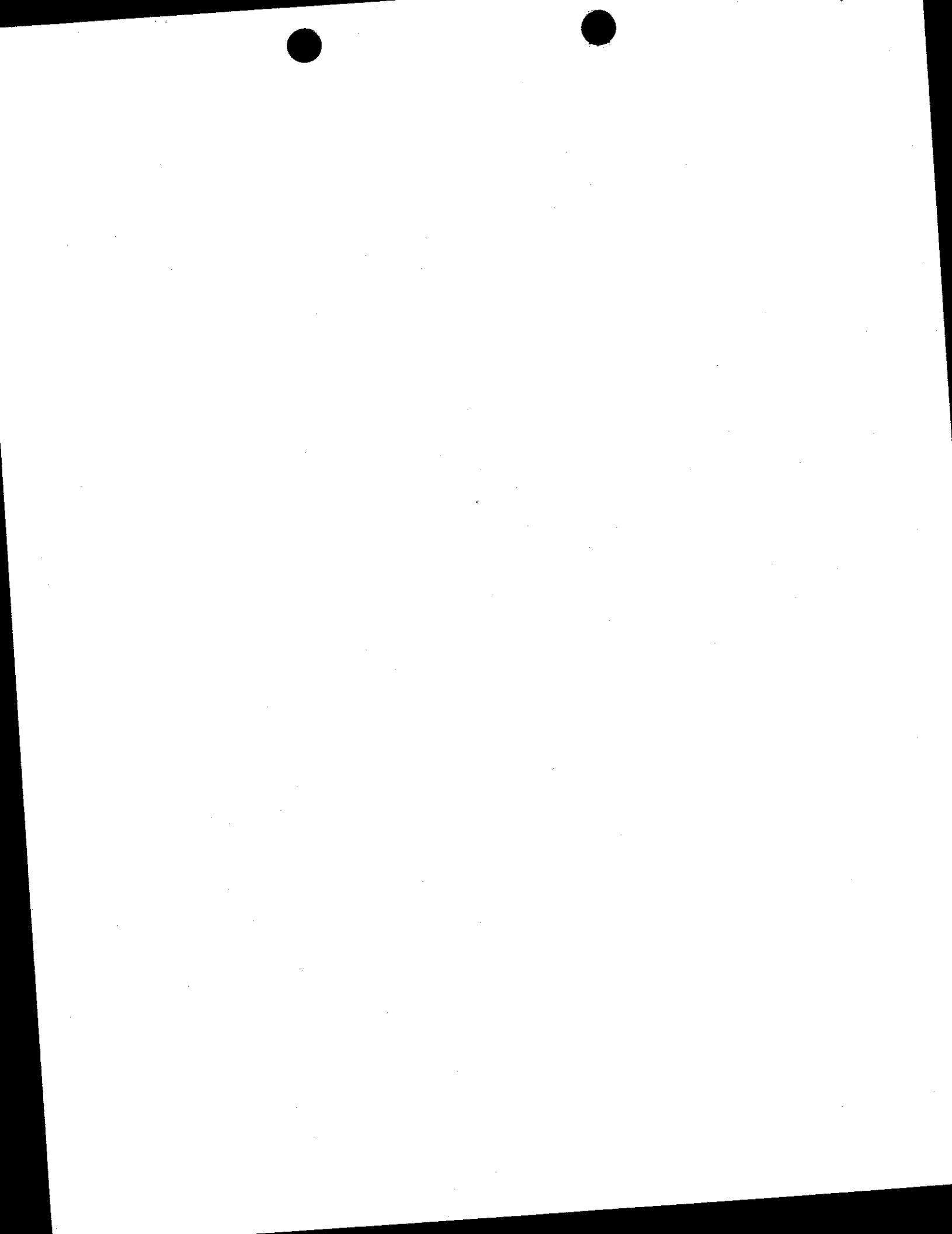
Carri Pirosko, Associate Agricultural Biologist with the CDFA, Integrated Pest Control Branch is based out of the Redding field office and will be overseeing the Riverview Golf Course pond treatments. Ms. Pirosko had experience in water quality monitoring with a CALFED Bay-Delta Purple Loosestrife project. Purple loosestrife (*Lythrum salicaria*) is an aggressive semi-aquatic noxious weed threatening the integrity of the CALFED Bay-Delta watershed. As part of the overall control element of the project, the Integrated Pest Control Branch of the CDFA agreed to conduct water quality sampling as a programmatic check for Rodeo®+ R-11 treatments. Ms. Pirosko was involved in helping to design the protocol and procedures used to collect water samples, helped locate sampling locations and sub-sampling stations, as well as was on site for the majority of sample collections. The samples were analyzed at the CDFG laboratory in Rancho Cordova. Ms. Pirosko's base-line experience results from experience in general chemistry, organic chemistry, and a diversity of biology laboratories both at St. Mary's College B.S. and the University of California at Davis M.S. In addition, Ms. Pirosko was a field investigator for the 2002 CDFA Water Monitoring Plan.

Florence Maly, Agricultural Pest Control Specialist with the CDFA, Integrated Pest Control Branch. Ms. Maly has been involved in the CDFA Hydrilla Eradication Project for more than ten years. In addition, Ms. Maly was a field technician for the 2002 CDFA Water Monitoring Plan.

Elaine Wong

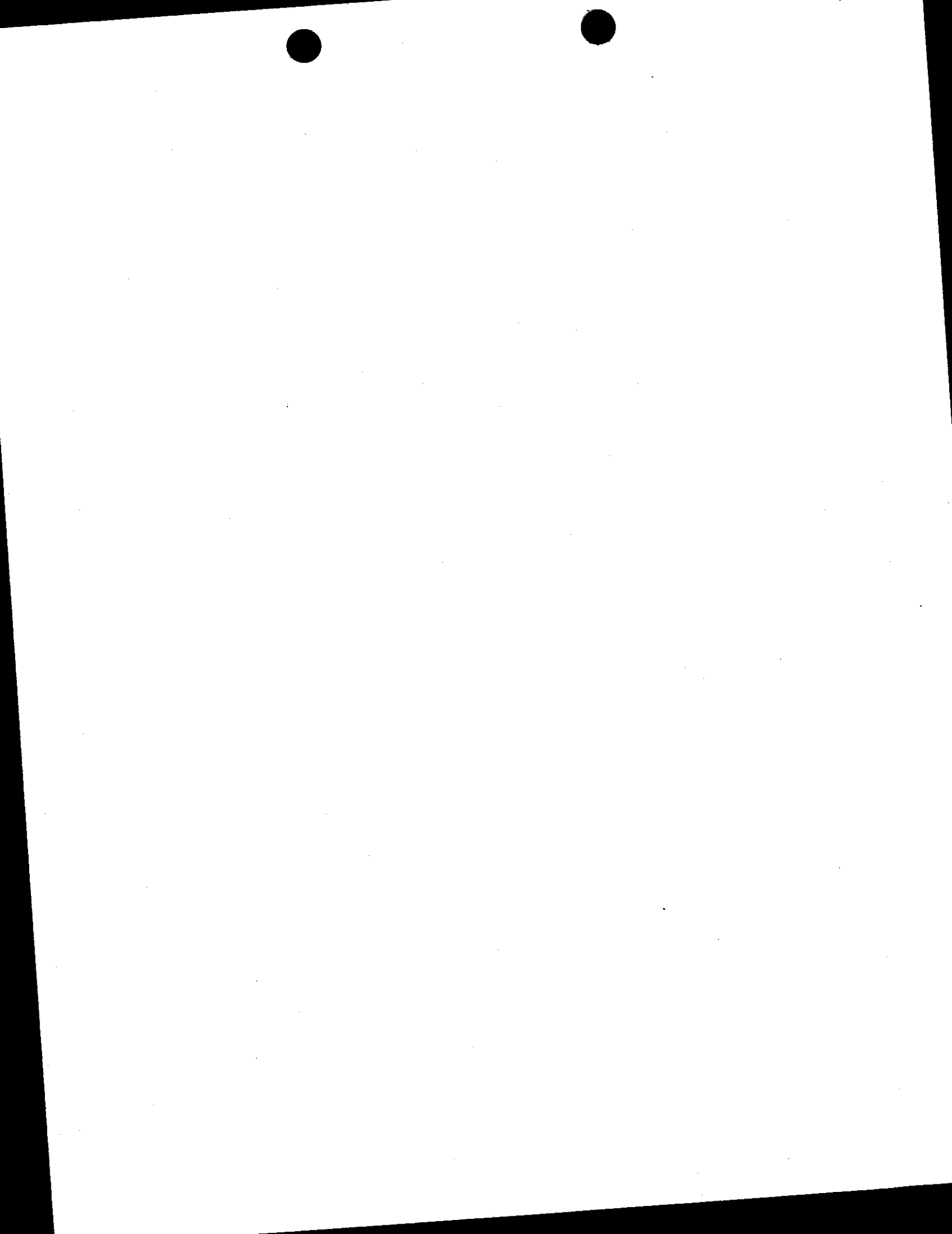
Martice Vasquez, Research Associate with the San Jose State University Foundation. Ms. Vasquez has two years of experience with the DFG Water Pollution Control Laboratory and holds a BA degree in chemistry from CSU, Sacramento. Ms. Vasquez performs multiple analyses for the inorganic chemistry section including analysis of anions, ammonia, total nitrogen, trace elements and biochemical oxygen demand using several different types of instrumentation.

Frank Zarate, Agricultural Pest Control Supervisor with the CDFA, Integrated Pest Control Branch. Mr. Zarate began working for the CDFA on the Hydrilla Eradication Program in 1989. This has involved extensive chemical applications and very extensive water and soil sampling and monitoring. This has required following very specific protocols set up by the research scientists at the University of California. From 1973 to 1989, he was part of a team that regularly obtained water samples while working on research vessels that 'covered' from Oregon into Mexico. Later he applied copper and acetic acid to raceways at a rainbow trout fish hatchery. Mr. Zarate then monitored the effectiveness of this treatment on the fish. This was done while working for the CDFG. Mr. Zarate also has a California Qualified Applicator Certificate (including Aquatics). In addition, Mr. Zarate was a field investigator for the 2002 CDFA Water Monitoring Plan.



4.4 References

- Clesceri, Lenore S., Arnold E. Greenberg, and R. Rhodes Trussell 1989. 3500-Cu D. Neocuproine Method. *In* Standard Methods for the Examination of Water and Wastewater 17th Edition. American Public Health Association, 1015 Fifteenth Street, Washington, D.C. 20005
- Crane, David, Abdou Mekebri, and Loc Nguyen 2002. Method CuGFAA.H2O Copper in Water (Atomic Absorption, Furnace Technique). California Department of Fish and Game Fish And Wildlife Water Pollution control laboratory, 2005 Nimbus Road, Rancho Cordova, CA 95670
- Netherland, M.D., D.R. Honnell, A.G. Staddon, and K.D. Getsinger 2002. Comparison of Immunoassay and HPLC for Analyzing Fluridone Concentrations: New Applications for Immunoassay Techniques. *Lake and Reservoir Management* 18(1): 75-80 2002.
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- SePRO Corporation 2002b. RaPID Assays Fluridone. SePRO Corporation, Carmel, Indiana 56032-4562 www.sepro.com
- SePRO Corporation 2003. Sample Collection Procedures for FastEST. SePRO Corporation, Carmel, Indiana 56032-4562 www.sepro.com
- United States Environmental Protection Agency, 1995. Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry. *In* Methods for the Determination of Organic Compounds in Drinking Water Supplement III. EPA-600/R-95/131. United States Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio 45268



4.5 Sample Forms



DRAFT STANDARD SAMPLING PROCEDURES

Section 4B: STANDARD FIELD SAMPLING PROCEDURES

The objective of these field sampling procedures to safely obtain a well characterized, representative water sample, without contamination.

The water samples for the CDFA Water Monitoring Plan are static (still) or low velocity flow samples. The purpose is to monitor aquatic herbicide concentrations, and not to calculate total discharges.

Appropriate sampling techniques:

- 1) Hand grab samples¹
- 2) Subsurface grab (pole extension) sampler
- 3) Pump sampler

Materials for sampling:

In field:

- 1) New sampling bottles, as per QAP
- 2) Cooler(s) sufficient to hold bottles, with white dairy cooler packs (gel packs tend to break and leak)
- 3) New plastic gloves
- 4) Subsurface grab sampler, or by hand, or pump and tubing
- 5) Depth finder or marked pole
- 6) Calibrated instrument(s) for temperature, pH, dissolved oxygen
- 7) Calibrated kit(s) for total water hardness, if appropriate
- 8) Nitric acid ampoules, if appropriate
- 9) Acetone rinse bottle, if appropriate
- 10) Water Sampling Data Sheets and clipboard
- 11) A cleaned boat and a transport vehicle

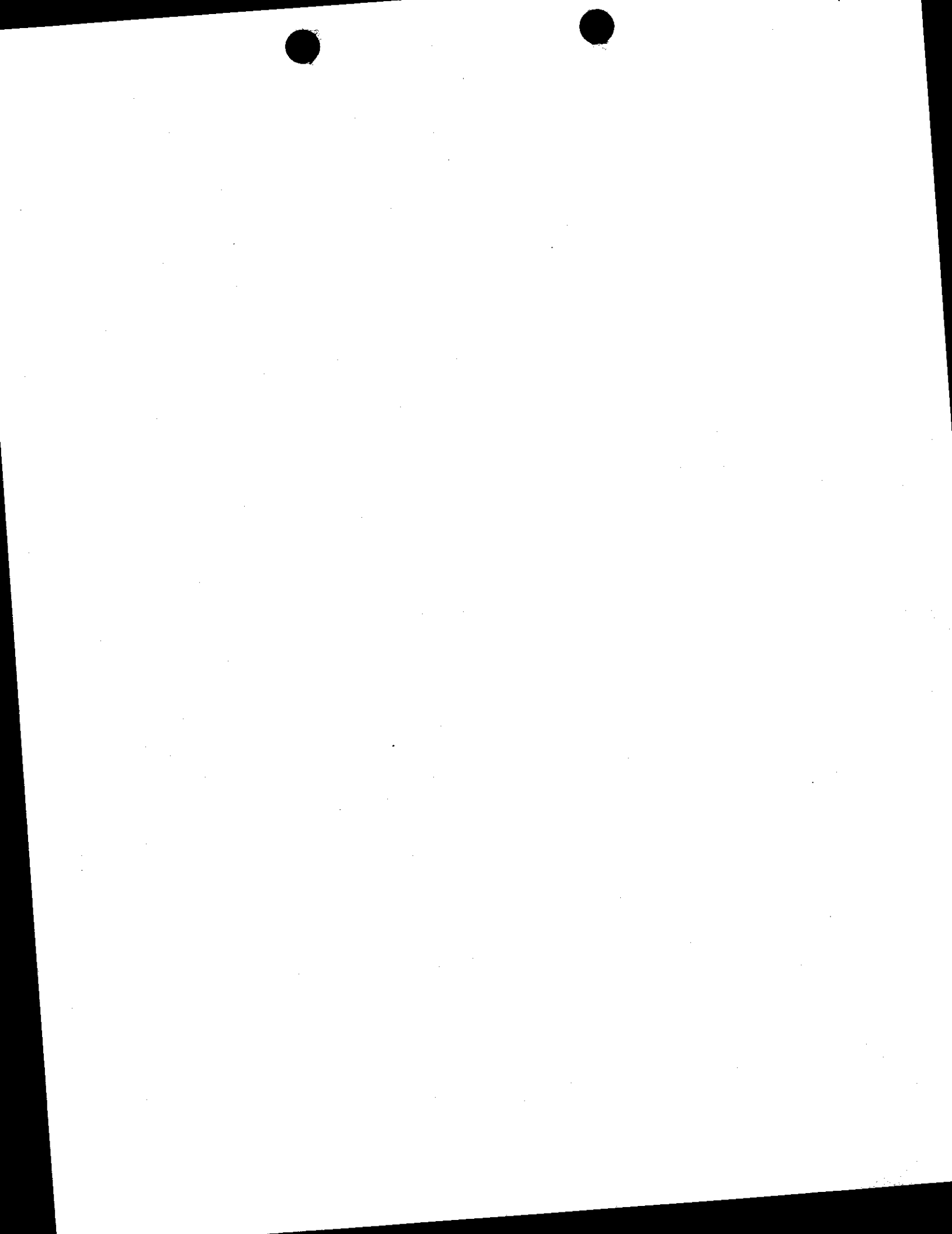
In office:

- 1) Clean refrigerator

General clean techniques to avoid/prevent contamination of the sample:

- 1) Wear new, disposable plastic gloves while taking the sample
- 2) Wear of clean, freshly laundered clothing. Use separate life preservers, boots, waders, etc. than those used for making herbicide applications.
- 3) The person who takes the sample shall not treat the same day, and shall have showered thoroughly and washed his/her hands carefully before going out to take samples
- 4) Treatment boat shall not be used to take samples. Instead, a cleaned boat will be used

¹ Safety Rule of Thumb: Do NOT wade in flowing water when the product of depth (in feet) and velocity (in feet per second) equals 10 or greater (Wilde, et.al. 1998a)



DRAFT STANDARD SAMPLING PROCEDURES

- 5) ALL materials used for sample collection shall be kept **FAR** from herbicide storage areas. This includes sample bottles, gloves, coolers, and the refrigerator

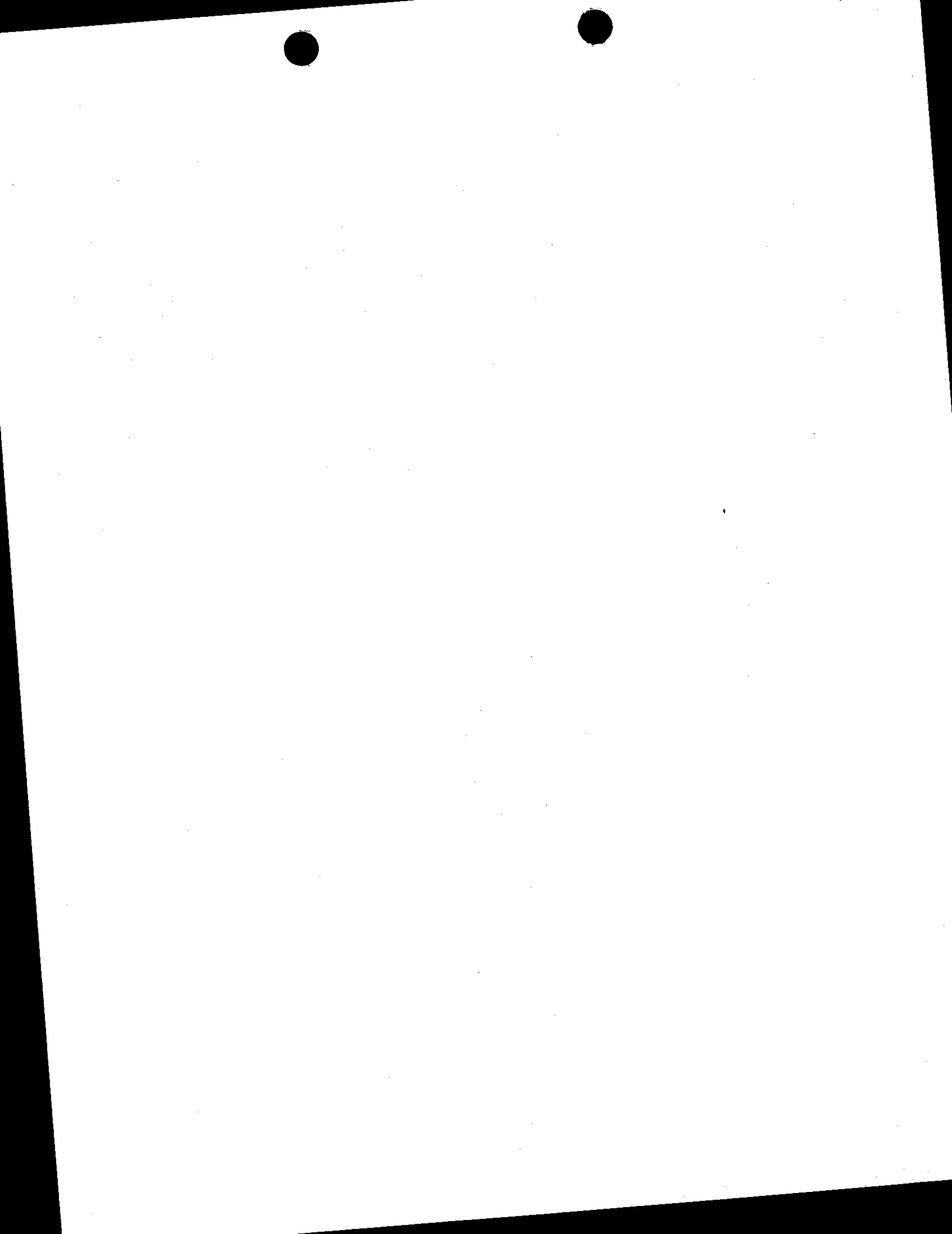
At the sample site:

- 1) Make a sketch map showing the site of the treatment and the location of the sample relative to the treated area
- 2) Take a Global Positioning System (GPS) reading, noting the waypoint number, or noting the latitude and longitude in World Geodetic System 1984 datum to six decimal places, or providing a Trimble data filename where the sample point is stored.
- 3) In Clear Lake, establish bouys at sampling sites.
- 4) Start filling out the Water Sampling Data Sheet with location, time, etc.

Taking the sample:

- 1) Blank (upstream, inlet, pre-treatment, and out-of-treatment-area) samples shall be taken **FIRST**.
- 2) The blank samples shall be stored in a cooler separate from the treated samples
- 3) Work from areas of expected low concentrations to areas of expected higher concentrations
- 4) Very high expected concentration samples should be stored separately from blanks and expected low concentration samples
- 5) When approaching a sampling location, care will be taken to not stir up sediments
- 6) In flowing water, face upstream to sample fresh water coming toward you (United States Environmental Protection Agency, 1997).
- 7) For hand grab samples: When taking the sample, the cap will be left on the bottle until it is at the appropriate depth as per the Sample Analysis Plan. Once the bottle is at the appropriate depth, remove the cap below the surface. (*Alternately, remove the cap and lower the bottle upside down into the water column, righting and filling the bottle at the appropriate depth.*) Avoid stirring the sediments. Turn the sample bottle into the current and scoop in the upstream direction (United States Environmental Protection Agency, 1997). Rinse the sample bottle with sample water and empty twice, then fill completely.
- 8) For subsurface grab sampler (pole extension): If sampling depth is beyond reach of the grab sampler, the sample will be taken as deep as possible. The pole extension should be marked in a minimum of one foot increments. Lower the pole to the required depth and open the plunger until the sample bottle is filled. Close the plunger. Retrieve the sample bottle, unscrew from the pole extension, and pour the sample into a permanent sample bottle. Rinse the sample bottle, the plunger, and the lower part of the pole twice with pesticide grade acetone and rinse three times with distilled water before reusing.² When finished, store sample bottle in plastic bag.
- 9) For pump samplers. Lower the pump or intake to the appropriate depth, and start the pump. Pump and discard at least three times the volume of the pump and tubing before filling the sample bottle (Wilde, et. al. 1998b). When finished, store pump, etc. in plastic bags.

² Only keep small amounts of acetone on hand as it can be a fire hazard.



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- 10) Break nitric acid ampoule and pour contents into sample, if sample needs to be acidified (copper samples for The Fish and Game Laboratory).
- 11) Dry the sample bottle and cap. It is a good idea to seal the cap with tape to avoid leakage.
- 12) Fix a waterproof sample number tag to the bottle.
- 13) Record the sample number on the Water Sample Data Sheet.
- 14) Place the bottle in the appropriate cooler (blanks separated from treated areas). Keep the bottles in contact with ice packs
- 15) Take other water condition measurements (pH, dissolved oxygen, temperature, hardness).
- 16) Finish filling out the Water Sampling Data Sheet with information for the sample
- 17) In the office, place the bottle into a refrigerator. Avoid freezing.

Storing the sample:

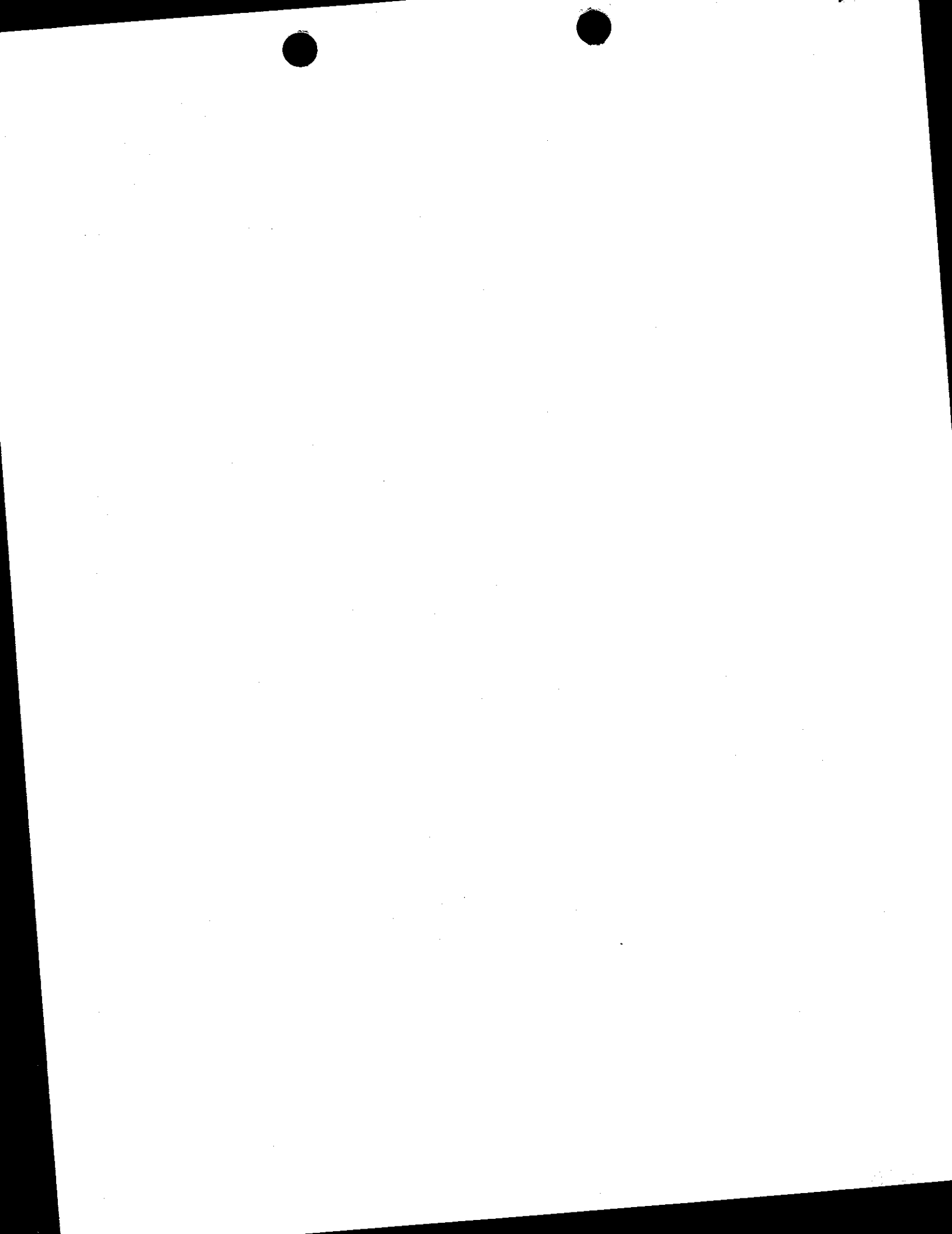
- 1) Store in a clean refrigerator until ready to ship.
- 2) Do not store near any pesticides.

Shipping the sample:

- 1) Samples must be accompanied by the original (white) "Water Sampling Data Sheet for the Hydrilla Eradication Program" and "Chain of Custody" (COC) forms properly filled out. Both forms must be signed or initialed, as appropriate.
- 2) Whether samples are shipped or delivered, they must arrive cold, but not frozen, at the laboratory (Wilde, et al. 1998c). For this purpose, pack in sufficient number of ice packs.
- 3) If the samples are shipped to the lab, the white and yellow copies of the COC form should be packed inside the shipping box with the samples, and filled out as follows: Delivered to Fed Ex (or other shipper). On opening the shipping box, the receiver should fill in as follows: Received from Fed Ex. The way bill will serve as COC between shipping and receiving. Save and attach the way bill.
- 4) If the samples are hand delivered to the lab, the delivering person will have receiving person sign the COC forms.

Receiving the sample:

- 1) The person receiving the sample should sign the COC form as "Delivered to"
- 2) The person receiving the sample should check the condition of the sample and indicate on the COC form (such as: good condition, received at room temperature, bottle cracked, identification tag loose).



DRAFT STANDARD SAMPLING PROCEDURES

References:

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- idem* 1998b. Chapter A4. Collection of Water Samples. *In National Field Manual for the Collection of Water Quality Data*, United States Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, CO 80225 www.usgs.gov
- idem* 1998c. Chapter A5. Processing of Water Samples. *In National Field Manual for the Collection of Water Quality Data*, United States Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, CO 80225 www.usgs.gov

