

Water Wise Agriculture
Survey of growers in the Navarro River Watershed

Please answer all of the questions. *Your personal information will not be released and no individual will be identified* in our reports of this survey. We need to ask for personal information because if we have questions regarding your responses we will need to contact you. Once the responses are entered into the database your name will be deleted and data will be presented only in aggregate.

Completed surveys can be mailed to the Mendocino UC Cooperative Extension office at 890 N. Bush St. Ukiah, CA 95482 and please also sign and return the included consent form when sending us your survey. If you have any questions or would like additional information, please call us at (707) 463-4495 or email to cemendocino@ucdavis.edu. If you would like to access the survey online or download the final report for the Russian River portion of this study, they can be found at http://ucanr.org/Navarro_Water_Wise/

Thanks again for your time!

First Name: _____
Last Name: _____
Town/Zip: _____
Telephone: _____
Email: _____

Section 1: General Irrigation and Water Use History

1. How many years have you irrigated crops within the Navarro Watershed? _____
2. Have you ever had difficulty meeting the irrigation needs of your crops?
 Yes No Year(s): _____

If so, please check the reasons below that apply to your situation.

Reasons (check **all** that apply)

- Irrigation system failure
- Pond(s) dry
- Well(s) dry
- Low rainfall
- Creek or stream dry
- High climatic demand
- Establishing crop

Your comments:

3. Have you ever had difficulty meeting the frost protection needs of your crop?
Yes No Year(s): _____

If so, please check the reasons below that apply to your situation.

Reasons (check all that apply)

- Irrigation system failure
- Pond(s) low or dry
- Well(s) dry
- Large number of frost days
- Early bud break
- Stream levels low

Your comments:

4. Do you use water for heat protection on your farm? Yes No

If so, which of the measures below do you consider?

Reasons (check all that apply)

- Low leaf water potential
- Leaf wilting/other physical signs
- Low soil moisture
- Number of days over _____ degrees (please fill in the temperature you use)

In which years did you provide the greatest amount of heat protection? _____

Your comments:

5. Do you apply any post-harvest irrigation to your crop and if so, on average, how many times do you irrigate? Yes No Times: _____

6. If you get water from a stream diversion, have you ever coordinated your pumping schedule with neighboring water users in order to reduce the impact of pumping on stream flow? Yes No

Your comments:

Section 2: Crops Irrigated

7. What is the total acreage you currently farm (irrigated and non-irrigated)? _____

8. Write in how many acres of each crop that you irrigate.

Grapes: _____ Olives: _____ Other 1: _____

Apples: _____ Pears: _____ Other 2: _____

Pasture/Hay: _____ Vegetables: _____ Other 3: _____

9. Of those irrigated acres identified in question 8 above, estimate how many acres are in fields that are irrigated directly from a river, stream, or other surface water course, how many from off-stream water storage reservoir and how many from wells.

Crop	Irrigation Water Source		
	Direct diversion of surface watercourse	Off-stream reservoir	Well or other groundwater source
Grapes	_____	_____	_____
Apples	_____	_____	_____
Pasture/Hay	_____	_____	_____
Olives	_____	_____	_____
Vegetables	_____	_____	_____
Other 1: _____	_____	_____	_____
Other 2: _____	_____	_____	_____
Other 3: _____	_____	_____	_____

10. For the irrigated acres identified in question 8 above, estimate the acreage irrigated by the following irrigation methods.

Crop	Irrigation Method			
	Drip	Overhead Sprinkler	Under/Micro Sprinkler	Flood/Furrow
Grapes	_____	_____	_____	_____
Apples	_____	_____	_____	_____
Pasture/Hay	_____	_____	_____	_____
Olives	_____	_____	_____	_____
Vegetables	_____	_____	_____	_____
Other 1: _____	_____	_____	_____	_____
Other 2: _____	_____	_____	_____	_____
Other 3: _____	_____	_____	_____	_____

11. For the irrigated acres identified in question 8 above, estimate the acreage for which you provide **frost protection** by the following methods.

Crop	Frost Protection Method			
	No Frost Protection	Sprinkler	Fan	Other: _____
Grapes	_____	_____	_____	_____
Apples	_____	_____	_____	_____
Pasture/Hay	_____	_____	_____	_____
Olives	_____	_____	_____	_____
Vegetables	_____	_____	_____	_____
Other 1: _____	_____	_____	_____	_____
Other 2: _____	_____	_____	_____	_____
Other 3: _____	_____	_____	_____	_____

Section 3: Irrigation System

12. Indicate the number of pumps you operate according to their power source and age group.

Age Group	Power Source			
	Diesel	Electric	Biodiesel	LPG
1-2 years	_____	_____	_____	_____
2-5 years	_____	_____	_____	_____
5-10 years	_____	_____	_____	_____
More than 10 years	_____	_____	_____	_____

13. How many of your pumps by age group are volume metered?

Age Group	Volume Meter	
	Yes	No
1-2 years	_____	_____
2-5 years	_____	_____
5-10 years	_____	_____
More than 10 years	_____	_____

14. By age group how many of your intake pumps have intakes in a local stream or creek and of those how many have fish screens?

Age Group	Stream Intake		No Stream Intake
	Fish Screened	Not Fish Screened	
1-2 years	_____	_____	_____
2-5 years	_____	_____	_____
5-10 years	_____	_____	_____
More than 10 years	_____	_____	_____

15. List the number of reservoirs that you have from each water source and their total storage capacity in acre-feet.

	Surface Water Diversion	Well Water	Subsurface Drainage System	Rainfall Harvesting/ Ephemeral Stream
Number of reservoirs	_____	_____	_____	_____
Total storage capacity	_____	_____	_____	_____

16. Do you usually have to refill your reservoir(s) using surface water diversion during the irrigation season and, if so, generally during which month?

Yes No Month: _____

17. Indicate if you have you made a change in irrigation systems method and if so in what year?

Yes No Year(s): _____

18. If you indicated yes in question 17, why did you make this change (check all that apply)?

- Cost savings in electricity or fuel
- Cost savings in water
- Replace failing or old system
- Replanting or changing crops
- Increased yield
- Improved crop quality
- Water conservation
- Other: _____

19. Indicate if you have made a transition in frost protection technology and if so in what year?

Yes No Year(s): _____

20. If you indicated yes in question 19, why did you make this change (check all that apply)?

- Cost savings in energy and fuel
- Cost savings in water
- Replace failing or old system
- Replanting or changing crops
- Water conservation
- Other: _____

Section 4: Irrigation Information

21. Rank, in order of use, your primary sources of information for irrigation system design. (1 = the source you most often use, 10 = a source rarely or never used)

Rank

- _____ Crop buyer
- _____ Farm Advisor
- _____ Farm Manager
- _____ Growers
- _____ Irrigation Consultant
- _____ Irrigation equipment supplier/designer
- _____ NRCS (Soil Conservation Service)
- _____ Self
- _____ Wine makers
- _____ Other: _____

22. Rank, in order of use, your primary sources of information for crop water requirements and application rates. (1 = the source you most often use, 10 = a source rarely or never used)

Rank

- _____ Crop buyer
- _____ Farm Advisor
- _____ Farm Manager
- _____ Growers
- _____ Irrigation Consultant
- _____ Irrigation equipment supplier/designer
- _____ NRCS (Soil Conservation Service)
- _____ Self
- _____ Wine makers
- _____ Other: _____

23. Do you use the practices of Regulated Deficit Irrigation (RDI) in your decisions of when and how much water to apply to your crop? Yes No

Your comments:

24. Do you know of and use the following tools and methods in your decisions of when and how much water to apply for crop production?

Tool or Resource	Know of	Use
CIMIS	<input type="checkbox"/>	<input type="checkbox"/>
Electronic weather station	<input type="checkbox"/>	<input type="checkbox"/>
Soil moisture measurements (neutron probe or other)	<input type="checkbox"/>	<input type="checkbox"/>
Crop water potential measurements (pressure bomb)	<input type="checkbox"/>	<input type="checkbox"/>
On-farm weather station	<input type="checkbox"/>	<input type="checkbox"/>
Field observations	<input type="checkbox"/>	<input type="checkbox"/>
Other (fill in): _____	<input type="checkbox"/>	<input type="checkbox"/>

25. Do you know of and use the following tools and methods in your decisions of when and how much water to apply for frost protection?

Tool or Resource	Know of	Use
Online weather sources	<input type="checkbox"/>	<input type="checkbox"/>
Alarm systems	<input type="checkbox"/>	<input type="checkbox"/>
On farm field measurements (wet bulb, thermometers)	<input type="checkbox"/>	<input type="checkbox"/>
Fruit frost forecast	<input type="checkbox"/>	<input type="checkbox"/>
Other (fill in): _____	<input type="checkbox"/>	<input type="checkbox"/>

Section 5: Irrigation and Water Management Alternatives

26. Have you ever participated in a conservation program? If so, please check the appropriate box below.

- USDA Environmental Quality Incentives Program
- Fish and Game Fishery Restoration Grants Program
- Fish Friendly Farming
- Wine Institute/CAWG Code of Sustainability
- Other: _____

27. How important are each of the following reasons for participating in water conservation programs? Rate each reason separately on a scale from 1 to 5 (1 = not important, 5 = very important)

Rate

- _____ Lower farm costs for water
- _____ Lower farm costs for electricity and fuel to run irrigation system
- _____ Marketing and premium for crop
- _____ Comply with regulations
- _____ Natural resource stewardship
- _____ Personal values and beliefs
- _____ Maintain stream flow for fish habitat
- _____ Tax rebates and incentives
- _____ Provide water for urban growth and development

Title of the study: Navarro River Agricultural Water Demand and Irrigation Technology Project

Investigators: Glenn McGourty, David Lewis, John Harper, Prahlada Papper; University of California, Cooperative Extension; (707) 463-4495

Dear Grower,

Thank you for agreeing to participate in a study of agricultural water demand and irrigation technologies in Mendocino County. It is important to note that this effort is part of a larger process directed by the Mendocino County Water Agency to estimate water demand for all water users countywide. Our objectives are to:

- Improve the understanding of agricultural water needs and uses within the Navarro River watershed, and
- Facilitate agriculture's implementation of improved irrigation and water supply technologies and water source alternatives.

As part of this study, we are interviewing approximately thirty growers, located in the Navarro River watershed. This set of interviews is a follow up to a preliminary estimate of agricultural water usage based on a Geographic Information System (GIS) analysis of the agricultural acreage in the study area.

What is not accounted for in these preliminary estimates is variability in irrigation application rates moving from north to south and east to west across the basin. Additionally, we have not yet explored the differences in application rates and amounts in response to differences in rainfall amounts between years. In the case of grapes, application rates can vary between one half and one and one half acre-foot per year depending upon vine age, location, varieties, and weather conditions of a given year.

To learn more about the realities of irrigation management, we are now conducting individual interviews and field surveys with growers.

This interview should take from one to two hours. The interview questions will cover such topics as general water use history, the type of irrigation system you have, the crops that you irrigate, and the feasibility of different water management alternatives.

CONSENT LETTER

July 29, 2009

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RISK: There are no risks to you for your participation in this study. We will keep all of your responses confidential. However, absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena.

COSTS: There is no cost to you beyond the time and effort required to participate in the interview.

RIGHT TO REFUSE OR WITHDRAW: You may refuse to participate in this study. You may change your mind about participating and quit after the study has started.

QUESTIONS: If you have any questions about this research project, please contact Glenn McGourty, UC Cooperative Extension – Mendocino, at (707) 463-4495.

If you have any questions regarding your rights and participation as a research subject, please contact the IRB Administration at (916) 703 9151 or write to IRB Administration, CRISP Building, Suite 1400, Rm. 1429, 2921 Stockton Blvd., Sacramento, CA 95817. The IRB Administration also has a website designed to make you familiar with your rights. The website discusses your basic rights as a research participant, an explanation of the informed consent process, the basic requirement that written consent be in a language understandable to you, and suggested sample questions to ask the research investigator regarding your participation in the study. The website can be accessed at: www.research.ucdavis.edu/IRBAdmin.

CONSENT

YOUR SIGNATURE, BELOW, WILL INDICATE THAT YOU HAVE DECIDED TO VOLUNTEER AS A RESEARCH SUBJECT AND THAT YOU HAVE READ AND UNDERSTOOD THE INFORMATION PROVIDED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Signature of Participant: _____

Printed Name of Participant: _____ Date: _____ Time: _____

Signature of Investigator: _____

Printed Name of Investigator: _____ Date: _____ Time: _____