

September 27, 2013

#### MEETING NOTICE & REQUEST FOR RSVP

#### TO: ENVIRONMENTAL ADVISORY COMMITTEE

<u>Jurisdiction</u>	<u>Representative</u>
District 1	Loren Lewis, Rita Norton
District 2	Patricia Colombe
District 3	Hon. Dean Chu, Rev. Jethroe Moore, II
District 4	Scott Green, Bob Levy
District 5	Nancy Smith
District 6	Clinton Brownley
District 7	Tess Byler, Richard McMurtry

The regular meeting of the Environmental Advisory Committee is scheduled to be held on Monday, October 21, 2013, at 6:00 p.m. in the District Headquarters Boardroom located at 5700 Almaden Expressway, San Jose, California. Dinner will be available at 5:30 p.m.

Enclosed are the meeting agenda and corresponding materials. Please bring this packet with you to the meeting. Additional copies of this meeting packet are available on-line at www.valleywater.org/About/BoardAdvisoryCommittees.aspx.

A majority of the appointed membership is required to constitute a quorum, which is fifty percent plus one. A quorum for this meeting must be confirmed at least 48 hours prior to the scheduled meeting date or it will be canceled.

Further, a quorum must be present on the day of the scheduled meeting to call the meeting to order and take action on agenda items.

Members with two or more consecutive unexcused absences will be subject to rescinded membership.

Please confirm your attendance by contacting Michelle Critchlow at 1-408-630-2883, or mcritchlow@valleywater.org.

**Enclosures** 



# Santa Clara Valley Water District - Headquarters Building 5700 Almaden Expressway, San Jose, CA 95118



#### From Oakland:

- Take 880 South to 85 South
- Take 85 South to Almaden Expressway exit
- Turn left on Almaden Plaza Way
- Turn right (south) on Almaden Expressway
- At Via Monte (third traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

#### From Sunnyvale:

- Take Highway 87 South to 85 North
- Take Highway 85 North to Almaden Expressway exit
- Turn left on Almaden Expressway
- At Via Monte (third traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

#### From Downtown San Jose:

- Take Highway 87 Guadalupe Expressway South
- Exit on Santa Teresa Blvd.
- Turn right on Blossom Hill Road
- Turn left at Almaden Expressway
- At Via Monte (first traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

#### From Morgan Hill/Gilroy:

- Take 101 North to 85 North
- Take 85 North to Almaden Expressway exit
- Turn left on Almaden Expressway
- Cross Blossom Hill Road
- At Via Monte (third traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

#### From San Francisco:

- Take 280 South to Highway 85 South
- Take Highway 85 South to Almaden Expressway exit
- Turn left on Almaden Plaza Way
- Turn right (south) on Almaden Expressway
- At Via Monte (third traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

#### From Walnut Creek, Concord and East Bay areas:

- Take 680 South to 280 North
- Exit Highway 87-Guadalupe Expressway South
- Exit on Santa Teresa Blvd.
- Turn right on Blossom Hill Road
- Turn left at Almaden Expressway
- At Via Monte (third traffic light), make a U-turn
- Proceed north on Almaden Expressway approximately 1,000 feet
- Turn right (east) into the campus entrance

# **Bob Levy, Committee Chair**

Dean Chu. Committee Vice-Chair

#### **Board Representative**

Linda J. LeZotte, Board Representative **Brian Schmidt, Alternate** 

#### AGENDA

#### **ENVIRONMENTAL ADVISORY COMMITTEE**

MONDAY, OCTOBER 21, 2013

6:00 p.m. – 8:00 p.m.

**Santa Clara Valley Water District Headquarters Building** 5700 Almaden Expressway San Jose, CA 95118

#### Time Certain:

6:00 p.m.

#### Call to Order/Roll Call 1.

#### 2. Time Open for Public Comment on Any Item Not on Agenda

Comments should be limited to two minutes. If the Committee wishes to discuss a subject raised by the speaker, it can request placement on a future agenda.

#### 3. **Approval of Minutes**

3.1. Approval of Minutes – July 15, 2013, Meeting

#### 4. **Policy Review**

- 4.1 Review and comment to the Board on staff recommendations related to the Open Space Credit Policy and associated practices (Darin Taylor)
- 4.2 Discuss Climate Divestment Investment Restriction (Charlene Sun)

#### 5. Policy Implementation

- 5.1 Update on the Three Creeks Conservation Habitat Plan (Debra Caldon)
- 5.2 Presentation of the Advisory Committee Ad Hoc Committee's Draft Phase II Improvement Recommendation Report (Director)
- 5.3 Discuss California Environmental Quality Act [CEQA] (Rick Callender)
- 5.4 Review Agenda and Advisory Committee Work Plan: Review of Recent Updates and Board Action (Committee Chair)

#### 6. **Information Only Items**

Informational only items are not for discussion or action. However, clarifying questions may be asked, and will be called for by the Chair

- 6.1 Update on the Santa Clara Valley Habitat Conservation Plan (Debra Caldon)
- 6.2 Lake Almaden Mercury Removal Issue (Rechelle Blank)

#### Review and Clarification of Committee's Policy Recommendations, Requests, and 7. Comments, to the Board

This is a review of the Committee's Policy Recommendations, Requests and Comments to the Board (from Items 4 and 5). The Committee may also request that the Board approve future agenda items for Committee discussion.

#### 8. Reports

Directors, Managers, and Committee members may make brief reports and/or announcements on their activities. Unless a subject is specifically listed on the agenda, the Report is for information only and not discussion or decision. Questions for clarification are permitted.

- 8.1 Director's Report
- 8.2 Manager's Report
- 8.3 Committee Member Reports

#### 9. Adjourn to next regular meeting on January 27, 2014

All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection at the Office of the Clerk of the Board at the Santa Clara Valley Water District Headquarter Building, 5700 Almaden Expressway, San Jose, CA., 95118, at the same time that the public records are distributed or made available to the legislative body.

The Santa Clara Valley Water District will make reasonable efforts to accommodate persons with disabilities wishing to attend committee meetings. Please advise the Clerk of the Board office of any special needs by calling 1-408-630-2277.

#### Environmental Advisory Committee's Purpose and Duties

The Environmental Advisory Committee of the Santa Clara Valley Water District (District) is established to assist the Board of Directors with policies pertaining to environmental restoration and enhancement.

The specific duties are:

- Providing input on policy alternatives for Board deliberation, when requested by the Board.
- Providing comment on activities in the implementation of the District's mission that the Board will consider or refer to staff.
- Producing and presenting to the Board an Annual Accomplishments Report that provides a synopsis of the Committee's discussions regarding specific topics and subsequent policy recommendations, comments, and requests that resulted from those discussions.

In carrying out these duties, the Board's Advisory Committees bring to the District their respective expertise and the interests of the communities they represent. In addition, Advisory Committee members may bring information regarding District activities to the communities they represent.



#### **ENVIRONMENTAL ADVISORY COMMITTEE MEETING**

# DRAFT MINUTES —

#### MONDAY, JULY 15, 2013 6:00 PM

(Paragraph numbers coincide with agenda item numbers)

A regular scheduled meeting of the Environmental Advisory Committee (Committee) Meeting was held on July 15, 2013, in the Boardroom at the Santa Clara Valley Water District Headquarters, 5700 Almaden Expressway, San Jose, California.

#### 1. CALL TO ORDER/ROLL CALL

Chair Bob Levy called the meeting to order at 6:09 p.m.

Members in attendance were

<u>District</u>	<u>Representative</u>
District 2	Patricia Colombe
District 3	Hon. Dean Chu
District 4	Bob Levy
District 5	Nancy Smith
District 6	Clinton Brownley
District 7	Tess Byler, Richard McMurtry

The Board members in attendance were Director Linda LeZotte, Board Representative and Director Brian Schmidt, Board Alternate.

Staff members in attendance were Glenna Brambill, Norma Camacho, Michelle Critchlow, Jim Fiedler, Cindy Kao, Liang Lee, Brian Mendenhall, Mary Ann Ruiz, and Darin Taylor

#### 2. PUBLIC COMMENT

There was no one present who wished to speak.

#### 3. APPROVAL OF MINUTES

It was moved by Nancy Smith, seconded by Hon. Dean Chu, and carried to approve the April 15, 2013, meeting minutes, with a correction to the public speakers under Agenda Item 4.1.

#### 4. POLICY REVIEW

#### 4.1 Discuss on Open Space Credit Policy

Mr. Darin Taylor reviewed the materials as outlined in the agenda item.

#### 5. POLICY IMPLEMENTATION

# 5.1 Update in Bay Delta Planning and Imported Water with Respect to Board Ends Policy 2.1: Reliable Water

Ms. Cindy Kao reviewed the materials as outlined in the agenda item.

#### 5.2 Update on Silicon Valley Advanced Water Purification Center

No Presentation Given

#### 5.3 Discuss Allocation of Measure B Funds (Safe, Clean Water Program)

Ms. Mary Ann Ruiz reviewed the materials as outlined in the agenda item.

# 5.4 Discuss Measure B Grant Criteria for Grant Selections- Safe, Clean Water Program

Mr. Brian Mendenhall reviewed the materials as outlined in the agenda item. There were two handouts distributed.

Mr. Allan Thompson, from Santa Clara County Fire Safe Council, spoke on this item.

Mr. Gary Sanchez, from State Farm Insurance, spoke on this item.

Ms. Susan Meyer, from Loma Prieta Resource Conservation District, spoke on this item.

It was moved by Hon Dean Chu, seconded by Mr. Clinton Brownley and unanimously carried to request for Board consideration that the Grant Criteria for D3 have higher priority on projects with an ecosystem, water-scale impact.

Chair Levy moved to item 7.1a on the agenda

#### 7. REPORTS

### 7.1a Report on June 25, 2013, Board Meeting on District Act Interpretation

Director Brian Schmidt reviewed the materials as outlined in the agenda item.

Chair Levy moved to item 5.5 on the agenda

#### 5. POLICY IMPLEMENTATION

5.5 Improvements to the Committee process, alternative perspectives for Board consideration, and that the agenda have one main topic for an in-depth discussion Chair Levy moved to item 5.6 on the agenda, since that item would give more background on agenda item 5.5.

# 5.6 Review of Draft Advisory Committee Ad Hoc Committee Phase I (Problem Definition) Report

Director Brian Schmidt reviewed the materials as outlined in the agenda item. The Phase 1 Report was distributed.

# 5.7 Review Agenda and Advisory Committee Work Plan: Review of Recent Updates and Board Action

Chair Levy reviewed the materials as outlined in the agenda item

It was moved by Richard McMurtry, seconded by Ms. Patricia Colombe and unanimously carried to request for Board consideration to add a standing Environmental Advisory Committee Meeting in June to discuss policies.

It was moved by Ms. Patricia Colombe, seconded by Hon. Dean Chu and unanimously carried to request for Board consideration to begin policy discussion at the Environmental Advisory Committee's January meeting.

# 6. REVIEW AND CLARIFICATION OF COMMITTEE'S POLICY RECOMMENDATIONS, REQUESTS, AND COMMENTS, TO THE BOARD

Ms. Michelle Critchlow reported the three Committee Requests for Board consideration:

The Environmental Advisory Committee submitted the following requests for Board consideration:

#### Committee Request 1:

The Environmental Advisory Committee request for Board consideration, that the Grant Criteria for D3 have higher priority on projects with an ecosystem, watershed-scale impact.

#### **Committee Request 2:**

The Environmental Advisory Committee request for Board consideration, to add a standing Environmental Advisory Committee Meeting in June to discuss policies.

#### **Committee Request 3:**

The Environmental Advisory Committee request for Board consideration, to begin policy discussions at their January meeting.

#### 7. REPORTS

#### 7.1. Director Report

Director LeZotte reported on the following:

- Board Action
- Water District News
- Water Supply
- Community Outreach

#### 7.2. Manager's Report

Chief Operating Officer, Ms. Norma Camacho, introduced Deputy Operating Officer, Mr. Liang Lee, as the new Oversight Manager for the Environmental Advisory Committee.

#### 7.3 Committee Member Reports

None

8. ADJOURNMEN <sup>·</sup>	ИENT
----------------------------	------

Chair Levy adjourned the meeting at 8:51 p.m., to the next regular meeting on October 21, 2013.

Michelle Critchlow Office of the Clerk of the Board

Approved:



Meeting Date: 10/21/13

Agenda Item No.: 4.1

Staff: Darin Taylor

E-mail: dtaylor@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

**SUBJECT:** Review and comment to the Board on staff recommendations related to the Open Space Credit

Policy and associated practices

#### **RECOMMENDED ACTION:**

Provide comment to the Board in the implementation of the District's mission as it applies to staff's recommendations related to the Open Space Credit Policy.

#### **POLICY RATIONALE:**

Executive Limitation 7.4: A BAO shall "marshal for the Board as many staff and external points of view, issues and options as needed for fully informed Board choices."

$\boxtimes$	Policy Review
	Policy Implementation

#### SUMMARY:

#### **Background**

The District Board has historically recognized that agriculture brings value to the county in the form of open space and local produce. In an effort to help preserve this value, the District Act limits the agricultural charge to be no more than 25% of the municipal and industrial (M&I) charge. In 1999, to further its support for agricultural lands, a policy was put into place to limit the agricultural groundwater charge to no more than 10% of the M&I charge. The agricultural community currently benefits from low groundwater charges that are 3% of M&I charges in North County and 6% of M&I charges in South County. According to Section 26.1 of the District Act, agricultural water is "water primarily used in the commercial production of agricultural crops or livestock."

The credit to agricultural water users has become known as an "Open Space Credit." It is essentially paid for by fungible, non-rate related revenue. Under current protocol, ad valorem property taxes generated in the Water Utility, General, and Watershed Stream Stewardship Funds are used to pay for the credit. The net South County Open Space Credit is currently estimated to be \$6.5 million in FY 2013–14 and projected to continually increase in the years that follow.

There has been concern expressed as to whether or not the property taxes used to support the Open Space Credit should be used to fund other important District activities. If the Open Space Credit policy were modified and/or agricultural water charges are increased, this would decrease the open space credit and the property tax revenues that were used to fund it could be used to fund other District activities. However, it is unclear if

increasing the agricultural groundwater charges would affect the viability of the agricultural lands. Consequently the Board directed staff to:

- 1. Engage community, such as the Agricultural Advisory Committee, Santa Clara County Farm Bureau, Water Commission, and farmers in North County and South County to gain insight on the impact of the current Open Space Credit policy on them and the impact of any potential changes;
- 2. Determine the short- and long- term impacts of transferring ad valorem property taxes for open space credit:
- 3. Create a schedule outside of the rate process to have dialogues; and
- 4. Evaluate options to decrease the Open Space Credit, within the legal limits.

Accordingly, staff performed the following activities:

- Hosted three working group meetings with members representing various interests (e.g., agricultural, water retailer, business community, County of Santa Clara Land Planning)
- Solicited feedback from Advisory Committees
- Conducted a Community Stakeholder Meeting
- Contracted with a consultant, ERA Economics LLC, to provide an independent perspective on the district's Open Space Credit Policy

#### Results of Economic Analysis

The economic study performed by ERA Economics LLC consisted of three parts:

- 1. A quantitative analysis of the value of open space created by agricultural lands in the County;
- 2. A quantitative analysis of the value of ecosystem services provided specifically by irrigated agricultural lands in Santa Clara County; and
- 3. An analysis of the impact of various higher water cost levels on the viability of agricultural businesses in the County.

At their July committee meetings, both the Water Commission and the Agricultural Advisory Committee requested to see the final report prepared by ERA Economics in order to better provide feedback to the Board. The final report is included as Attachment 1.

The following is a brief summary of the economic studies. Regarding the value of open space created by agricultural lands in the county, ERA Economics conducted a literature review and meta-analysis to determine the value of agricultural open space. Open space is not directly traded in a market, the value must be inferred from nearby home values. The results were that the value of an average home within 0.25 miles of cropland increases by 2.2 percent. The value of an average home within 0.25 miles of rangeland increases by 2.56 percent. The value of an average home within 0.33 miles of intensive agriculture decreases by 6.4 percent.

Regarding the value of ecosystem services provided by agricultural lands, ERA Economics performed a literature review that found that there is no standard or "consensus" value for valuing ecosystem services since this body of analysis is fairly new. Although there are numerous ecosystem services, the consultants focused on flood control and groundwater recharge, which are the District's main work efforts. Based on the analysis, the average non-market value for flood control and groundwater recharge is \$177 to \$253 per acre per year.

Regarding the impact of higher water cost levels on the viability of agricultural business in the county, ERA Economics developed a model that focused on two water charge scenarios: 1) agricultural water charges increasing to 10% of municipal and industrial (M&I) by FY 2024, and 2) agricultural water charges increasing to 25% of M&I by FY 2024. Under the 10% scenario, the economic analysis showed that 17 acres of land, or less than 1% of harvested acreage, would fallow by FY 2024. Accordingly, staff calculated that the Open Space Credit could be reduced by roughly \$2 million cumulatively over a 10-year horizon under this scenario. Under

the 25% scenario, the economic analysis showed that 549 acres of land, or less than 3% of harvested acreage, would fallow by FY 2024. Accordingly, staff calculated that the Open Space Credit could be reduced by roughly \$8 million cumulatively over a 10-year horizon. There was sentiment from several members of the working group that the fallow impact to agriculture could be greater under the 25% scenario.

#### **Results of Working Group Engagement**

After a series of meetings, the working group comprised of members representing various stakeholder interests was able to reach a consensus recommendation as follows:

- 1. Maintain Open Space Credit as is; both in practice (keep ag at 6% of M&I charge) and policy (limit ag charge to 10% of M&I charge)
- 2. Weigh any decisions regarding the open space credit policy in the context of other external factors that affect agriculture
  - Credit is only one factor that impacts agricultural costs
  - Incremental increases to ag can have significant impact
- 3. Explore other sources of money for capital and operating projects that are not fully funded or where funding sources are less than robust

#### Pros of Recommendation:

- This will encourage economic viability for ag
- The District will not be perceived as anti-ag
- The nexus of agriculture and ecosystem services will be maintained
- It aligns with county and District vision for land use as it applies to ag
- · As ag decreases, the cost of credit will decrease

#### Cons of Recommendation:

- There is no guarantee that policy alone will meet goals to preserve ag land (external factors)
- Some funds remain less than robust financially (i.e., Watershed Stream Stewardship Fund)

#### Staff Recommendation

Staff recommends maintaining the current policy language as is. The current policy language reads:

"...In order to encourage the continuance of agricultural use of land in the County, to encourage the preservation of open space, to defer intensification of users and to further support the limitation imposed by the State Legislature, it is the District's policy that rates for agricultural water shall not exceed one-tenth the rate for all water other than agricultural water."

However, for the sake of clarity, staff recommends abandoning the term "Open Space Credit Policy" and instead referring to the Board's policy as the "Ag Land Preservation Policy."

Staff recommends exploring and pursuing other sources of funding as circumstances dictate to improve the financial health of the Watershed Stream Stewardship fund, to mitigate the impact of the credit on that fund.

Staff recommend increasing the South County agricultural groundwater production charge from 6% of M&I to 10% of M&I over a 5 year time frame, and continuing the practice of setting the North County agricultural groundwater production charge equal to the South County charge. Primary reasons include: 1) the report prepared by ERA Economics showed a minimal impact to agricultural lands in terms of permanent fallow based on a scenario where the agricultural charge was increased to 10% of M&I over 10 years; 2) This recommendation would help address the financial sustainability issue and save \$3 million over the next 10 years.

One alternative considered but not recommended was providing a discounted agricultural charge from 10% of M&I back to 6% of M&I for participation in a mobile lab conservation program. A major issue is that the

incremental costs (\$300K+) would exceed the anticipated incremental revenue (\$75K) and therefore drive up the Open Space Credit subsidy.

Another alternative considered but not recommended was providing a discounted agricultural charge from 10% of M&I back to 6% of M&I for Williamson Act participation. A major issue is that not all agricultural water users qualify for the Williamson Act due to the 100 acre requirement, and therefore many smaller farms would be excluded.

#### ATTACHMENT(S):

- Attachment 1: Final Report on the Economic Evaluation of the Open Space Credit, prepared by ERA Economics, LLC
- Attachment 2: ERA Economics PowerPoint presentation
- Attachment 3: Staff PowerPoint presentation
- Attachment 4: Response to Board Member Request regarding farming industry use of District Conservation Programs

# **Economic Evaluation of the Open Space Credit**

Prepared for



5750 Almaden Expressway San Jose, CA 95118

August 15, 2013

Prepared by

Duncan MacEwan, Ph.D. Richard Howitt, Ph.D.



# **Executive Summary**

Santa Clara Valley Water District (the District) contracted with ERA Economics to provide an independent and quantitative analysis of the Open Space Credit and changes to the agricultural groundwater charge in Santa Clara County. The study consists of three parts: (i) an analysis of the value of agricultural open space, (ii) an analysis of important ecosystem service values provided by agriculture, and (iii) an economic analysis of the direct costs to growers resulting from changes in the agricultural groundwater charge. The information and findings in this report can be used by the District staff, Board of Directors, stakeholders and the community to make informed decisions concerning changes to the Open Space Credit.

Since 1980 harvested agricultural acreage in Santa Clara County has decreased from a peak of 44,000 acres in 1987 to 18,500 acres in 2011. The decline in Santa Clara County agriculture has been driven by a number of factors including increased competition and market-driven production shifts to other regions. Despite the decline in total acreage, increased productivity and real crop prices over the same time period have kept gross crop revenues constant in real terms. Average gross crop revenue per acre has increased from a low of \$2,100 per acre in 1990 to \$4,500 per acre in 2011 in real terms.

The study finds that agriculture provides positive value as open space and from most ecosystem services. Increasing the agricultural groundwater charge would impose direct costs to growers but most of these costs are a result of higher water rates, not from land fallowing. The study finds that increasing the agricultural groundwater charge to 10 percent of municipal and industrial (M&I) rates will result in less than 1 percent decrease in total harvested acres in Santa Clara County.

Agricultural open space provides value to the community. The analysis of the value of agricultural open space involved a literature review and meta-analysis of relevant studies conducted in other regions. Agricultural open space is not traded in a market so its value is inferred by statistical analysis of nearby home values. Key findings include:

- Cropland open space increases home values within 0.25 mile by 2.2 percent, on average.
- Rangeland, native vegetation and conservation easement open spaces increase home values within 0.25 mile by 2.56 percent, on average.
- Intensive agriculture such as mushroom farms and livestock operations decrease home values within 0.33 mile by 6.4 percent, on average.

Agriculture provides services to the ecosystem which provide value to the county and District. The analysis of the value of ecosystem services provided by agriculture involved a literature review and meta-analysis of relevant studies conducted in other regions. There are many types of ecosystem services and most are not traded in markets. The analysis included the seven following ecosystem services commonly associated with agriculture: flood control, groundwater recharge, water quality, pollination, habitat, biodiversity and nitrogen regulation. Key findings based on a meta-analysis include:

- The value of flood control provided by agriculture is estimated at between \$42 and \$86 per acre. This
  figure is likely to be higher in Santa Clara County where flood events have a higher cost than the areas
  evaluated in the reference studies.
- The value of groundwater recharge provided by agriculture is estimated at between \$135.30 and \$167.28 per acre based on a soil-water balance developed for Santa Clara County.

The analysis of the direct costs to growers from changes in the agricultural groundwater charge involved comprehensive data collection and the development of an economic model of agricultural production in Santa Clara County. The model was used to estimate the responses of growers to incremental changes in the

agricultural groundwater charge, and the corresponding effect on crop mix, land fallowing, and profits. Two scenarios were evaluated relative to baseline conditions: agricultural groundwater charge increasing to 10 percent or 25 percent of M&I rates over a 10 year phase-in period from fiscal years 2015 to 2024. The incremental cost is the annual cost in each year of phase-in and the present value of the total cost is the sum of the incremental costs in current dollars. Key findings include:

- When the agricultural groundwater charge increases to 10 percent of M&I rates over 10 years the incremental cost per year increases from \$26,800 in FY 2015 to \$465,000 in FY 2024. The present value of the total cost to growers is estimated to be \$6.96 million. Total harvested area declines by 17 acres, less than 1 percent.
- When the agricultural groundwater charge increases to 25 percent of M&I rates over 10 years the incremental cost per year increases from \$80,800 in FY 2015 to \$2.51 million in FY 2024. The present value of the total cost to growers is estimated to be \$35.91 million. Total harvested area declines by 549 acres, less than 3 percent.

# Contents

Executive Summary	2
Contents	
List of Figures	6
List of Tables	6
1. Introduction	8
1.1 Structure of the Report	8
2. Problem Statement	9
3. Overview of the Approach	10
4. Santa Clara County	11
4.1 Agricultural Production	11
4.2 Agricultural Employment	13
4.3 Agricultural Revenues	14
5. The Value of Agricultural Open Space	16
5.1 The Value of Open Space in Santa Clara County	17
5.1.1. Results	17
5.1.2. Example Application	18
6. The Value of Ecosystem Services	20
6.1 Meta-analysis of the Value of Ecosystem Services in Santa Clara County	20
6.1.1. Results	21
7. Analysis of the Agricultural Groundwater Charge	23
7.1. Groundwater Charge Scenarios	23
7.2. Santa Clara County Agricultural Production Model	23
7.3. Groundwater Costs as a Percent of Variable Costs	24
7.4. Direct Costs to Growers	
7.4.1. Agricultural Groundwater Charges at 10 Percent of M&I Rates	26
7.4.2. Agricultural Groundwater Charges at 25 Percent of M&I Rates	26
7.5. Changes in Irrigated Acres	27
7.6. Costs to the County Economy	28
8. Summary of Findings	29
Technical Appendix A: Value of Open Space	30
A.1. The Value of Open Space in Santa Clara County	30
A.1.1 An Overview of the Value of Open Space	31
A.1.2. Positive and Negative Amenities	32
A.2. Meta-Analysis of the Value of Open Space	33
A.2.1. Summary of Results	34
A.2.2. Example Application	35
A.3. Conclusion	36
A.4. Relevant Studies Reviewed	36
Technical Appendix B: Ecosystem Service Value	37
B.1. Ecosystem Services	

	B.1.1. Methods for Estimating the Value of Ecosystem Services	38
	B.2. Ecosystem Services Related to Agriculture	39
	B.3. Meta-Analysis of Ecosystem Service Value	39
	B.3.1. Summary of Meta-Analysis Results	40
	B.4. Santa Clara County Framework	42
	B.4.1. Flood Control	42
	B.4.2. Groundwater Recharge	42
	B.4.3. Summary	44
	B.5. Conclusion	44
	B.6. Relevant Studies Reviewed	45
Technic	cal Appendix C: Model Documentation	47
	C.1. Problem Overview	
	C.2. Santa Clara County Agricultural Model Objectives	47
	C.3. Santa Clara County Model Overview	48
	C.3.1. Model Calibration	49
	C.3.2. Model Validation	50
	C.4. Santa Clara County Model Components	50
	C.4.1. Crops	50
	C.4.2. Geographic Regions	51
	C.4.3. Land Use Data	52
	C.4.4. Acreage Response Elasticities	53
	C.4.5. Crop Prices and Yields	53
	C.4.6. Other Input Costs	54
	C.4.7. Water Use, Availability and Costs	54
	C.5. Using the Model	54
	C.5.1. Data Input File	55
	C.5.2. Model Program File	55
	C.5.3. Solver Options File	55
	C.5.4. Output File	55
	C.6. Relevant Studies Reviewed	55

# List of Figures

Figure 1. Total Harvested Acres in Santa Clara County, 1980 – 2011	12
Figure 2. Total Farm Jobs in Santa Clara County, 1990 - 2011	13
Figure 3. Gross Agricultural Crop Revenue in Santa Clara County, 1980 - 2011 (2012 Dollars)	
Figure 4. Gross Agricultural Crop Revenue per acre in Santa Clara County, 1980 - 2011 (2012 Dollars)	15
Figure 5. Farm Monitoring and Mapping Program (FMMP) Aggregate Land Use, 2010, and Agriculture-Urban	
Interface	16
Figure A1. Farm Monitoring and Mapping Program (FMMP) Aggregate Land Use, 2010, and Agriculture-Urbar	1
Interface	. 31
Figure C1. Santa Clara County Model Regions	52
List of Tables	
Table 1. Farm Mapping and Monitoring Program 2010 Reported Santa Clara County Land Use	11
Table 2. Harvested Acres in Santa Clara County, 2001 - 2011	. 12
Table 3. Summary of Open Space Value	18
Table 4. Value of Open Space Example	. 18
Table 5. Meta-Analysis of the Total Value of Ecosystem Services Provided by Agriculture	22
Table 6. Groundwater Recharge Ecosystem Service Value in Santa Clara County	. 22
Table 7. Agricultural Groundwater Charge (\$/af) by Fiscal Year	23
Table 8. Santa Clara County Model Crop Acreage, 2010-2011 Average	24
Table 9. Agricultural Groundwater Charge as a Percent of Variable Production Costs, Weighted Average by Fis	scal
Year	
Table 10. Total Groundwater Cost as a Percent of Variable Production Costs, Weighted Average by Fiscal Year	
Table 11. Direct Cost to Growers, by Fiscal Year (dollars in thousands) for 10 percent of M&I	
Table 12. Direct Cost to Growers, by Fiscal Year (dollars in thousands) for 25 percent of M&I	
Table 13. Fallow Acres due to Increased Groundwater Charge	
Table A1. Summary of Open Space Value	35
Table A2. Value of Open Space Example	
Table B1. Meta-Analysis of the Total Value of Ecosystem Services Provided by Agriculture	
Table B2. Land and Water Use Summary Data	
Table B3. 1990-2003 Average Monthly Rainfall at Gilroy, California (inches)	
Table B4. Groundwater Recharge Ecosystem Service Value in Santa Clara County	
Table C1. Santa Clara County Model Crop Groups	
Table C2. Santa Clara County Model Crop Acreage, 2010-2011 Average	53

Page 15

# 1. Introduction

Santa Clara Valley Water District (the District) contracted with ERA Economics to provide an independent and quantitative analysis of the Open Space Credit and changes to the agricultural groundwater charge in Santa Clara County. The Open Space Credit exists to encourage agricultural lands in Santa Clara County.

Increasing the agricultural groundwater charge would decrease the Open Space Credit and potentially allow the District to fund other activities. This study estimates the value of agriculture and the economic costs of increasing the agricultural groundwater charge in order to inform future policy discussion. The study does not include a benefit-cost analysis for Open Space Credit funding. To inform future discussion, the study consists of three parts: (i) an analysis of the value of agricultural open space, (ii) an analysis of important ecosystem service values provided by agriculture, and (iii) an economic analysis of the direct costs to growers resulting from changes in the agricultural groundwater charge.

Santa Clara County has experienced a shift in land use from agriculture to urban development, primarily in North County. Since 1980 harvested agricultural acreage in Santa Clara County has decreased from a peak of 44,000 acres in 1987 to 18,500 acres in 2011. The decline in Santa Clara County agriculture has been driven by a number of factors including increased competition and market-driven production shifts to other regions. Despite a decline in total acreage, increased productivity and real crop prices over the same time period have kept gross crop revenues constant in real terms. Gross crop revenue per acre has increased from a low of \$2,100 per acre in 1990 to \$4,500 per acre in 2011 in real terms. Santa Clara County acreage has been contracting for some time but the gross value per acre has been steadily increasing.

To estimate the economic impacts of changes in the agricultural groundwater charge this study holds all other factors constant. Possible costs to agriculture such as increasing electricity rates and labor costs are not considered in the analysis. Possible benefits to agriculture such as increasing real crop prices and productivity are also not considered in the analysis. This is necessary in order to isolate the effects of increases in the agricultural groundwater charge on the agricultural community.

The information and findings in this report can be used by the District staff, Board of Directors, stakeholders and the community to make informed decisions concerning changes to the Open Space Credit.

### 1.1 Structure of the Report

The main text of this report provides a summary and overview of the economic evaluation of the Open Space Credit. The interested reader can find details and further documentation in three supporting technical appendices. The main text and each of the appendices can each be read as stand-alone documents.

Section 2 provides the problem statement and section 3 provides an overview of the quantitative approach. Section 4 summarizes important agricultural statistics for Santa Clara County and includes a discussion of important trends underlying the historical decline in crop acreage. Section 4 additionally includes summary statistics for the value of agricultural production in Santa Clara County. Sections 5 and 6 summarize the value of agriculture beyond direct crop production, including the value of open space and the value of ecosystem services provided by agriculture. Section 7 summarizes the economic impact analysis of increases in the agricultural groundwater charge. Technical appendices A, B and C provide additional detail and references for sections 5, 6 and 7, respectively.

8

### 2. Problem Statement

The Open Space Credit takes the form of a subsidy to agricultural groundwater users such that currently agricultural producers pay 3 and 6 percent of the municipal and industrial (M&I) rate in North County and South County, respectively. Section 26.7(a)(3)(D) of the District Act limits the agricultural groundwater charge to an amount no greater than 25 percent of the M&I groundwater charge. Resolution 99-21 sets the agricultural groundwater charge at no more than 10 percent of M&I rates. The Open Space Credit is funded by non-rate related revenues from ad valorem property taxes in the General, Water Utility, and Watershed Stream Stewardship Funds. Increasing the agricultural groundwater charge would decrease the Open Space Credit and potentially allow for the reallocation of property tax revenues to fund other District activities. However, higher agricultural groundwater charges may affect the viability of the agricultural economy in Santa Clara County and, in turn, the preservation of open space for which the Open Space Credit was first established. The District commissioned this study in order to better understand short and long-term impacts of higher agricultural groundwater charges.

The District has requested a study that provides an assessment of the value of agriculture and the economic impacts of changes to the agricultural groundwater charge. The study includes an estimate of the value of agriculture as open space and for ecosystem services. The economic impact analysis includes two alternative scenarios where agricultural groundwater charges are increased to either 10 percent or 25 percent of M&I water rates by fiscal year 2024. The scenarios include a 10 year phase-in period starting in fiscal year 2015. Economic impacts are estimated relative to baseline agricultural groundwater charges projected by the District over the same 10 year period.

This study provides a basis for understanding the value of agricultural land in terms of open space and ecosystem services, and the direct costs to growers from changing the agricultural groundwater charge. This study does not estimate the total economic costs to the Santa Clara County economy from changes in the agricultural groundwater charge. The study does not provide benefit-cost analysis of shifting property tax revenues from the Open Space Credit to other district activities. However the results of this analysis represent the starting point for county-wide impact and benefit-cost analyses.

# 3. Overview of the Approach

The first part of the study estimates the value of agricultural open space and the value of ecosystem services. Open space and ecosystem service values for Santa Clara County agriculture are established from a literature review of studies conducted in different regions with results that are applicable to Santa Clara County. A set of selection criteria were applied to identify a subset of relevant studies and a smaller subset of these studies were selected to include in a meta-analysis to estimate the values in Santa Clara County.

The second part of the study estimates the direct cost to growers, and underlying changes in the crop mix and total irrigated acreage, from to higher agricultural groundwater charges. Given that the agricultural groundwater charges considered in this analysis are in the range of 1–5¹ percent of variable production costs, on average, an accounting approach based on average crop budgets would not reflect the subtle changes in costs and acreages implied by relatively small changes in the agricultural groundwater charge. An economic model of agricultural production in Santa Clara County was constructed for the study. This involved data collection on the different types of crops, the groundwater basins in which they were grown, and the revenues and costs associated with producing each crop. In addition, the relative responsiveness of farmers to changes in costs for different crops was based on a previous statistical analysis over a period of 30 years. The technical term for the responsiveness of crop acres to changes in profitability is the price elasticity of supply. When combined with the data for the Santa Clara County agricultural sector and calibrated against a particular average year, in this case 2010-2011, the resulting economic model can forecast how growers production decisions would change in particular regions, and the effect on farm profitability.

The method used in this study is a standard economic approach used by state and federal agencies including the United States Army Corps of Engineers, United States Bureau of Reclamation, and California Department of Water Resources for project impact evaluations. The model is a flexible framework that could be expanded to measure the effects of the changes in irrigated agriculture on both ecosystem service benefits and open-space benefits. It could also be used to evaluate changes in prices, other input costs, or other policies.

All other factors that may affect future conditions in the agricultural industry are held constant in order to isolate the effect of changes in the agricultural groundwater charge. This is a standard approach for economic analysis. A number of other factors are likely to affect Santa Clara County agriculture in the future but these factors are external to changes in the agricultural groundwater charge. Increased labor and energy costs are likely to be offset by increased agricultural productivity and higher commodity prices. All of these factors are held constant in the analysis.

<sup>&</sup>lt;sup>1</sup> A weighted average across all crops in Santa Clara County shows that the agricultural groundwater charge plus pumping costs is less than 8 percent of average variable costs under all policies considered in this report. This proportion varies by crop and Section 7.3 provides a more detailed discussion and overview.

# 4. Santa Clara County

This section provides a summary of Santa Clara County land use, agriculture and historical trends driving land use change. The total area of agriculture in Santa Clara County has been on the decline since the 1980's. Increases in productivity and real crop prices have helped keep gross crop revenues constant in real terms and gross revenue per acre has been increasing in recent years.

According to the United States Census Bureau, as of 2011 1.8 million residents call Santa Clara County home. Primary cities at the agriculture-urban interface include Morgan Hill, San Martin, and Gilroy, with populations of 37,882, 7,027, and 48,821, respectively. These cities are immediately surrounded by productive farmland and include average residential home prices above the state average. According to California's Farmland Mapping and Monitoring Program (FMMP), of the 835,000 total acres in the county, 189,000 (23%) are currently developed. Of the remaining acreage, 3% is in productive agriculture, 47% is in range and grazing lands, and the remaining 27% consists of bodies of water and vegetation. Table 1 summarizes land use in Santa Clara County.

Table 1. Farm Mapping and Monitoring Program 2010 Reported Santa Clara County Land Use

Land Use	Acres	Share (%)
Developed	189,130	22.64
Agriculture – Grazing	392,776	47.03
Agriculture – Local	4,327	0.52
Agriculture – Prime	17,271	2.07
Agriculture – State	3,630	0.43
Agriculture – Unique	2,524	0.30
Water Bodies	8,458	1.01
Miscellaneous Other	217,109	25.99
Total	835,225	

### 4.1 Agricultural Production

The 2011 Santa Clara County Agricultural Crop Report estimates an annual gross value of agricultural production of over \$247 million on less than 20,000 harvested acres and an additional 210,000 acres of non-irrigated rangeland. The recently released 2012 Crop Report shows that the gross value increased an additional 5 percent, to just over \$260 million. The 2011 gross value of agricultural production includes \$86 million from nursery crops and \$61 million from mushroom farms. Harvested acreage includes irrigated crops and dry farmed grain hay. Table 2 summarizes County Agricultural Commissioner harvested acreage data by aggregate crop groups starting in 2001. Harvested acres exhibited a slight downward trend over the last 10 years, decreasing from a high of 23 thousand acres in 2003 down to 18.4 thousand acres in 2011.

Table 2. Harvested Acres in Santa Clara County, 2001 - 2011

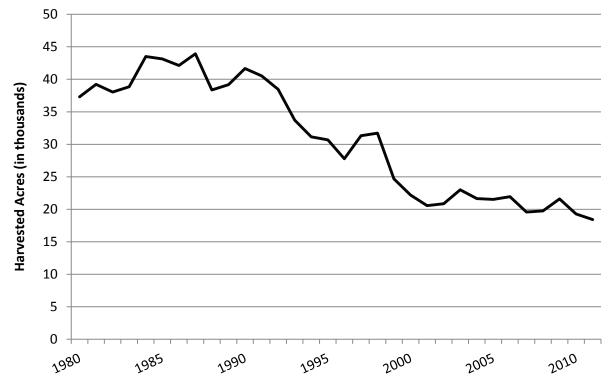
Year	Fruit and Nuts	Field Crops	Onions and Garlic	Vegetables	Processing Tomatoes	Grapes	Dryland Grain Hay	Total
2001	1,847	1,687	590	9,968	525	1,750	4,200	20,567
2002	1,889	2,001	568	10,289	623	1,839	3,642	20,851
2003	1,939	2,176	774	12,726	497	1,854	3,042	23,008
2004	1,674	1,804	691	12,469	169	1,870	2,961	21,638
2005	1,806	2,111	596	12,126	0	1,720	3,163	21,522
2006	1,847	1,903	563	13,160	0	1,750	2,717	21,940
2007	1,862	2,055	623	10,084	0	1,550	3,402	19,576
2008	1,803	2,025	651	9,605	0	1,510	4,143	19,737
2009	1,625	1,476	795	10,482	1,160	1,516	4,530	21,584
2010	1,301	1,082	556	10,008	1,010	1,530	3,790	19,277
2011	1,197	1,339	520	9,248	1,060	1,550	3,510	18,424

Source: Santa Clara County Agricultural Commissioner Annual Crop Reports, 2001 - 2011

Note: Excludes approximately 210,000 acres of non-irrigated rangeland

Figure 1 illustrates the trend for total harvested acres in Santa Clara County. Total acreage has decreased since 1980. Average harvested acres equaled 40,367 per year between 1980 and 1989 and fell to an average of 33,168 and 21,158 in the decades 1990–1999 and 2000–2009, respectively. Given the current difference in the density of cropping across the county, it is clear that the majority of the reduction in acreage took place in North County, where the pressure to convert farmland to commercial, industrial and residential use was the strongest. In addition, traditional crops in North County included soft fruits, which declined in greater proportions than the total harvested acres.

Figure 1. Total Harvested Acres in Santa Clara County, 1980 – 2011



There are a number of trends underlying the changes in total harvested acres. The area planted to grapes has remained fairly stable since 1980, however, like many areas in the Central Valley there has been a conversion in the type of grapes produced from table grapes to wine grapes. This change has coincided with the 1989 designation of Santa Clara Valley as an American Viticultural Area. Garlic acreage has declined by more than 50 percent, a change that is largely attributed to international competition from China. Recent years have seen a steady increase in fresh vegetables, such as bell peppers, in response to strong fresh vegetable demand.

The 2011 gross value of agricultural production (\$247 million) includes 26 different commodities with over \$1 million in value. Nursery crops accounted for the largest share of gross value (\$86 million), which includes miscellaneous bedding plants, roses and shrubs, and turf. Mushrooms are the second most valuable commodity in the county with gross value of \$61 million in 2011. Mushroom farms in Santa Clara County include Monterey Mushrooms, South Valley Mushrooms, Royal Oaks Mushrooms, B&D Mushrooms, San Martin Mushrooms, Countryside Mushrooms, and Global Mushrooms. Other top-grossing commodities include bell peppers, fresh tomatoes, lettuce, and miscellaneous greens. For the last decade nursery crops, mushroom farms, and bell peppers have been top grossing commodities in Santa Clara County.

### 4.2 Agricultural Employment

The California Employment Development Department (EDD) classifies Santa Clara County as part of the San Jose–Sunnyvale–Santa Clara Metropolitan Statistical Area (MSA). EDD shows total farm employment in Santa Clara County in 2011 equaled 3,400 Full Time Equivalent (FTE) jobs in the MSA according to the North American Industry Classification System (NAICS) code(s) 11-000000, total farm jobs. Farm employment has decreased in the MSA since 2008, and the 20 year average is 4,440 FTE farm jobs in Santa Clara County. Farm employment generally mirrors trends in harvested acreage. Figure 2 illustrates total farm jobs in Santa Clara County from 1990 to 2011.

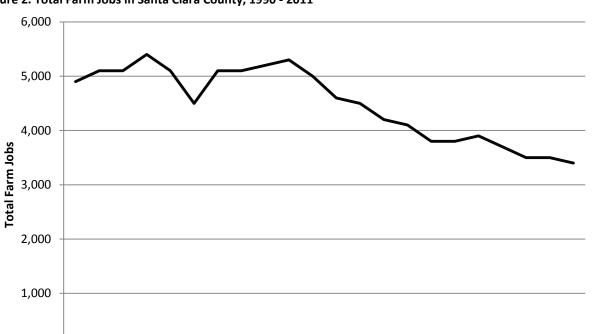


Figure 2. Total Farm Jobs in Santa Clara County, 1990 - 2011

The NAICS data shown in figure 2 do not include indirect and induced jobs supported by the agricultural sector. Indirect jobs include industries that support agriculture such as farm machinery, agricultural chemicals, and fertilizers. Induced jobs are those created by money spent by workers in other industries. For example, a grower employs laborers (direct jobs) and purchases drip tape from a supply store in Gilroy that hires workers (indirect jobs) to support the growers purchases. The farm laborer spends money at local restaurants that hire employees to cook and serve food (induced jobs). Total agricultural employment, including all supporting and supported industries, is higher than that shown in figure 2. Estimation of direct, indirect and induced jobs would require additional analysis with an input-output model of Santa Clara County. Input-output models quantify the relationship between various sectors of the economy and are able to estimate changes in all related industries due to a change in the agricultural sector.

### 4.3 Agricultural Revenues

The footprint of the agricultural industry in Santa Clara County has been on the decline for a number of years, which can be seen in the declining acreage and employment figures. At the same time the industry has benefited from increased yields through improved efficiency and production practices. International and domestic demand has simultaneously driven strong agricultural prices and land values in recent years.

Figure 3 illustrates gross crop revenue in Santa Clara County since 1980, in constant 2012 dollars. Crop revenue excludes apiary products, livestock, mushroom farms, nurseries, and rangeland. Crop production represents the largest agricultural groundwater user in the county and will be most affected by changes in the agricultural groundwater charge. Figure 3 shows that gross agricultural crop revenue has remained constant in real terms since 1980. This is driven by increases in productivity (yields) and increases in real prices.

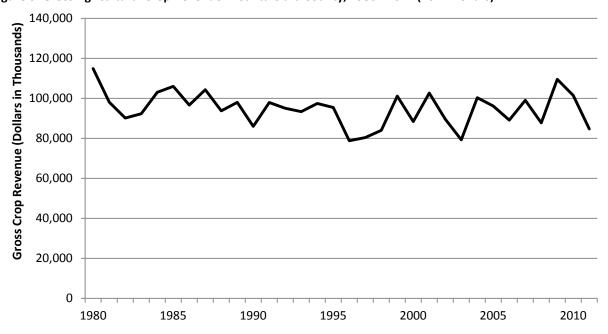


Figure 3. Gross Agricultural Crop Revenue in Santa Clara County, 1980 - 2011 (2012 Dollars)

Figure 4 illustrates gross crop revenue per acre from 1980 to 2011, in constant 2012 dollars. Increases in productivity (yields) and real prices and a shift towards higher value more intensive production has led to an increase in gross crop revenues per acre. Although acreage and jobs have declined, the agricultural industry in Santa Clara County currently produces a higher value per unit land than previous years.

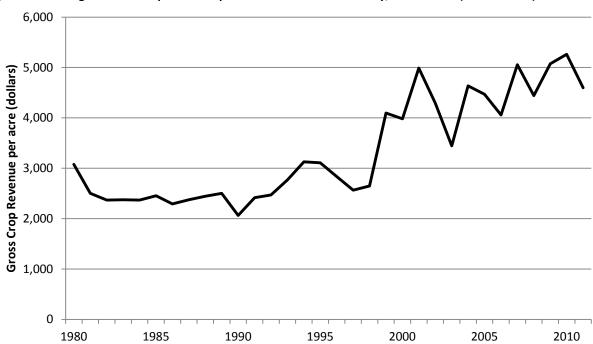


Figure 4. Gross Agricultural Crop Revenue per acre in Santa Clara County, 1980 - 2011 (2012 Dollars)

# The Value of Agricultural Open Space

This section provides an overview of the methods used to estimate the value of different types of agricultural open space in Santa Clara County. The section includes a summary of the estimated value in Santa Clara County and an example application for how to value particular areas of open space. Technical details, references and the logic behind the analysis can be found in technical appendix A.

Open agricultural space provides a range of amenities to communities beyond the direct value of the crops produced and the revenues generated. Many such amenities are positive, such as aesthetic value and scenery for nearby residents, recreation opportunities and prevention of traffic and urban sprawl. Measuring the value of open agricultural land is particularly relevant to Santa Clara County, where fragmented high-tech and residential development is interspersed with high value agriculture. This pattern of development has resulted in a larger agriculture-urban interface (edge) in Santa Clara County than in most urban environments. Figure 5 illustrates land use and the agriculture-urban interface in 2010. The agriculture-urban interface is calculated by applying a 0.25 mile radius to all types of agricultural land reported by the FMMP. Urban development within this radius represents the agriculture-urban interface and is shown in yellow.

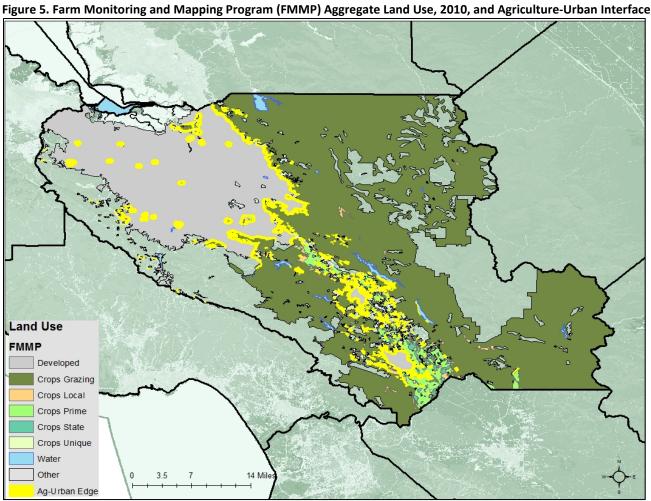


Figure 5 illustrates the concentration of the agriculture-urban edge in South County. This is consistent with the knowledge that as North County has become more developed, agriculture and open space are pushed farther south.

### 5.1 The Value of Open Space in Santa Clara County

Analysis of Santa Clara County data and review of existing economic studies shows there are three key types of agricultural open space: (i) cropland, (ii) rangeland, and (iii) intensive agriculture. Cropland is land that is actively farmed. Rangeland includes non-irrigated and non-seeded grazing land, native vegetation, and forests. Intensive agriculture includes dairies, mushroom farms, and related production processes that likely generate negative amenities such as noise and odors. These three types of open space were found to provide different economic value and consequently were treated separately in the analysis.

Economists consider open space a non-market good because it has value, but no market where it is traded. Economists have studied the value of open space in different regions using a range of approaches. Over 30 studies were reviewed and 12 studies were identified as relevant for California open space valuation and, in particular, applicable to areas such as Santa Clara County. After careful review and analysis 3 studies were selected to value Santa Clara County open space in cropland, rangeland, and intensive agriculture. Three criteria were used to identify applicable studies:

- The study applied best economic principles, statistical and econometric analysis.
- The study estimated the value of relevant types of agricultural open space.
- The study used data from a region similar to Santa Clara County.

Since agricultural open space is not explicitly traded in a market valuation relies on statistical analysis of nearby home prices. This method relies on econometric (statistical) analysis to decompose the price of a home into the value of its individual attributes. For example, proximity to transportation, quality of the school district, house size, neighborhood characteristics, and a number of other factors can affect the sale price of a home, in addition to proximity to open space. The analysis must control for all other factors that affect the price of a home in order to identify the incremental value attributable to specific types of agricultural open space.

#### 5.1.1. Results

Three types of agricultural open space in Santa Clara County were included in the analysis. To the extent that some homes are located near several land use types, the net effect is a weighted average of the individual estimates provided below. Valuation of all open space in the county would require collecting a comprehensive dataset of all agricultural and urban lands in a geospatial database. Specifically, it would be necessary to know the location of every urban parcel relative to cropland, rangeland, or intensive agriculture.

Analysis of the literature shows that a 0.25 mile proximity to cropland open space increases home values by 2.2% on average. Proximity to forests, rangeland, and native vegetation increases home values further, by 2.56% on average. Some types of open space provides negative value. Proximity within 0.33 mile of intensive agriculture decreases home values by 6.4% on average. Table 3 summarizes the key findings of the analysis.

**Table 3. Summary of Open Space Value** 

Land Use Type	Percent change in nearby home values for 1 parcel converted to open space	Radius (mi)	Study	Location
Cropland	2.20	0.25	Kuminoff (2009)	CA
Forests, rangeland	2.56	0.25	Ready and Abdalla (2005)	MD
Intensive agriculture	-6.40	0.3	Irwin (2002)	PA

#### 5.1.2. Example Application

Consider conversion of 1 parcel from existing urban use to agricultural open space within 0.25 mile of an average home in the cities of Morgan Hill, San Martin and Gilroy. Table 4 summarizes the average change in home value in each location for three open space types. Column 2 lists the average home sale price as of May 2013 in each location. Average home sale prices are compiled from the Zillow Home Value Database and represent an average sale price for all homes sold between January and May 2013. Column 3 shows the change in the average home value if 1 parcel of urban development is converted to crop production. On average, home values increase by 2.2 percent, reflecting the implicit value of open space to the region. For example, in Gilroy this would increase the average value of homes located within 0.25 mile by \$9,875. If the parcel was instead converted to rangeland the value would be \$11,491. The average home value would decrease if the urban parcel was instead converted to intensive agriculture such as a mushroom farm. These changes in home values hold all other factors constant and consequently represent the implicit value of agricultural open space.

The net value will depend on the quantity and location of different agricultural open space. For example, if a single parcel located within 0.25 mile of an average home in Gilroy was converted from urban development to cropland and another parcel to intensive agriculture, home values near both parcels would decrease in value by 4.2 percent (2.2 - 6.4 percent), on average. The value of open space in this case is -\$18,825 (\$448,875 x 4.2%).

**Table 4. Value of Open Space Example** 

		Change in home	value due to conver	sion of 1 acre to:
City	Average Home Price <sup>1</sup>	Cropland	Rangeland	Intensive
Morgan Hill	\$581,250	\$12,788	\$14,880	-\$37,200
San Martin	\$678,775	\$14,933	\$17,377	-\$43,442
Gilroy	\$448,875	\$9,875	\$11,491	-\$28,728
Santa Clara County <sup>2</sup>	\$683,025	\$15,027	\$17,485	-\$43,714

<sup>&</sup>lt;sup>1</sup>Source: January 2013 - May 2013 average, computed from Zillow Home Value Database

The analysis shows that there are positive effects on home values located in close proximity to agricultural open space. On average, home values increase by 2.2 - 2.56 percent when located close (within 0.25 mile) to cropland or rangeland. There are a few types of agriculture which could have negative effects from odors, noise, and other factors. In Santa Clara County these include mushroom farms and small-scale livestock operations. Proximity (within 0.33 mile) to intensive agriculture such as mushroom farms decreases home values by 6.4 percent on average as a result of negative amenities. Given the checkerboard development pattern in Santa

<sup>&</sup>lt;sup>2</sup>County average.

Clara County and the limited amount of intensive agriculture open agricultural space contributes positive value to Santa Clara County.

# 6. The Value of Ecosystem Services

This section provides an overview of the methods used to estimate the value of ecosystem services provided by agriculture in Santa Clara County. Technical details, references and the logic behind the analysis can be found in technical appendix B.

Ecosystem services can be broadly defined as the amenities provided by resources and natural systems. Services include maintenance of soil quality, species habitat, clean drinking water, and a general existence value through support provided to a larger ecosystem network. Ecologists have identified over one hundred ecosystem services that can be associated with agriculture and open space. Most services are location-specific such as habitat and water quality. Seven common ecosystem services provided by agriculture are considered and specific attention is paid to flood control and groundwater recharge since these are two components of the District's mission.

# 6.1 Meta-analysis of the Value of Ecosystem Services in Santa Clara County

Similar to open space, many ecosystem services are non-market goods in that they are not actively traded in a market with an observable price. Ecosystem services are additionally difficult to value because the appropriate geographic scale for analysis varies widely; some services are local in nature, such as pollination, while others are global, such as carbon sequestration. Even after defining the relevant geographic scale, values depend on the location of the field (proximity to important species) and field-specific management practices (organic versus conventional agriculture). In light of these challenges, applied policy research and the academic literature continue to develop new methods to value ecosystem services.

The meta-analysis focused specifically on the groundwater recharge and flood control benefits provided by irrigated agriculture and dry farmed grain hay. Five additional services commonly associated with agricultural production were identified. Ecosystem service values provided by agriculture in Santa Clara County reviewed for this analysis include flood control, groundwater recharge, water quality, pollination, habitat, biodiversity and nitrogen regulation.

**Flood control**. Agriculture can provide a natural buffer for variation in seasonal water flows and rainfall. Land management practices upstream and downstream affect runoff, drainage and the frequency of flood events. In some areas agriculture can be managed for both crop production and as a seasonal floodplain. Agriculture typically has a lower cost for a given level of flood risk than residential and commercial development.

**Groundwater recharge**. Deep percolation from irrigation and precipitation will result from some portion of applied water in excess of consumptive use. This proportion depends on field soil characteristics, slope, crop type and irrigation practices.

**Water quality**. Surface runoff and deep percolation of water from irrigation and precipitation on agricultural land can increase or decrease water quality. Excessive nitrogen application can lead to significantly decreased water quality. Less intensive agriculture such as rangeland can provide a natural filter for water.

**Pollination**. Wild pollinator populations have recently been on steady decline in California. Agriculture provides natural habitat for pollinators.

**Habitat**. Conversion from native vegetation to agriculture can destroy habitat for some species. However species such as the Swainson's Hawk and other predatory birds benefit from hunting conditions on open fields.

**Biodiversity**. A diverse crop mix and rotation system functions as a natural break for pest and disease cycles. It also provides flexibility for producers to respond to changes in agricultural prices and import and export market conditions.

**Nitrogen regulation**. Excessive nutrient runoff is a primary cause of eutrophication of surface water. Agriculture is a primary contributor to this problem in many regions, although rotation systems and other field management decisions can be used to manage nitrogen application and reduce runoff.

Agriculture provides ecosystem services and many disservices. The cost of ecosystem disservices from agriculture should not be understated. For example in the Llagas subbasin, the rate of domestic well contamination above the nitrate MCL is known to be high, and the primary causes include fertilizers used in agriculture and septic tanks. This analysis focuses on the value of ecosystem services but careful attention should be paid to tradeoffs between the benefits described in this report and potential costs along other dimensions.

Several dozen studies were reviewed and 22 were identified as relevant for Santa Clara County. From these, 4 studies were identified for use in the meta-analysis. The decision to include the study in the meta-analysis was based on three criteria:

- The study estimates some or all of the 7 ecosystem service values for agriculture.
- The study used data from a region with a large agriculture-urban interface similar to that found in Santa Clara County.
- The study was peer-reviewed or part of a public report that was based on peer-reviewed publications.

Additional estimates of the value of groundwater recharge from agriculture were calculated to update values identified in the meta-analysis. The additional analysis used District and California Department of Water Resources water use data to estimate deep percolation using a soil-water balance for major crops in the county.

#### 6.1.1. Results

Table 5 summarizes total ecosystem service values for the seven services considered in this analysis.

Flood control ecosystem service values range between \$42 and \$86 per acre per year. The value of flood control ecosystem services is typically estimated using an avoided cost approach. In the avoided cost framework the estimated value of an agricultural acre of flood control benefits is based on the change in risk and additional cost of flood events if the land were converted to urban use. Values in Santa Clara County are likely to be higher given the high-value urban land in North County, and significant agriculture-urban interface in South County.

Groundwater recharge ecosystem service values identified in the literature review range between \$22 and \$44 per acre per year. Groundwater recharge benefits are estimated using a soil-water balance approach and include the benefits from deep percolation of irrigation water and precipitation. Irrigation and precipitation in excess of consumptive use goes to soil capacity, surface runoff, or deep percolation. Studies reviewed for the meta-analysis typically make location specific adjustments for the proportion of soil capacity and surface runoff in order to estimate the amount of groundwater recharge provided by an average acre. The studies identified in the literature review are not representative of Santa Clara County water values and conditions. This estimate is updated in the following section.

Table 5. Meta-Analysis of the Total Value of Ecosystem Services Provided by Agriculture

Service	Total Value (\$/ac per year)	Summary Notes
Flood Control	\$42 – \$86	Santa Clara County is likely at or above the high end of this range due to high cost of flood events.
Groundwater Recharge	\$22 – \$44	This value represents the average for direct recharge from irrigation and precipitation. Santa Clara County has a higher value and this estimate is further refined.
Water Quality	\$27	Value represents an average, range varies from positive to negative depending on the crop.
Pollination	\$19 – \$64	None.
Habitat	Varies	Estimates are both crop and species-specific. Excluded from this analysis.
Biodiversity	\$31	None.
Nitrogen Regulation	\$0 – \$433	Estimates are crop-specific and can be negative in some cases.

Additional analysis was performed to refine estimates of the groundwater recharge value in Santa Clara County. The analysis estimates groundwater recharge from irrigated agriculture and dry farmed grain hay and does not include other sources of recharge such as that in developed areas. The amount of groundwater recharge depends on factors such as soil capacity and surface runoff. These factors are varied in the analysis in order to generate a lower and upper-bound scenario. Table 6 summarizes the results of the analysis. Groundwater recharge is estimated at between 10,686 and 13,140 acre-feet per year. This translates into an annual average of 0.55 to 0.68 acre-feet of groundwater recharge provided by an acre of harvested agricultural land in Santa Clara County. The average cost of an acre foot of agricultural water to the District is \$246 per acre-foot (as of Fiscal Year 2014) and this is used to value the groundwater recharge. A cost of \$246 per acre foot of agricultural water and recharge of between 0.55 and 0.68 acre-feet per acre implies a groundwater recharge ecosystem service value between \$135.30 and \$167.28 per acre per year. Assumptions used for the calculation can be found in technical appendix B.

The groundwater recharge ecosystem service value represents the direct total value for an agricultural acre. If an acre is converted to urban development it would be necessary to estimate the difference in recharge between the two land use types in order to calculate the net effect.

Table 6. Groundwater Recharge Ecosystem Service Value in Santa Clara County

Scenario	Groundwater recharge (af/year)	Acre-feet per acre per year	Value per af (\$/af)	Groundwater Recharge Value (\$/ac per year)
Low Assumptions Estimate	10,686	0.55	\$246	\$135.30
High Assumptions Estimate	13,140	0.68	\$246	\$167.28

Taking the meta-analysis results for the value of flood control benefits presented in table 5 and the groundwater recharge estimates presented in table 6, the estimated total value of groundwater recharge and flood control ecosystem services provided by agriculture to Santa Clara County is between \$177.30 and \$253.28 per acre per year.

Ecosystem services are difficult to define and challenging to value. Work continues to develop the scientific methodologies to understand ecosystem processes and the economic approaches to value individual components.

# 7. Analysis of the Agricultural Groundwater Charge

This section provides an overview of the methods used to estimate the direct costs to Santa Clara County growers resulting from changes in the agricultural groundwater charge. Technical model details, references and the logic behind the analysis can be found in technical appendix C.

The ability to analyze changes in the groundwater charge under short run and long run conditions requires an economic model of the agricultural economy in Santa Clara County which is able to reflect the incremental effects of changes in water costs. Changes in local economic activity occur gradually as costs and benefits change, so there is a corresponding difference between short run and long run analysis. Grower response to increasing groundwater charges will be a smooth adjustment, rather than a sudden shift out of production.

### 7.1. Groundwater Charge Scenarios

The analysis considers three scenarios over a 10 year time horizon:

- Baseline
- Agricultural groundwater charge increasing to 10 percent of M&I over a 10-year time period
- Agricultural groundwater charge increasing to 25 percent of M&I over a 10-year time period

Table 7 summarizes the agricultural groundwater charge in the three scenarios. As shown, baseline conditions have the agricultural groundwater charge increasing from the current level (FY 2014) of \$18.30 per acre-foot to \$18.90 per acre-foot in FY 2015, up to \$24.82 in FY 2024. The agricultural groundwater charge increases to \$41.39 and \$103.36 by 2024 in the 10 percent and 25 percent of M&I scenarios, respectively.

Table 7. Agricultural Groundwater Charge (\$/af) by Fiscal Year

Scenario	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline	18.90	19.50	20.10	20.70	21.30	21.91	22.51	23.11	23.71	24.82
10% of M&I	19.86	21.55	23.38	25.37	27.52	29.86	32.40	35.16	38.14	41.39
25% of M&I	21.76	25.88	30.77	36.58	43.50	51.72	61.49	73.12	86.93	103.36

The direct economic cost to growers from changes in the agricultural groundwater charge equals the difference between the baseline scenario and the 10 and 25 percent scenarios, respectively.

### 7.2. Santa Clara County Agricultural Production Model

An economic model of agricultural production in Santa Clara County was constructed for this analysis. The model includes 18 crop groups and their corresponding revenues and production costs. The model is defined over 3 groundwater areas including the Santa Clara Plain, Coyote Valley, and Llagas Subbasin. Economic and land use data were collected for the Santa Clara County agricultural sector and the model was calibrated against a particular average year, in this case 2010-2011. The resulting economic model is used to forecast how growers production decisions would change in particular regions in response to higher agricultural groundwater costs, and the effect on farm profitability.

Table 8 summarizes crop acreage across the three Santa Clara County model regions based on 2010-2011 averages.

Table 8. Santa Clara County Model Crop Acreage, 2010-2011 Average

Crop Group	Santa Clara Plain	Coyote Valley	Llagas
Alfalfa	286	91	0
Apricot	105	41	76
Beans	6	390	437
Cherries	0	199	336
Citrus	118	13	100
Cucurbits	0	564	404
Fresh Tomatoes	0	26	732
Garlic	0	54	245
Grain	1,155	579	1,916
Lettuce	15	530	1,908
Onions	0	12	227
Other Truck	44	628	3,610
Pasture	85	22	361
<b>Processing Tomatoes</b>	0	21	1,014
Strawberries	0	19	76
Sweet Corn	21	392	753
Vines	657	324	559
Walnuts	29	24	111

### 7.3. Groundwater Costs as a Percent of Variable Costs

Small changes in the agricultural groundwater charge require an estimation framework that can capture the incremental responses of growers. A standard crop budget accounting approach cannot capture incremental grower adjustments because it lacks economic information, such as observed responsiveness to changes in prices and costs, found in classical economic models. Beyond this, an accounting approach does not acknowledge cross-crop effects and the fact that many crops are grown in a rotation that will likely adjust as relative crop profitability changes.

Table 9 summarizes the agricultural groundwater charge as a percentage of variable costs under the baseline, 10 percent of M&I and 25 percent of M&I scenarios. Without proprietary information it is not possible to compute the groundwater costs as a percentage of grower profits. Estimates represent a weighted average over all crop acres in the county. The proportion of variable production costs attributable to the agricultural groundwater charge equals less than 1 percent, on average, under baseline conditions. This increases to a maximum just under 5 percent of variable costs in the 25 percent scenario in fiscal year 2024.

Underlying the weighted averages are large variations by crop type. For flood irrigated water-intensive crops such as alfalfa, the groundwater charge accounts for 14 to 45 percent of variable production costs in the baseline (year 2015) and 25 percent of M&I (year 2024) scenarios, respectively. Other crops such as lettuce have variable production costs that are driven by yield and the corresponding harvest costs such that the groundwater charge accounts for less than 0.3 to 2 percent of variable production costs.

Table 9. Agricultural Groundwater Charge as a Percent of Variable Production Costs, Weighted Average by Fiscal Year

Scenario	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline	0.89	0.92	0.95	0.98	1.00	1.03	1.06	1.09	1.12	1.17
10% of M&I	0.94	1.02	1.10	1.19	1.29	1.40	1.52	1.65	1.78	1.93
25% of M&I	1.02	1.22	1.44	1.71	2.03	2.40	2.84	3.36	3.97	4.69

Table 10 summarizes the total groundwater cost as a percent of variable production costs under baseline, 10 percent of M&I, and 25 percent of M&I scenarios. The total groundwater cost includes the amortized fixed cost of the pump and well plus the variable operating cost of the pump and minor upkeep and maintenance expenses in addition to the agricultural groundwater charge. The corresponding proportion of variable costs is higher, ranging from just over 4 percent to just under 8 percent of variable production costs.

Table 10. Total Groundwater Cost as a Percent of Variable Production Costs, Weighted Average by Fiscal Year

Scenario	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline	4.12	4.15	4.17	4.20	4.23	4.25	4.28	4.30	4.33	4.38
10% of M&I	4.16	4.24	4.32	4.40	4.50	4.60	4.71	4.83	4.95	5.09
25% of M&I	4.25	4.43	4.64	4.89	5.18	5.54	5.95	6.44	7.01	7.68

Groundwater costs, both the agricultural groundwater charge and total groundwater cost, represent a relatively small portion of variable production costs. Even though groundwater is a relatively small portion of variable costs, growers respond economically to incremental changes in the groundwater charge. There is a corresponding cost to growers and the county. The following sections highlight this finding and the results of the analysis.

#### 7.4. Direct Costs to Growers

The model framework estimates the direct cost of the change in the agricultural groundwater charge to growers at each point in time as the difference between baseline conditions and each of the two groundwater charge scenarios. There are four key direct costs to growers:

- Shifts in the regional crop mix (net revenue loss)
- The decision to permanently fallow land (fallow land cost)
- Increased groundwater cost to all growers (additional groundwater cost)
- Cost to mushroom farms and nurseries

Growers are likely to shift the regional crop mix and alter rotations in response to changes in the cost of groundwater. Changes in production costs alter the relative profitability between crops and profit maximizing growers are expected to adjust land use patterns accordingly. This effect is additionally governed by the acreage response elasticities which show how growers have historically responded to changes in production costs and crop prices. The cost of the shift in crop mix depends on the crops brought into and out of production which is estimated using the Santa Clara County model.

As water costs increase it may become economically optimal to fallow less productive land. The cost of land out of production is equal to the land rental rate, which in Santa Clara County averages \$300 per acre.

All growers in Santa Clara County would face higher groundwater charges per acre foot. The difference between the baseline conditions and the 10 percent or 25 percent scenario, multiplied by the total acre-feet of

groundwater used represents the additional cost to growers. Total agricultural groundwater use varies with the estimated crop mix but is generally around 27,800 acre-feet per year. The method used to calculate the total groundwater cost can be found in technical appendix C.

Costs to mushroom farms and nurseries are treated separate from standard crop production. Changes in these industries are more likely to be driven by changes in regional demand for bedding plants and increased competition in mushroom production from Pennsylvania, Canada, and China. Consequently, mushroom farm and nursery response to changes in the groundwater charge is modeled as perfectly inelastic. This means that these industries bear the full cost of the increase in the groundwater charge and do not shift production or pass on costs to consumers.

The incremental cost to growers represents the difference between baseline conditions and the respective policy at each point in time. The total cost is the sum of the incremental costs. Due to general price inflation a dollar today is worth more than a dollar in the future. The sum of the incremental costs is consequently "discounted" back to a present value figure. This represents the present value of the total cost to growers.

#### 7.4.1. Agricultural Groundwater Charges at 10 Percent of M&I Rates

Table 11 summarizes the cost to growers, relative to baseline, when the groundwater charge increases to 10 percent of M&I rates by 2024. The table shows the incremental cost for each of the four components for each of the 10 years of phase-in.

The total cost to growers is equal to the present discounted value of the 10 year stream of losses, plus the infinite future stream of losses from year fiscal year 2024 forward. Growers face an increasing incremental cost for the first 10 years of phase in, then it is assumed that the difference between baseline and 10 percent of M&I rates remains constant into the future. To the extent that relative rates converge or further diverge the present value of the total cost to growers will decrease or increase, respectively. Using a standard discount rate of 5 percent, the present value of the total cost to growers is \$6.96 million.

Table 11. Direct Cost to Growers.	hy Fiscal Year (dollars	in thousands) for 10	nercent of M&I
Table 11. Direct cost to drowers,	DV 113Cai 1Cai (GOIIA13	III tiidusailus <i>i</i> idi x	Derceill of Mixi

Cost to Growers	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Additional Groundwater Cost	25.3	54.0	86.5	123.1	163.9	209.5	260.5	317.4	380.0	436.3
Net Revenue Loss	0.1	0.2	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.7
Land Fallow Cost	0.2	0.5	0.8	1.2	1.7	2.3	3.0	3.8	4.7	5.2
Mushroom and Nursery	1.3	2.7	4.3	6.2	8.2	10.5	13.1	15.9	19.1	21.9
Total Cost	26.8	57.4	91.8	130.9	174.4	223.0	277.6	338.3	405.2	465.0

Results show that the largest cost to growers is the cost of additional groundwater. Changes in the crop mix (reflected in net revenue loss) and increased land fallowing are relatively minor factors in response to relatively small increases in the groundwater charge.

The general trend underlying the analysis is an incremental shift out of lower-value and higher water use crops, that are not grown as part of a higher value rotation, into higher-value and lower water use crops. Incremental costs increase from \$26,800 in fiscal year 2015 to \$465,000 in fiscal year 2024. Costs to growers increase at an increasing rate as the groundwater charge increases. From fiscal year 2024 onward the incremental costs are assumed constant at \$465,000.

#### 7.4.2. Agricultural Groundwater Charges at 25 Percent of M&I Rates

Table 12 summarizes the cost to growers, relative to baseline, when the groundwater charge increases to 25 percent of M&I rates by 2024. The table shows the incremental cost for each of the four components for each of the 10 years.

The total cost to growers is equal to the present discounted value of the 10 year stream of losses, plus the infinite future stream of losses from fiscal year 2025 into the future. Using a standard discount rate of 5 percent, the present value of the total cost to growers is \$35.91 million.

Table 12. Direct Cost to Growers, by Fiscal Year (dollars in thousands) for 25 percent of M&I

Cost to Growers	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Additional										
Groundwater	75.4	168.1	281.1	418.1	584.2	783.9	1,022.8	1,299.7	1,620.4	1,975.9
Cost										
Net Revenue	0.4	0.9	1.5	2.3	3.1	4.1	15.6	75.2	159.9	268.3
Loss	0.4	0.9	1.5	2.3	3.1	4.1	13.0	73.2	139.9	200.3
<b>Land Fallow Cost</b>	1.2	2.7	4.7	7.0	9.9	13.4	22.0	53.6	99.0	164.7
Mushroom and	2.0	0.4	111	21.0	20.2	20.4	F1 F	CC 0	02.5	102.7
Nursery	3.8	8.4	14.1	21.0	29.3	39.4	51.5	66.0	83.5	103.7
Total Cost	80.8	180.2	301.4	448.4	626.6	840.8	1,111.8	1,494.5	1,962.8	2,512.6

Results show that, as with the 10 percent scenario, the largest cost to growers is the cost of additional groundwater. Shifting crop mix and increased land fallowing are relatively minor occurrences over small changes in the groundwater charge. Net revenue losses (shift in crop mix) begin to increase at an increasing rate beginning in 2021 as the agricultural groundwater charge exceeds \$61 per acre foot.

Incremental costs increase from \$80,800 in fiscal year 2015 to over \$2.51 million in fiscal year 2024. Costs to growers increase at an increasing rate as the groundwater charge increases. From fiscal year 2024 forward the incremental costs are assumed constant at \$2.51 million.

#### 7.5. Changes in Irrigated Acres

Growers are expected to fallow some land in response to higher groundwater costs. Fallow land corresponds to land permanently taken out of production in response to higher groundwater charges, not land fallow as part of a crop rotation. Land out of production is expected to come from lower quality production conditions and farms that already operate with higher production costs. Growers who fallow land will lose the ability to rent the land, reflecting the fixed costs of production. Land rents for an average of \$300 per acre in Santa Clara County. Table 13 summarizes total land out of production in response to higher agricultural groundwater charges.

Table 13. Fallow Acres due to Increased Groundwater Charge

Fallow Land (acres)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
10 percent Scenario	1	2	3	4	6	8	10	13	16	17
25 percent Scenario	4	9	16	23	33	45	73	179	330	549

The analysis shows that total land out of production is expected to be a small proportion of the total harvested land area. The maximum land out of production in the 10 percent scenario (17 acres) is less than 1 percent of total harvested acres.

When the groundwater charge increases to 25 percent of M&I rates by 2024, total land out of production is still a relatively small proportion of total acreage. A maximum of 549 acres out of production corresponds to less than 3 percent of total county harvested acreage.

The agricultural community will correctly note that there are a range of external pressures that are not captured by this analysis. Increases in all other production costs are held constant in real terms in order to isolate the

effect of increasing the agricultural groundwater charge. Conversely agricultural producers have enjoyed a steady increase in real prices and farm productivity in recent years. Increases in agricultural prices and productivity are held constant in order to isolate the effect of increasing the agricultural groundwater charge. All other external costs and benefits are held constant in the analysis.

The analysis considers changes within the Santa Clara County agricultural economy and the decision of whether or not to fallow land is fundamentally a decision about whether to continue farming in Santa Clara County. Some growers may decide to shift production to other regions such as Salinas or the Central Valley, or areas to the south in San Benito County. While this decision is partially captured by the acreage response elasticities implicit in the model, it is likely that response in some parts of the county may be more elastic. Consequently, fallow acreage estimates in this analysis should be viewed as conservative estimates.

#### 7.6. Costs to the County Economy

This analysis summarizes the cost to growers from increases in the groundwater charge. This study has not considered the effects on the Santa Clara County economy, such as jobs, output value, and county tax revenues. Additionally, this study is concerned with the direct cost and has not estimated indirect and induced costs on the broader economy. Estimation of total costs to the county and agricultural employment would require additional analysis with a regional input-output model of Santa Clara County, such as IMPLAN.

#### 8. Summary of Findings

This study has provided an independent and quantitative assessment of the value of agricultural open space, the value ecosystem service provided by agriculture, and the direct economic costs to growers from changes in the agricultural groundwater charge in Santa Clara County.

The value of agricultural open space was found to be generally positive. Cropland increases nearby (within 0.25 mile) home values by 2.2 percent and open rangeland increases values by 2.56 percent. The total value of an agricultural acre depends on the location and number of surrounding homes. Intensive agriculture decreases home values within 0.33 mile by 6.4 percent. The net effect of loss (or addition) of agricultural open space depends on the location, homes, and types of open space land use.

The value of ecosystem services provided by agriculture is a relatively new area of research and methods are still being refined. A meta-analysis and additional county-specific estimates found that the total ecosystem service value of flood control and groundwater recharge is between \$177.30 and \$253.28 per acre per year. Future studies should be location specific and be aware of the costs of agricultural runoff and other disservices.

Baseline conditions and two agricultural groundwater charge scenarios were evaluated using an economic model of Santa Clara County agriculture. Results of the analysis show that small changes in the agricultural groundwater charge will lead to incremental production adjustments by growers, but that the agricultural industry will not collapse. Total land fallowing is minimal. When the agricultural groundwater charge increases to 10 percent of M&I rates over a 10 year period, the present value of the total cost to growers is \$6.96 million. Total land fallowing is 17 acres, less than 1 percent of total harvested acres. When the agricultural groundwater charge increases to 25 percent of M&I rates over a period of 10 years, the present value of the total cost to growers is \$35.91 million. Total land fallowing is 549 acres, less than 3 percent of total harvested acres.

#### Technical Appendix A: Value of Open Space

This technical appendix provides an independent and quantitative assessment of the value of agricultural open space in Santa Clara County using a comprehensive literature review and meta-analysis.

#### A.1. The Value of Open Space in Santa Clara County

Open agricultural space provides a range of amenities to a community beyond the direct value of the crops produced and the revenue generated. Many such amenities are positive, such as aesthetic value and scenery for nearby residents, recreation opportunities, ecosystem services (flood control, water supply, water quality, habitat, recreation, and extraction), and prevention of traffic and urban sprawl. Because of these benefits, state and local governments have instituted various policies designed to preserve agricultural land, including zoning changes and purchases of conservation easements. The District encourages preservation of open space through the Open Space Credit, which essentially functions as an agricultural irrigation water subsidy designed to encourage agricultural lands in the county. Quantifying the value of open agricultural land is particularly relevant to Santa Clara County, where fragmented high-tech and residential development is interspersed with high value agriculture.

Figure A1 illustrates land use and the agriculture-urban interface in 2010. Agricultural open space includes cropland, rangeland, and intensive agriculture. Open space may provide both positive and negative amenities depending on the type and location. Correctly valuing open space requires careful statistical analysis and should be tailored to the specific region of interest. The analysis in this appendix includes a comprehensive review of the economic literature on open space valuation in order to identify the studies most applicable to Santa Clara County.

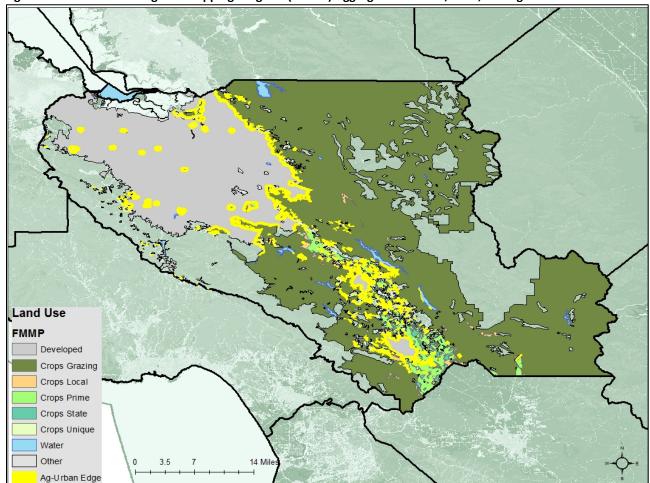


Figure A1. Farm Monitoring and Mapping Program (FMMP) Aggregate Land Use, 2010, and Agriculture-Urban Interface

Open space is what economists refer to as a non-market good because it has value, but not a market where it is traded. There are a number of methods that economists use to value such goods, which are discussed in subsequent sections of this technical appendix. Non-market values are typically classified as either use or non-use values. Use values are benefits related to seeing or using the open space (e.g. pleasant views, experiencing improved water quality, having increased opportunity for viewing wildlife), while non-use values are instead derived from simply knowing that the open space exists. This analysis relies on a comprehensive review of the economics literature and public policy reports valuing open space in other regions using a range of methods. Relevant studies are identified and used to generate relevant values for Santa Clara County. This analysis should be thought of as a representative acre analysis in that it estimates the value of an average representative acre of agricultural open space situated next to an average representative urban development as reflected in the average value of nearby homes.

#### A.1.1 An Overview of the Value of Open Space

Contingent Valuation (CV) methods, typically in the form of stated or revealed preference, are commonly used to value non-market goods. CV methods recognize that there is no market in which to establish the price of open space and instead use other sources of information to statically infer the price. Valuation methods include:

- Stated Preference
- Revealed Preference

- Cost of Travel
- General Equilibrium
- Cost of Service

Stated preference methods rely on carefully designed surveys that ask property owners to state what they are willing to pay to avoid conversion of existing open space to alternative uses. Revealed preference analysis measures how property values change when they are associated with changes in open space, holding all other factors constant. The revealed preference method relies on econometric (statistical) analysis to decompose the price of a home into individual attributes. For example, proximity to transportation, school district, house size, neighborhood, and a number of other factors can affect the sale price of a home, in addition to proximity to open space. In order to correctly value open space, the analysis must control for all other factors that affect the price of a home. Other less common valuation methods include cost of travel, general equilibrium modeling, and cost of services approaches.

Agricultural open space provides direct and indirect benefits. Direct benefits include those benefits accrued to agricultural land owners and owners of adjacent properties. For example, the presence of agricultural open space may provide growers with a more robust agricultural industry, such as cheaper and more readily available input and labor markets. Residential owners of adjacent properties may see increased property values from proximity to agricultural open space and this translates into greater property tax income for the county. Indirect benefits include preservation of land base for agriculture to expand and respond to changing market conditions, preservation of rural character, and prevention of urban sprawl.

The value of open space depends on the type of land use. Mushroom farms will not provide the same aesthetic or biodiversity value as alfalfa stands. Economic studies have additionally shown different values for permanent and temporary open space. Homeowners place a higher value on nearby land that is zoned (or otherwise restricted) for permanent open space.

#### A.1.2. Positive and Negative Amenities

Open space may have both positive and negative amenity value. Some common negative amenities due to agricultural production:

- Noise
- Odors
- Dust, pesticides
- Increased agricultural traffic

Negative amenities include increased noise from agricultural production processes, which may decrease the value of surrounding homes. For example, a study by Ready and Abdalla (2005) of housing prices in the Philadelphia area shows that open space (including agricultural space) has a positive impact on house prices within 400 meters, but that larger-scale livestock operations (Confined Animal Feeding Operations, or CAFOs) can reduce house prices out to 1,600 meters by as much as 6.4 percent.

Some common positive externalities:

- Aesthetic value
- Recreation
- Water Supply
- Ecosystem benefits

- Prevention of noise, congestion, and other effects of sprawl
- Agricultural marketing and development

Positive amenities are those that are expected to increase nearby home values. For example, agricultural open space reduces urban sprawl, traffic, and noise, which homeowners likely desire.

Although there are certain situations where agricultural land may provide negative amenities to the surrounding area, most studies find that agricultural land generates positive nonmarket benefits. Analysis of Santa Clara County data and review of existing economic studies shows there are three key types of agricultural open space: (i) cropland, (ii) rangeland, and (iii) intensive agriculture. Cropland is land that is actively farmed. Rangeland includes non-irrigated and non-seeded grazing land, native vegetation, and forests. Intensive agriculture includes dairies, mushroom farms, and related production that likely generate negative amenities such as noise and odors.

#### A.2. Meta-Analysis of the Value of Open Space

An exhaustive literature review focused on identifying studies relevant to valuing open space in Santa Clara County. Santa Clara County is unique for several reasons. First, the county hosts a significant concentration of high-tech firms. Economies created by large tech firms attract additional startups and employees to the area and increase pressure on both residential and commercial development. Indicators for the macro-economy have been steadily increasing since the worst of the recession in the Fall of 2008, and pressure on commercial and residential development has followed. In addition to a large tech industry Santa Clara County provides productive farmland for a range of high value agriculture including fruit and nut orchards and bell peppers. Residential and commercial development in North County has pushed remaining agriculture into South County, which has resulted in a checkerboard pattern of productive farmland and high-value commercial and residential development.

Economists have studied the value of open space using a range of approaches. Over 30 studies were reviewed and 12 studies were identified as potentially relevant for California areas. After careful review and analysis 3 studies were selected to value Santa Clara County open space in cropland, rangeland, and intensive agriculture. Three key criteria were used to identify applicable studies:

- The study estimates some or all of the 7 ecosystem service values for agriculture.
- The study used data from a region with a large agriculture-urban interface similar to that found in Santa Clara County.
- The study was peer-reviewed or part of a public report that was based on peer-reviewed publications.

The study by Kuminoff (2009) was identified as most applicable for the value of cropland agricultural open space. Kuminoff estimates a revealed preference model using data from San Joaquin County. His analysis allows for both positive and negative amenity values for different types of open agricultural space. He estimates that converting one acre of cropland to urban development within 0.25 mile of the average home would reduce the price by 2.2 percent (95 percent Confidence Interval = [2.1, 2.8]) on average. For a small share (3–7 percent) of homes that are directly next to cropland, the negative amenities provided by agriculture dominate such that converting an acre of cropland to urban development would result in higher home values. Kuminoff concludes that there is evidence that open agricultural land provides generally positive value to nearby urban development.

Cropland and the agriculture-urban interface are different between San Joaquin and Santa Clara Counties for a number of reasons. Santa Clara generally produces higher value agriculture and has higher per-capita income, land and real estate values. It is not possible to determine whether these differences would bias estimates up or

down when extrapolating to Santa Clara County without additional data. San Joaquin and Santa Clara Counties are areas with a similar agriculture-urban interface and, although they are subject to different county-level policies, they are subject to the same state policies and trends. San Joaquin County represents the best available proxy for Santa Clara County for which an existing study was available. The study by Kuminoff (2009) captures the essential aspects of the value of agricultural open space and results show that proximity to cropland increases home values for a large majority of single-family homes near the urban-agricultural border.

The study by Irwin (2002) was identified as most applicable for the value of forest and rangeland open space. Irwin estimates a revealed preference model to value open space using data from Maryland counties. Irwin's analysis estimates the value of open space in crop production, in addition to open space in forests and rangelands. Irwin estimates that converting one acre of rangeland to urban development within 0.25 mile of the average home would reduce the price by 2.6 percent (95 percent Confidence Interval = [2.2, 3.1]) on average.

Maryland represents a significantly different geographic region than Santa Clara County. Maryland has different development laws, home values, resident preferences and transportation options. All of these factors significantly affect confidence in applying Maryland results to Santa Clara County. However, the work by Irwin (2002) represents a peer-reviewed publication in a leading economic journal and the quantitative methods are very well refined. In the absence of a study using the same methods and California data, Irwin's work represents the best rangeland open space study identified in the literature review. Note that work by Howard (2011) estimates the value of rangeland in Kern County California. However, his current work focuses on the economic theory underlying his approach and quantitative estimates are still a work in progress. Personal communication with Howard found that he felt the study by Irwin (2002), specifically a value of 2.6 percent change in home value, was consistent with his preliminary findings in California.

The study by Ready and Abdalla (2005) was identified as the most applicable for the value of intensive agricultural open space. Ready and Adballa estimate the positive and negative amenities from various types of agricultural open space in Pennsylvania. They use a revealed preference approach and analyze a comprehensive dataset on home sales, neighborhood characteristics, and proximity to open space. They identify the value (cost) of negative amenities such as noise, runoff, and pollution from Confined Animal Feeding Operations (CAFOs). They find that converting one acre of CAFO to urban development within one-third of a mile of the average home would increase its price by 6.4 percent (95 percent Confidence Interval (CI) = [3.2, 8.1]) on average.

There was a limited range of studies that estimated the negative amenity value of intensive agriculture. Mushroom farms, smaller scale livestock operations and, to a lesser extent, nurseries are the primary types of intensive agriculture in Santa Clara County expected to decrease nearby home values. The study by Ready and Abdalla (2005) focuses on CAFOs, which are used as a proxy for different types of intensive agriculture in Santa Clara. Although the study has a different geographic location, the results are based on robust economic analysis and represent defensible values for the negative value of intensive agriculture.

#### A.2.1. Summary of Results

The analysis focused on the value of an average parcel of agricultural open space. Valuation of all open space in the county would require collecting a comprehensive dataset of all agricultural and urban lands in a geospatial database. It would be necessary to know the location of every urban parcel relative to cropland, rangeland, or intensive agriculture. These areas are highlighted in yellow in Figure A1. It is beyond the scope of this study to identify the total number of parcels at the agriculture-urban interface in Santa Clara County.

Analysis of the literature shows that 0.25 mile proximity to agricultural cropland open space increases home values by 2.2 percent on average. Proximity to forests, rangeland, and native vegetation increases home values by 2.56 percent on average. Some open space provides negative value. Proximity within 0.33 mile of intensive agriculture decreases home values by 6.4 percent on average. Effects dissipate when homes are located farther away from the open space parcel. Table A1 summarizes the key findings of the analysis.

**Table A1. Summary of Open Space Value** 

Land Use Type	Percent change in nearby home values for 1 parcel converted to open space	Radius (mi)	Study	Location
Cropland	2.20	0.25	Kuminoff (2009)	CA
Forests, rangeland	2.56	0.25	Ready and Abdalla (2005)	MD
Intensive agriculture	-6.40	0.3	Irwin (2002)	PA

#### A.2.2. Example Application

The value of converting an acre from urban to agricultural open space depends on the value of nearby homes. Morgan Hill, San Martin, and Gilroy are three cities closest to the agriculture-urban interface in Santa Clara County.

Consider conversion of 1 parcel from existing urban use to agricultural open space within 0.25 mile of an average home in the cities of Morgan Hill, San Martin and Gilroy. Table A2 summarizes the average change in home value in each location for three open space types. Column 2 lists the average home sale price as of May 2013 in each location. Average home sale prices are compiled from the Zillow Home Value Database and represent an average sale price for all homes sold between January and May 2013. Column 3 shows the change in the average home value if 1 parcel of urban development is converted to crop production. On average, home values increase by 2.2 percent, reflecting the implicit value of open space to the region. For example, in Gilroy this would increase the average value of homes located within 0.25 mile by \$9,875. If the parcel was instead converted to rangeland the value would be \$11,491. The average home value would decrease if the urban parcel was instead converted to intensive agriculture such as a mushroom farm. These changes in home values hold all other factors constant and consequently represent the implicit value of agricultural open space.

The net value will depend on the quantity and location of different agricultural open space. For example, if a single parcel, located within 0.25 mile of an average home in Gilroy, was converted from urban development to cropland and another parcel to intensive agriculture, home values near both parcels would decrease in value by 4.2 percent (2.2 - 6.4 percent), on average. The value of open space in this case is -\$18,825 (\$448,875 x 4.2%).

**Table A2. Value of Open Space Example** 

		Change in home	home value due to conversion of 1 acre to				
City	Average Home Price*	Cropland	Rangeland	Intensive			
Morgan Hill	\$581,250	\$12,788	\$14,880	-\$37,200			
San Martin	\$678,775	\$14,933	\$17,377	-\$43,442			
Gilroy	\$448,875	\$9,875	\$11,491	-\$28,728			
Santa Clara County	\$683,025	\$15,027	\$17,485	-\$43,714			

<sup>\*</sup>Source: January 2013 - May 2013 average, computed from Zillow Home Value Database

It is important to note studies have shown that very close proximity to crop production actually decreases average home values. Although home values near cropland increase by 2.2% on average, for some homes situated directly adjacent to fields values actually decrease. A location too close to a productive field would expose the homeowner to negative amenities such as noise, pesticides, and other production externalities. This partially explains the prevalence of agricultural-urban buffer zones in many cities and emphasizes the importance of case-specific analysis.

#### A.3. Conclusion

The analysis clearly shows that there are positive effects on home values located in close proximity to agricultural open space. On average, home values increase by 2.2 - 2.56 percent when located close (within 0.25 mile) to cropland or rangeland. There are a few types of agriculture which could have negative effects from odors, noise, and other factors. In Santa Clara County these include mushroom farms and small-scale livestock operations. Proximity (within 0.33 mile) to intensive agriculture such as mushroom farms decreases home values by 6.4 percent on average as a result of negative amenities. Given the checkerboard development pattern in Santa Clara County and the limited amount of intensive agriculture open agricultural space contributes positive value to Santa Clara County.

#### A.4. Relevant Studies Reviewed

- Anderson, Soren T., and Sarah E. West. 2006. "Open Space, Residential Property Values, and Spatial Context." Regional Science and Urban Economics 36 (6) (November): 773–789. doi:10.1016/j.regsciurbeco.2006.03.007.
- Brander, Luke M., and Mark J. Koetse. 2011. "The Value of Urban Open Space: Meta-analyses of Contingent Valuation and Hedonic Pricing Results." *Journal of Environmental Management* 92 (10) (October): 2763–2773. doi:10.1016/j.jenvman.2011.06.019.
- Geoghegan, Jacqueline, Lori Lynch, and Shawn Bucholtz. 2003. "Capitalization of Open Spaces into Housing Values and the Residential Property Tax Revenue Impacts of Agricultural Easement Programs."

  Agricultural and Resource Economics Review 32 (1): 33–45.
- Heimlich, Ralph E, and William D Anderson. 2001. "Development At The Urban Fringe And Beyond: Impacts On Agriculture And Rural Land". Agricultural Economics Reports 33943. United States Department of Agriculture, Economic Research Service. http://ideas.repec.org/p/ags/uerser/33943.html.
- Howard, Peter H. 2011. "Optimal Preservation of Agricultural and Environmental Land Within a Municipality Under Irreversibility and Uncertainty". 2011 Annual Meeting, July 24-26, 2011, Pittsburgh, Pennsylvania 103639. Agricultural and Applied Economics Association. http://econpapers.repec.org/paper/agsaaea11/103639.htm.
- Irwin, Elena G. 2002. "The Effects of Open Space on Residential Property Values." *Land Economics* 78 (4) (November 1): 465–480. doi:10.2307/3146847.
- Irwin, Elena G., and Nancy E. Bockstael. 2001. "The Problem of Identifying Land Use Spillovers: Measuring the Effects of Open Space on Residential Property Values." *American Journal of Agricultural Economics* 83 (3) (August 1): 698–704. doi:10.2307/1245102.
- Kotchen, Matthew J., and Shawn M. Powers. 2006. "Explaining the Appearance and Success of Voter Referenda for Open-space Conservation." *Journal of Environmental Economics and Management* 52 (1) (July): 373–390. doi:10.1016/j.jeem.2006.02.003.
- Kuminoff, Nicolai V. 2009. "Using a Bundled Amenity Model to Estimate the Value of Cropland Open Space and Determine an Optimal Buffer Zone." *Journal of Agricultural and Resource Economics* 34 (1) (April 1): 68–90. doi:10.2307/41548402.
- McConnell, Virginia D, and Margaret A Walls. 2005. *The Value of Open Space: Evidence from Studies of Nonmarket Benefits*. Resources for the Future Washington, DC. http://www.rff.org/RFF/Documents/RFF-REPORT-Open%20Spaces.pdf.
- Ready, Richard C., and Charles W. Abdalla. 2005. "The Amenity and Disamenity Impacts of Agriculture: Estimates from a Hedonic Pricing Model." *American Journal of Agricultural Economics* 87 (2) (May 1): 314–326. doi:10.1111/j.1467-8276.2005.00724.x.
- Sokolow, Alvin D, and Cathy Lemp. 2002. "Agricultural Easement Programs . . . Saving Agriculture or Saving the Environment?" *California Agriculture* 56 (1) (January 1). https://vpn.lib.ucdavis.edu/uc/item/,DanaInfo=escholarship.ucop.edu+89n824ct.

#### Technical Appendix B: Ecosystem Service Value

This technical appendix provides an independent and quantitative assessment of the value of ecosystem services provided by agriculture in Santa Clara County using a comprehensive literature review and meta-analysis.

Agricultural land provides ecosystem services to the surrounding region in the form of hydrological services, carbon sequestration, increased biodiversity and habitat preservation for flora and fauna. The District encourages preservation of open space through the Open Space Credit, which essentially functions as an agricultural irrigation water subsidy to encourage agricultural lands in the county.

Open space and agricultural land in Santa Clara County includes rangeland, land in conservation easements, and native vegetation, in addition to intensive agriculture and crop production. The analysis in this appendix includes a comprehensive review of the economic and ecological literature on the value of ecosystem services provided by these land uses and identifies studies that are most applicable to Santa Clara County. Relevant studies are used to provide a range of estimates for the value of ecosystem services provided by agricultural land within the county.

#### **B.1. Ecosystem Services**

Ecosystem services can be broadly defined as the amenities provided by resources and natural systems. Services include maintenance of soil quality, species habitat, clean drinking water, and a general existence value through support provided to a larger ecosystem network. Ecologists have identified over one hundred ecosystem services that can be associated with agriculture and open space. Most services are location-specific such as habitat for local species. This technical appendix considers seven common ecosystem services provided by agriculture and specific attention is paid to flood control and groundwater recharge.

Scientists have long recognized the importance of ecosystems but the economic value of these services has only recently attracted attention. The United Nations commissioned the Millennium Ecosystem Assessment (MEA) in the year 2000 to "assess the consequences of ecosystem change for human well-being and to establish the scientific basis for actions needed to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being." The MEA included contributions from over 2,000 scientists. The report identified the following four categories of ecosystem services:

- *Provisioning services* Products provided by the ecosystem.
  - o *Examples*: Food, timber, fiber, biochemicals, pharmaceuticals, water.
- Regulating services Processes that are regulated by the ecosystem.
  - o Examples: Carbon sequestration, flood control, water recharge, water quality.
- Cultural services Intangible existence value of the ecosystem.
  - o Examples: Recreation opportunities, aesthetic value, spiritual benefits.
- Supporting services The ecosystem as part of a broader natural process.
  - o Examples: Soil formation, photosynthesis, nutrient cycling.

Services provided by agriculture typically fall into the provisioning and regulating categories listed above. Primary provisioning services include the food value of crops produced on the land. Regulating services include a range of benefits such as flood control, groundwater recharge, erosion control, pollination, and provision of

habitat, to name a few. This technical appendix will review the range of common ecosystem services provided by agriculture and will focus particularly on flood control and groundwater recharge.

#### B.1.1. Methods for Estimating the Value of Ecosystem Services

Economic valuation of ecosystem services stems from an interest in using ecosystems to augment engineered control projects. Wetlands can provide flood control and water quality benefits, which can also augment existing levees or water treatment plants. The first attempts to value ecosystem services come from Daily et al. (1997) and Costanza et al. (1997). Daily and Costanza and co-authors attempted to estimate the total value of services provided by global ecosystems using a variety of new methodologies. They estimated the total value of global ecosystem services to fall in the range of \$16–54 trillion per year. Although this work has since been recognized as a rough approximation, it did serve to stimulate a large body of research and policy reports attempting to value ecosystem services.

Many ecosystem services are non-market goods in that they are not actively traded in a market with an observed price. Further complicating the problem, the appropriate geographic scale for analysis varies widely as some services are local in nature, such as pollination, while others are global, such as carbon sequestration. Even with a well defined geographic scale the valuation of services remains location dependent. For example, soil factors (organic matter, texture and sediment profile), climatic factors (solar radiation, precipitation, temperature) and naturally occurring flora and fauna can affect the value of an ecosystem service. The fact that management practices can have a significant effect on the level of ecosystem services produced also adds to the complexity of valuing these services. Organic and conventional agriculture have different effects on the ecosystem, and consequently the ecosystem service values associated with the two production processes vary greatly. Applied policy research and the academic literature continue to develop new methods to value ecosystem services.

The total value of ecosystem services equals to the sum of all of the individual services provided. Services for agriculture may include flood control, erosion control, water quality, food production, crop biodiversity, and biological control, among others. Each individual service requires a different valuation approach and must be considered on a case-by-case basis.

The value of individual ecosystem services can be classified as market or non-market. Market values are those for which the value is directly observable in a market through prices. For example, crops grown on the land provide a direct value for food on the market. Non-market values include those for which no market exists. For example, the habitat value of agricultural land as a hunting ground for predatory bird species is not traded in the market. Swinton et al. (2007) identify four common methods used to estimate the non-market values of ecosystem services.

- Contingent valuation
  - Using the market price of farmland and surrounding properties to infer the value of non-market attributes
- Stated preference methods
  - o Conducting surveys to identify individuals willingness-to-pay for services
- Avoided cost methods
  - Assessing flood risk with and without agricultural lands present to infer the value of agriculture for flood control
- Approaches based on cost of mitigation or replacement of resources with other sources

 Removal of wetlands may require building an additional water treatment facility which has an observable cost

Studies determine appropriate valuation methods by considering the ecosystem services of interest and the geographic scale. It is important to note that measurement and valuation in the context of agricultural ecosystems remain a work in progress.

#### B.2. Ecosystem Services Related to Agriculture

Groundwater management and flood control are part of the District's mission. In addition to groundwater recharge and flood control, an additional five services commonly associated with agricultural production were identified. Ecosystem service values provided by agriculture in Santa Clara County include flood control, groundwater recharge, water quality, pollination, habitat, biodiversity and nitrogen regulation.

**Flood control**. Agriculture can provide a natural buffer for variation in seasonal water flows and rainfall. Land management practices up and downstream affect runoff, drainage and the frequency of flood events. In some areas agriculture can be managed for both crop production and as a seasonal floodplain. Agriculture typically has a lower cost for a given level of flood risk than residential and commercial development.

**Groundwater recharge**. Deep percolation from irrigation and precipitation will result from some portion of applied water in excess of consumptive use. This proportion depends on field soil characteristics, slope, crop type and irrigation practices.

**Water quality**. Surface runoff and deep percolation of water from irrigation and precipitation on agricultural land can increase or decrease water quality. Excessive nitrogen application can lead to significantly decreased water quality. Less intensive agriculture such as rangeland can provide a natural filter for water.

**Pollination**. Wild pollinator populations have recently been on steady decline in California. Agriculture provides natural habitat for pollinators.

**Habitat**. Conversion from native vegetation to agriculture can destroy habitat for some species. However species such as the Swainson's Hawk and other predatory birds benefit from hunting conditions on open fields.

**Biodiversity**. A diverse crop mix and rotation system functions as a natural break for pest and disease cycles. It also provides flexibility for producers to respond to changes in agricultural prices and import and export market conditions.

**Nitrogen regulation**. Excessive nutrient runoff is a primary cause of eutrophication of surface water. Agriculture is a primary contributor to this problem in many regions, although rotation systems and other field management decisions can be used to manage nitrogen application and reduce runoff.

Agriculture creates a unique ecosystem that benefits from and creates services at the same time it provides many disservices. The cost of ecosystem disservices from agriculture should not be understated. For example in the Llagas Subbasin, the rate of domestic well contamination above the nitrate MCL is rather high, and the primary cause is fertilizers used in agriculture followed by septic tanks. This analysis focuses on the value of ecosystem services, but careful attention should be paid to tradeoffs between the benefits described and potential costs along other dimensions.

#### B.3. Meta-Analysis of Ecosystem Service Value

Despite the fact that measuring and valuing ecosystem services from agriculture is a new field of research many studies have been able to produce quantitative estimates of service levels and their associated values. Several dozen studies were reviewed and 22 were identified as relevant for Santa Clara County. From these, 4 studies

were identified for use in the meta-analysis. The decision to include the study in the meta-analysis was based on three criteria:

- The study estimates some or all of the 7 ecosystem service values for agriculture
- The study used data from a region with a large agriculture-urban interface similar to that in Santa Clara County.
- The study was peer-reviewed or part of a public report that was based on peer-reviewed publications.

Studies included in the meta-analysis include Chan et al. (2006), Sandhu et al. (2008), Porter et al. (2009) and Costanza et al. (1997).

Chan et al. (2006) represents the work most relevant to Santa Clara County. The authors model the level of six different ecosystem services including carbon storage, flood control, forage production, outdoor recreation, crop pollination and water provision for the Central Coast region of California. The geographic scope of their analysis includes parts of Santa Clara County. Their analysis relies on previous estimates of the value of specific ecosystem services which they incorporate into a spatial economic-ecologic model of the Central Coast region. They are particularly interested in examining the spatial correlation between various types of services. Spatial correlation between ecosystem services is not relevant for this analysis but the values used in their study are applicable to the Central Coast region including portions of Santa Clara County.

Sandhu et al. (2008) design an experimental approach to measure the economic value of ecosystem services under conventional and organic arable systems in the Canterbury region of New Zealand. This region of New Zealand lacks the level of agriculture-urban interface found in Santa Clara County, however the methods and results in this study are informative for aggregate ecosystem service value estimates. The authors estimate the value of all ecosystem services provided by conventional and organic agriculture and this includes the seven services identified as relevant for Santa Clara. Some of the services they value include biological pest control, soil formation, mineralization of plant nutrients, pollination, services provided by shrubs/hedges, hydrological flow, aesthetics, carbon sequestration, nitrogen fixation and soil fertility. The authors find that the total value of all ecosystem services ranges between \$651 and \$7,862 per acre per year for organic fields and \$514 to \$5,898 per acre per year for conventional fields. This study is used to provide a bound on the range of the value of ecosystem services in Santa Clara County.

Porter et al. (2009) estimate the value of ecosystem services produced by an experimental organic agroecosystem in Denmark that simultaneously produces food, fodder and bio-energy. They use an experimental design approach similar to that used by Sandhu et al. (2008). The authors focus on identifying non-market benefits related to ecosystem services provided by agriculture, in contrast to Sandhu et al. who focused on total benefits (market plus non-market values). They estimate the value of non-market ecosystem services to range from \$196–\$372 per acre per year, depending on the crop and management practices.

Costanza et al. (1997) estimate the total value of global ecosystem services using various methods. The data in the study are not specific to Santa Clara County, however the authors provide defensible estimates of a range of services related to agriculture and these estimates are used to validate the estimates from the studies discussed above. In some cases the values in Costanza et al. (1997) are used to provide upper and lower bounds for estimates from other studies.

#### B.3.1. Summary of Meta-Analysis Results

Key ecosystem services that would be affected by changes in the acreage of irrigated agriculture in Santa Clara County are summarized in Table B1. Values vary by service type from negative (ecosystem disservices) to over \$400 per acre. The two areas of particular interest for this study include groundwater recharge and flood control.

Table B1 summarizes total ecosystem service values. Flood control total ecosystem service values are between \$42 and \$86 per acre. The value of flood control ecosystem services is typically estimated using an avoided cost approach. In the avoided cost framework the estimated value of an agricultural acre for flood control benefits is based on the change in risk and additional cost of flood events if the land were converted to urban use. These values are based on results from analysis by Porter et al. (2009), described above, and validated with results from Costanza et al. (1997). Values in Santa Clara County are likely to be higher given the high-value urban land in North County, and significant agriculture-urban interface in South County.

Groundwater recharge total ecosystem service values are between \$22 and \$44 per acre. Groundwater recharge benefits are estimated using a soil-water balance approach and include the benefits from irrigation water and precipitation deep percolation. Irrigation and precipitation in excess of consumptive use goes to soil capacity, surface runoff, or deep percolation. Studies reviewed for the meta-analysis typically make location specific adjustments for the proportion of soil capacity and surface runoff in order to estimate the amount of groundwater recharge provided by an average acre. The meta-analysis relies on results by Sandhu et al. (2008) and Costanza et al. (1997), described above. This estimate is a lower bound and is further refined in the following sections.

Table B1. Meta-Analysis of the Total Value of Ecosystem Services Provided by Agriculture

Service	Total Value (\$/ac)	Summary Notes
Flood Control	\$42 – \$86	Santa Clara County is likely at or above the high end of this range due to North County flood control requirements.
Groundwater Recharge	\$22 – \$44	This value represents the average for direct recharge from irrigation and precipitation. Santa Clara County has a higher value and this estimate is further refined.
Water Quality	\$27	Value represents an average, range varies from positive to negative depending on the crop.
Pollination	\$19 – \$64	None.
Habitat	Varies	Estimates are both crop and species-specific. Excluded from this analysis.
Biodiversity	\$31	None.
Nitrogen Regulation	\$0 – \$433	Estimates are crop-specific and can be negative in some cases.

Table Notes: Compiled as part of a meta-analysis using estimates from Costanza et al. (1997), Sandhu et al. (2008), Porter et al. (2009), and Chan et al. (2009).

Many of the studies used for this meta-analysis break-down the ecosystem service values into market and non-market components. Market values include the avoided cost of increased risk and deep percolation of groundwater from irrigation and precipitation for flood control and groundwater recharge, respectively. Non-market values for flood control include upstream and downstream effects of changes in land use that change the frequency of flood events. Non-market values for groundwater recharge include factors such as the effects of field-specific management decisions on the proportion of irrigation and precipitation that results in deep percolation. A weighted average over all studies reviewed shows that non-market and market value are approximately 67 and 33 percent of the total value on average, respectively.

Ecosystem service values are location and crop-specific. The values reported in Table B1 should be interpreted as average representative values of an average acre of agricultural land. More refined estimates would require more detailed analysis and data collection for Santa Clara County.

The following section includes suggestions for a county-specific analysis and provides an estimate of the value of groundwater recharge.

#### **B.4. Santa Clara County Framework**

While a full empirical measurement of benefits of groundwater recharge and flood control from agricultural production in Santa Clara County is beyond the scope of this study, and definitely beyond the current empirical database, the following discussion of how to approach such a measurement will be useful in applying the meta-analysis summarized in the previous section.

#### **B.4.1. Flood Control**

There are two broad approaches to characterize flood control; (i) it can be characterized as dispersion on a floodplain, or (ii) channelization between levees. Economic analysis of flood control increasingly reinforces the conclusion that channeling floods through levees changes their location but that ultimately both the water and the energy have to be dissipated by a diffusion process. Increasingly the high fiscal and environmental cost of building improved levees has caused flood control engineers to reconsider the use of floodplains as a major part of flood control. Wetlands and agricultural land can provide a valuable ecosystem service to support flood control.

Consider Yolo and Sacramento County as a case study of the interaction between agriculture and flood control. Sacramento River flood control is achieved through a combination of levees and floodplains. In particular, the Yolo Bypass floodplain was designed to reroute Sacramento River water around the greater Sacramento urban area. The establishment of irrigated agriculture and flood easements throughout the floodplain has ensured a functioning bypass. Field preparation by growers during the spring and summer removes debris and vegetation from the bypass, thereby ensuring that potential flooding stays within the desired area in the following season. This is a non-market flood control ecosystem service value provided by agricultural lands in the Yolo Bypass.

The main difficulty in using agricultural land for floodplains in Santa Clara County is that there are limited opportunities in North County due to the limited amount of agricultural land, particularly on the valley floor. The areas of agriculture able to accommodate periodic flooding are concentrated in South County, specifically the Coyote Valley and Llagas sub-basins. A quantitative assessment of benefits of maintaining the land in the Coyote Valley and Llagas sub-basins would require careful analysis of existing flood risk areas and their associated watersheds. This information can then be used to assess target areas for purchase of flood easements and, in turn, value the associated flood control ecosystem service in Santa Clara County.

#### B.4.2. Groundwater Recharge

Field management decisions control the proportion of irrigation and precipitation for evapotranspiration, surface runoff, and groundwater recharge. Studies including Schilling et al. (2010) have shown that land converted from native vegetation to annual crops can increase groundwater recharge. Irrigated agriculture provides groundwater recharge from two key sources:

- Deep percolation of water applied for crop irrigation.
- Deep percolation during times when precipitation exceeds evapotranspiration.

This analysis considers a set of calculations to assess a realistic range from natural recharge in the agricultural areas in Santa Clara County. The analysis combines seasonal values of evapotranspiration, applied water requirements, total irrigated acres by crop, and irrigation efficiency in Santa Clara County. Land use data are from the Santa Clara Valley Water District Agricultural Production Model, prepared under a separate Task in this project, and water data are compiled from the California Department of Water Resources reports for Santa Clara County. Table B2 summarizes Santa Clara water use data for 10 key crop groups.

Table B2. Land and Water Use Summary Data

Data	Units	Alfalfa	Fruit and Nuts	Field Crops	Processing Tomatoes	Fresh Tomatoes
Acreage	ac	378	1,154	833	1,035	759
Applied Water	af/ac	3.35	2.82	1.83	2.25	1.88
Evapotranspiration	af/ac	3.40	2.90	2.60	2.00	1.60
Effective Precipitation	af/ac	0.65	0.62	1.13	0.20	0.10
Evapotranspiration of Applied Water	af/ac	2.75	2.29	1.47	1.80	1.50
Consumed Fraction	%	0.82	0.81	0.80	0.80	0.80

Data	Units	Pasture	Vegetables	Cucurbits	Onions and Garlic	Grapes
Acreage	ac	468	7,995	970	538	1,540
Applied Water	af/ac	3.70	2.50	1.33	2.88	1.29
Evapotranspiration	af/ac	3.50	2.47	1.10	2.50	1.60
Effective Precipitation	af/ac	0.50	0.47	0.04	0.20	0.57
Evapotranspiration of Applied Water	af/ac	3.00	2.00	1.06	2.30	1.03
Consumed Fraction	%	0.81	0.80	0.80	0.80	0.80

Source: Land use data compiled by authors, water use data from CA Department of Water Resources.

In addition to applied irrigation water, agricultural land may provide recharge through deep percolation when precipitation exceeds evapotranspiration. Table B3 summarizes average monthly rainfall in inches using a 1990-2003 average from the Gilroy (D10 3417 00) weather station. Rainfall data are available for a longer historical time series, 1990 – 2003 are selected as a representative subset of years covering dry years in the early 1990's in addition to wet and average water years.

Table B3. 1990-2003 Average Monthly Rainfall at Gilroy, California (inches)

	Oct	Nov	Dec	Jan	Feb	Mar
Precipitation (in)	0.819	2.068	3.336	5.491	4.266	2.981
	Apr	May	Jun	Jul	Aug	Sep
Precipitation (in)	0.906	0.756	0.096	0.008	0.064	0.078

These data can be used to apply a soil-water balance approach to estimate the net recharge to Santa Clara County groundwater provided by agriculture. Agriculture for this analysis includes 15,760 acres of irrigated land detailed in table B2 plus an additional 3,650 acres of dry farmed hay grain for a total of 19,410 acres. Rangeland acreage (just over 210,000 acres) are excluded from this analysis. Deep percolation can be defined as:

Deep percolation = precipitation + irrigation - soil storage - surface runoff - evapotranspiration.

This analysis considers a monthly time-step for the above equation. Surface runoff is assumed constant at zero for all months. In practice a limited amount of surface runoff is likely and this would decrease groundwater recharge value estimates provided below. Monthly precipitation is from Table B3 and converted to acre feet per acre. Monthly evapotranspiration for each crop is calculated by proportionally allocating the values reported in

table B2 across the growing season for each crop. Monthly evapotranspiration of idle fields (non-growing season for each crop) varies from 0.07 to 1.1 inches, using data from Zone 9 (includes most of Santa Clara) estimated by the California Department of Water Resources and the Irrigation Training and Research Center at Cal Poly San Luis Obispo. Growers are assumed to optimize irrigation. During the growing season irrigation water is never applied in excess of evapotranspiration minus precipitation. Change in soil storage each month depends on field capacity for which data are not readily available for use in this analysis. Therefore two scenarios are considered, (i) an upper bound where the soil is assumed always at field capacity, and (ii) a lower scenario where the soil is only at field capacity in the winter and early spring months (December - March). In months where the field is below soil capacity deep percolation is zero.

Table B4 summarizes the results of the analysis. Groundwater recharge is estimated between 10,686 and 13,140 acre-feet per year. This translates into an average 0.55 to 0.68 acre-feet of groundwater recharge provided by an acre of dry farmed hay grain plus irrigated agricultural land in Santa Clara County. The average cost of an acre foot of agricultural water to the District is \$246 per acre-foot (as of Fiscal Year 2014) and this is used to value the groundwater recharge. A cost of \$246 per acre foot of agricultural water and recharge between 0.55 and 0.68 acre-feet per acre implies a groundwater recharge ecosystem service value between \$135.30 and \$167.28 per acre per year.

Table B4. Groundwater Recharge Ecosystem Service Value in Santa Clara County

Scenario	Groundwater recharge (af/year)	Acre-feet per acre per year	Value per af (\$/af)	Groundwater Recharge Value (\$/ac per year)
Field capacity only in winter months	10,686	0.55	\$246	\$135.30
Always at field capacity	13,140	0.68	\$246	\$167.28

Note that changes in factors omitted from the analysis such as permeability, field capacity, and storability, as well as the time needed for deep percolation can change the estimated value. However, assumptions may increase or decrease the value and, on balance and when compared to the meta-analysis results, these estimates suggest a positive value for groundwater recharge. These initial calculations suggest that the benefits of groundwater recharge associated with agricultural lands in Santa Clara County groundwater basins offset a portion of the cost of recharging water pumped by the agricultural sector.

#### B.4.3. Summary

Analysis of flood control and groundwater recharge benefits suggests that opportunities exist to increase the role of agriculture in flood control in Santa Clara County and that the effect of agriculture on recharge in the groundwater basin is significant and appears to justify some of the special treatment that Santa Clara County agriculture receives through the open space credit program. Groundwater benefits may also warrant additional hydrologic analysis in order to refine the analysis in this report, which was calculated using standard parameters applied to the entire county agricultural sector. The District's existing groundwater models are tools that could be used for the hydrologic analysis.

#### **B.5.** Conclusion

Ecosystem services are difficult to define and challenging to value. Work continues to develop the scientific methodologies to understand ecosystem processes and the economic approaches to value individual components. With this in mind, this study has presented results of a literature review and meta-analysis based on a comprehensive literature review of ecosystem service valuation studies. Particular attention was paid to groundwater recharge and flood control benefits. Five additional services commonly attributed to agriculture were presented to provide context for groundwater recharge and flood control benefits.

Taking the meta-analysis results for the value of flood control benefits presented in table 4 and the groundwater recharge estimates presented in table 5, the estimated total value of groundwater recharge and flood control ecosystem services provided by agriculture to Santa Clara County is between \$177.30 and \$253.28 per acre per year.

Note that these values are contingent on a number of assumptions and location specific factors should be factored into specific policy decisions. It is additionally important to consider land use conversion. When analyzing the provision of ecosystem services, it is necessary to consider changes from one type of land use to another. For example, conversion from irrigated agriculture to wetlands or urban development will lead to changes in ecosystem service values.

#### **B.6.** Relevant Studies Reviewed

- Boyd, James, and Spencer Banzhaf. 2007. "What Are Ecosystem Services? The Need for Standardized Environmental Accounting Units." *Ecological Economics* 63 (2–3) (August 1): 616–626. doi:10.1016/j.ecolecon.2007.01.002.
- Brouwer, Roy, and Louis H. G. Slangen. 1998. "Contingent Valuation of the Public Benefits of Agricultural Wildlife Management: The Case of Dutchpeat Meadow Land." *European Review of Agricultural Economics* 25 (1) (January 1): 53–72. doi:10.1093/erae/25.1.53.
- Brown, Thomas C, John C Bergstrom, and John B Loomis. 2007. "Defining, Valuing and Providing Ecosystem Goods and Services." *Natural Resources Journal* 47 (2): 329–376.
- Chan, Kai M. A, M. Rebecca Shaw, David R Cameron, Emma C Underwood, and Gretchen C Daily. 2006. "Conservation Planning for Ecosystem Services." *PLoS Biol* 4 (11) (October 31): e379. doi:10.1371/journal.pbio.0040379.
- Colombo, Sergio, Javier Calatrava-Requena, and Nick Hanley. 2006. "Analysing the Social Benefits of Soil Conservation Measures Using Stated Preference Methods." *Ecological Economics* 58 (4) (July): 850–861. doi:10.1016/j.ecolecon.2005.09.010.
- Costanza, Robert, Ralph d' Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, et al. 1997. "The Value of the World's Ecosystem Services and Natural Capital" 387 (6630) (May 15): 253. doi:10.1038/387253a0.
- Daily, Gretchen, Susan Alexander, Paul R. Erlich, Larry Goulder, Jane Lubchenco, Pamela A. Matson, and Harold A. Mooney. 1997. "Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems." Washington (DC): Ecological Society of America 2.
- De Groot, Rudolf S, Matthew A Wilson, and Roelof M.J Boumans. 2002. "A Typology for the Classification, Description and Valuation of Ecosystem Functions, Goods and Services." *Ecological Economics* 41 (3) (June): 393–408. doi:10.1016/S0921-8009(02)00089-7.
- Heal, Geoffrey M., and Arthur A. Small. 2002. "Chapter 25 Agriculture and Ecosystem Services." In *Handbook of Agricultural Economics*, 2:1341. Elsevier. https://vpn.lib.ucdavis.edu/science/article/pii/,DanaInfo=www.sciencedirect.com+S1574007202100077
- Kroeger, Timm, and Frank Casey. 2007. "An Assessment of Market-based Approaches to Providing Ecosystem Services on Agricultural Lands." *Ecological Economics* 64 (2) (December 15): 321–332. doi:10.1016/j.ecolecon.2007.07.021.
- MEA. 2005. "Ecosystems and Human Well-being: Synthesis." Millenium Ecosystem Assessment. Washington,
- Montagnini, Florencia. 2005. Environmental Services of Agroforestry Systems. Psychology Press.
- National Academy of Sciences. 2004. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making*. http://www.nap.edu/catalog.php?record\_id=11139.

- Nelson, Erik, Guillermo Mendoza, James Regetz, Stephen Polasky, Heather Tallis, Drichard Cameron, Kai MA Chan, et al. 2009. "Modeling Multiple Ecosystem Services, Biodiversity Conservation, Commodity Production, and Tradeoffs at Landscape Scales." Frontiers in Ecology and the Environment 7 (1) (February): 4–11. doi:10.1890/080023.
- Porter, John, Robert Costanza, Harpinder Sandhu, Lene Sigsgaard, and Steve Wratten. 2009. "The Value of Producing Food, Energy, and Ecosystem Services Within an Agro-ecosystem." *Ambio* 38 (4) (June): 186–193.
- Power, A. G. 2010. "Ecosystem Services and Agriculture: Tradeoffs and Synergies." *Philosophical Transactions of the Royal Society B: Biological Sciences* 365 (1554) (August 16): 2959–2971. doi:10.1098/rstb.2010.0143.
- Sandhu, Harpinder S., Stephen D. Wratten, Ross Cullen, and Brad Case. 2008. "The Future of Farming: The Value of Ecosystem Services in Conventional and Organic Arable Land. An Experimental Approach." *Ecological Economics* 64 (4) (February): 835–848. doi:10.1016/j.ecolecon.2007.05.007.
- Schroth, Goetz, Gustavo A. B. da Fonseca, and Celia A. Harvey. 2004. *Agroforestry and Biodiversity Conservation in Tropical Landscapes*. Island Press.
- Schroth, Götz, and Fergus L. Sinclair. 2003. *Trees, Crops, and Soil Fertility [electronic Resource]: Concepts and Research Methods*. CABI.
- Schilling, K.E., K.S. Chan, H. Liu, and Y.K. Zhang. 2010. "Quantifying the effect of land use land cover change on increasing discharge in the upper Mississippi River." *Journal of Hydrology*. 387:343-345.
- Swinton, Scott M., Frank Lupi, G. Philip Robertson, and Stephen K. Hamilton. 2007. "Ecosystem Services and Agriculture: Cultivating Agricultural Ecosystems for Diverse Benefits." *Ecological Economics* 64 (2) (December): 245–252. doi:10.1016/j.ecolecon.2007.09.020.
- Wood, Stanley, Kate Sebastian, Sara J. Scherr, and Niels H. Batjes. 2000. *Agroecosystems*. World Resources Institute.
- Wossink, Ada, and Scott M. Swinton. 2007. "Jointness in Production and Farmers' Willingness to Supply Non-marketed Ecosystem Services." *Ecological Economics* 64 (2) (December 15): 297–304. doi:10.1016/j.ecolecon.2007.07.003.

#### **Technical Appendix C: Model Documentation**

This technical appendix provides an overview of the economic model developed to analyze the direct economic impacts to growers from changes in the agricultural groundwater charge.

The ability to analyze changes in the groundwater charge under short run and long run conditions requires an economic model of the agricultural economy in Santa Clara County which is able to reflect the incremental effects of changes in water costs. Changes in local economic activity occur gradually as costs and benefits change, so there is a corresponding difference between short run and long run analysis. Grower response to increasing groundwater charges will be a smooth adjustment, rather than a sudden shift out of production.

The analysis relies on an economic evaluation framework known as a calibrated optimization model. The model calibrates to an observed set of base years using observed grower decisions and economic data. The framework used to analyze changes in the agricultural groundwater charge is grounded in observed data and economic principles and represents the incremental adjustments by growers in response to changing production costs.

#### C.1. Problem Overview

The Open Space Credit essentially functions as a groundwater charge subsidy for agricultural users. The District currently charges agricultural groundwater users between 3 and 6 percent of the corresponding Municipal and Industrial (M&I) rates. The District has requested an economic analysis of the impact of higher groundwater charges on agricultural users in Santa Clara County.

Changes in the cost of irrigation water may alter the crop mix in the short and long run. In addition to impacts on open space, this may have financial implications for the District and Santa Clara County. The District has requested analysis of two alternative scenarios where agricultural groundwater charges are increased to 10% or 25% of M&I water rates by fiscal year 2024. The scenarios include a 10 year phase in period starting in fiscal year 2015 and are compared relative to projected baseline agricultural groundwater charges.

Economic analysis of increased agricultural groundwater charges consists of three key components, (i) grower response within the region through a shift in crop mix, (ii) grower response through an increase in land fallowing, and (iii) increased costs of production for all growers.

#### C.2. Santa Clara County Agricultural Model Objectives

The agricultural economic model developed for this study will be referred to as the Santa Clara County model. The model is used to estimate changes in county agriculture as a result of changes in the District's groundwater charge. Other factors such as relative crop prices, market conditions, and other input costs are held constant in order to isolate the effect of changes in the groundwater change. The analysis considers direct impacts to growers including input use (i.e., land, labor, water, other supplies), revenue, and costs under three (3) scenarios defined by the District.

The following are considered for the analysis:

- Scenarios considered: Baseline, groundwater charge gradually increased to 10% of M&I over a 10-year horizon, and groundwater charge gradually increased to 25% of M&I over a 10-year horizon.
- Time frames considered: All scenarios are evaluated over a 10 year time frame from fiscal year 2015 to fiscal year 2024.
- The model holds other input costs, crop prices, resource availability, and market conditions constant to isolate the effect of changes in the groundwater charge.

- Relevant impacts include changes in input use, revenues, and costs by crop and region.
- Mushroom farms and nurseries are modeled separately from standard crop production.

The direct economic cost to growers from changes in the agricultural groundwater charge is defined as the difference between the baseline scenario and the 10 percent and 25 percent scenarios, respectively.

The analysis considers direct economic impacts across four dimensions:

- Shifts in the regional crop mix
- The decision to fallow (non-rotational) land
- Increased groundwater cost to all growers
- Cost to mushroom farms and nurseries (treated separate from the model)

The sum of these individual components equals the incremental direct cost to growers at any point in time. The total cost can be calculated by discounting the 10 year stream of costs back to the present plus the infinite future stream beginning in year 11 onward. This analysis only considers the direct cost to growers and does not include upstream and downstream costs to markets that support, and are supported by agriculture.

#### C.3. Santa Clara County Model Overview

The Santa Clara County model is a regional agricultural production and economic optimization model that simulates the decisions of growers across agricultural land in Santa Clara County. Similar models have been used for numerous policy analyses and impact studies since the 1980's, by agencies including the California Department of Water Resources, United States Fish and Wildlife Service, Unites States Army Corps of Engineers, and United States Bureau of Reclamation. This model framework has additionally been applied for a range of water districts and counties and is currently being used to evaluate alternatives in the Bay Delta Conservation Plan.

The model assumes that growers attempt to maximize profits<sup>2</sup> by choosing total input use (for example, total crop acres), but are subject to constraints and conditions on resource availability, land suitability, input costs, and markets. Input use intensity (for example, applied water per acre) is held constant in the Santa Clara County model. Growers face competitive markets, where no one grower can influence crop prices. The competitive market is simulated by maximizing grower profits (sometimes referred to as producer surplus) subject to the following relationships and constraints:

- Leontief (fixed proportion) production functions for every crop in every region.
  - A production function is a mathematical relationship that translates input use (land, labor, water, other supplies) into agricultural production (yield).
  - The Leontief production function is a specification that holds input use intensity constant. In other words, labor, water, and other supply input use per acre is held constant across all scenarios.
  - There are 4 inputs including land, labor, water, and other supplies.

48

<sup>&</sup>lt;sup>2</sup> Profit is defined as returns to land, management, and risk. Profit = Crop revenue (price x yield x acres, by crop and region) - water costs - other production costs (excluding land)

- o Parameters are calculated using a combination of observed grower decisions and economic data and the method of Positive Mathematical Programming, discussed in the following section.
- Incremental land cost functions, estimated using the method of Positive Mathematical Programming. These cost functions capture the increasing cost of bringing additional land into production, by using observed grower land use and acreage response elasticities which relate change in acreage to changes in expected returns and other information.
- Groundwater pumping cost including depth to groundwater, energy cost, and District groundwater charge for each region.
- Resource constraints on land, labor, water, and other supplies availability.
- Agronomic and economic constraints on perennial crop acreage changes and crop rotations.

The model chooses the optimal values of land, water, labor, and other input use subject to the above constraints and definitions. For this project, the model is then used to compare the response of agriculture in Santa Clara County to potential changes in the agricultural groundwater charge. The model framework can estimate grower response to a range of additional policies including, for example, changes in crop prices, water availability, energy costs, or other input costs and availability.

#### C.3.1. Model Calibration

The Santa Clara County model self-calibrates using a three-step procedure based on the method of Positive Mathematical Programming (PMP) and the assumption that farmers behave as profit-maximizing agents. The method of PMP has been used by economists since the early 1980's and was formalized in a publication by Howitt (1995). The essence of PMP can be described as follows. In a traditional optimization model profit-maximizing growers would simply allocate all land, up until resource constraints become binding, to the most valuable crop(s). In practice, regions such as Santa Clara County exhibit a diverse mix of crops, some of which are relatively low-value. PMP incorporates information on the marginal production conditions that farmers face, allowing the model to calibrate to a base year of observed input use and output. Marginal conditions may include inter-temporal effects of crop rotation, proximity to processing facilities, management skills, farm-level effects such as risk and input smoothing, and variation in soil and other field conditions.

PMP translates unobservable marginal conditions using observed grower decisions and economic data in the form of acreage response elasticities. This information is represented as a crop and region specific cost function which allows the model to calibrate to a base year of observed input use and output.

PMP, as it is applied to the Santa Clara County model, is fundamentally a three step procedure, although each step includes a number of calculations and model checks.

- The first step in PMP is a linear program of farm profit maximization subject to resource constraints, with calibration constraints set to observed values of land use. The resource and calibration constraints contain information on the value of additional resources (e.g. land and water) and the marginal opportunity cost of restricting valuable activities in order to bring what appear to be less-profitable activities into the optimal solution.
- 2. The information from the calibration and resource constraints is used in a second step to calibrate exponential PMP land cost functions and Leontief production functions.
- 3. The third step is a non-linear farm profit maximization program that includes the calibrated PMP cost functions and Leontief production functions. The calibrated cost functions guarantee that the program calibrate to observed data (in inputs and output) without restrictive calibration constraints.

4. Policy analysis follows in subsequent model scenarios by changing relevant parameters such as the groundwater charge, input costs, output prices, or resource constraints.

#### C.3.2. Model Validation

The Santa Clara County model, and calibration by PMP, uses a sequential testing process for model validation, diagnosing problems, and debugging the model. At each stage in the model there is a corresponding model check.

#### C.4. Santa Clara County Model Components

The following section reviews the key components and data in the Santa Clara model and how they are incorporated.

#### C.4.1. Crops

The model includes 18 representative crop groups, excluding mushroom farms and nurseries which are treated separately. Crop groups are the same across all model regions. Each group can represent a number of individual crops, but most are dominated by a single crop in Santa Clara County. Harvested acreage represents acreage of all crops within each group, and production costs and returns are represented by a single proxy crop. Proxy crops for each group were chosen based on standard criteria applied to similar economic models:

- A detailed crop budget was available.
- It is the largest acreage within the group.
- Its water requirement is representative of all crops in the group.
- Gross and net returns are representative of all crops in the group.

The relative importance of the selection criteria varies by crop group. Table C1 summarizes the crop groups and corresponding proxy crop.

**Table C1. Santa Clara County Model Crop Groups** 

Model Definition	Proxy Crop	Other Crops	
Alfalfa	Alfalfa Hay		
Apricot	Apricot		
Beans	Dry Beans	Lima Beans	
Cherries	Cherries		
Citrus	Olives	Misc. Citrus	
Cucurbits	Summer Squash	Misc. Melons	
Fresh Tomatoes	Fresh Tomatoes		
Garlic	Garlic		
Grain	Hay Grain		
Lettuce	Head	Leaf, Misc. Greens	
Onions	Dry Onions		
Other Truck	Bell Peppers	Celery, Other Vegetables	
Pasture	Irrigated Pasture		
<b>Processing Tomatoes</b>	<b>Processing Tomatoes</b>		
Berries	Strawberries	Misc. Berries	
Sweet Corn	Sweet Corn		
Vines	Wine Grapes		
Walnuts	Walnuts		

#### C.4.2. Geographic Regions

The Santa Clara County model has 3 geographic regions, including one in North County and two in South County. Regions are defined based on existing groundwater subbasins and management areas across the county – the Santa Clara Plain portion of the Santa Clara Subbasin, the Coyote Valley portion of the Santa Clara Subbasin, and the Llagas Subbasin.

#### Santa Clara Plain

The Santa Clara Plain is a large portion of the Santa Clara Subbasin and extends from the northern border of Santa Clara County to the Coyote Narrows. Total surface area, according the District's 2010 Urban Water Management Plan, is 225 square miles. The majority of streams and recharge facilities are located in this part of the county. Santa Clara Plain includes North County agriculture, which represents a small proportion of total county acreage.

#### **Coyote Valley**

The Coyote Valley is a portion of the Santa Clara Subbasin which is hydraulically connected to the Santa Clara Plain, but treated as a separate unit by the District. The total surface area is 15 square miles. The Coyote Valley includes agriculture and land between San Jose and Morgan Hill.

#### Llagas Subbasin

The Llagas Subbasin lies to the south of Coyote Valley, extending for 15 miles. Agriculture in the basin includes high value and productive row crop land in the Morgan Hill, San Martin, and Gilroy areas.

Figure C1 illustrates the three geographical regions in the Santa Clara County model.

Santa Clara

Coyote Valley

Liagas

Figure C1. Santa Clara County Model Regions

#### C.4.3. Land Use Data

The Santa Clara model calibrates to a base year of observed land use, for each crop and region, based on the 2010 - 2011 county average. The years 2010 and 2011 are representative of average production conditions within the county and represent an ideal set of base years to calibrate against. These years included above average agricultural prices and normal rainfall conditions.

Land use data are compiled from three sources:

- Santa Clara County Agricultural Commissioner Annual Crop Reports
- Santa Clara County Pesticide Use Reports
- United States Department of Agriculture National Agricultural Statistics Service (NASS) Cropland Data Layers (GIS)

Agricultural Commissioner reports provide the most consistent source of land use information and are used as the benchmark standard in the model. The Agricultural Commissioner reports only include county-wide total crop acreages, therefore additional data are required to disaggregate land use for each of the subbasins.

Pesticide Use Reports are used to proportionally allocate crop acreage between each of the three groundwater areas. Pesticide Use Reports are subject to reporting and entry error in addition to double-counting error. These

reports are consequently only used to disaggregate the total proportion of crops across the three groundwater areas. Absolute acreage is based on the Agricultural Commissioner reports.

NASS GIS layers are used to verify total crop acreage in each of the three groundwater areas. NASS uses satellite data and a classification algorithm in order to identify crop type (and other land use) down to a scale of 50 meters. The algorithm is very effective for regions where there is a relatively uniform crop mix, such as corn and soybeans in the Midwest, but is subject to classification error in regions such as California. As with the Pesticide Use Reports these data are only used to disaggregate land use by region.

Table C2 summarizes total harvested acreage in each of the groundwater areas, 2010 and 2011 average.

Table C2. Santa Clara County Model Crop Acreage, 2010-2011 Average

Crop Group	Santa Clara Plain	Coyote Valley	Llagas
Alfalfa	286	91	0
Apricot	105	41	76
Beans	6	390	437
Cherries	0	199	336
Citrus	118	13	100
Cucurbits	0	564	404
Fresh Tomatoes	0	26	732
Garlic	0	54	245
Grain	1,155	579	1,916
Lettuce	15	530	1,908
Onions	0	12	227
Other Truck	44	628	3,610
Pasture	85	22	361
<b>Processing Tomatoes</b>	0	21	1,014
Strawberries	0	19	76
Sweet Corn	21	392	753
Vines	657	324	559
Walnuts	29	24	111

#### C.4.4. Acreage Response Elasticities

An elasticity is the percent change in a variable, per unit of percent change in another variable or parameter. Acreage response elasticity is one component of supply response. It is the percentage change in acreage of a crop from a one percent change in that crop's price. Long run acreage response elasticities are used for this analysis. Acreage response elasticities are compiled from a study by economists at UC Davis using historical California data (Russo et al. 2012).

Elasticities are likely to vary between regions due to different production conditions. The calibration routine used for the Santa Clara County model allows individual region elasticities to vary from the aggregate measure. This more accurately reflects regional production conditions and allows the model to better reflect regional differences.

#### C.4.5. Crop Prices and Yields

Crop prices in the model correspond to 2010-2011 average prices received by growers in Santa Clara County. Data are compiled for each of the proxy crops and farm-gate prices are the same across all geographic regions.

Crop yields for each crop group in the Santa Clara model correspond to the proxy crops and are based on best management practices. Yields represent average expected yields under best management practices. Note that crop budgets, discussed in a subsequent section, also reflect best management practices. Thus, crop yields may be slightly higher than those estimated by calculating county averages, but are more consistent with the production costs.

Crop yield data are compiled from the University of California Cooperative Extension (UCCE) production cost budgets prepared by extension specialists and economists at the University of California at Davis (UC Davis). These data are validated using the Agricultural Commissioner Crop Reports, which include estimated county-average yields.

#### C.4.6. Other Input Costs

Input costs are derived from respective University of California Cooperative Extension (UCCE) crop budgets. These budgets are compiled for various years for each of the proxy crops. The most recent budget is used and dollar values are indexed to 2012 using the Gross Domestic Product (GDP) Implicit Price Deflator.

Confidential budgets provided by the Santa Clara County Farm Bureau were used to validate and, when necessary, adjust UCCE budgets to better reflect conditions in Santa Clara County.

#### C.4.7. Water Use, Availability and Costs

Irrigation water is available from three sources: surface water, recycled water, and groundwater. The primary source for agricultural irrigation water is groundwater. Water availability is reported in the District's 2010 Urban Water Management Plan and District reports available online.

Applied water per acre requirements for crops in the model are derived from California Department of Water Resources estimates. DWR estimates are based on geographic regions known as Detailed Analysis Units (DAU) and those regions in Santa Clara County are used for the model. Additionally, DWR data are checked against crop water requirements reported in the UCCE crop budgets.

The key source of irrigation water is groundwater pumping. Groundwater pumping costs, excluding the agricultural groundwater charge, are broken out into fixed, energy, and operations and maintenance (O&M) components in the model. Energy and O&M components are variable and the fixed component represents the amortized fixed cost of the well and pump over a standard useful life.

Pumping costs are calculated as two components, the fixed cost per acre foot based on typical well designs and costs within the county, plus the variable cost per acre foot. The variable cost per acre foot is O&M plus energy costs based on average total dynamic lift within the region.

Energy costs depend on the price of electricity. Energy cost is 21 cents per kilowatt-hour, which is an average of PG&E's AG-1B and AG-4B rates. Overall well efficiency is assumed to be 70 percent.

The total dynamic lift (TDL) for each region is in feet, and includes both static lift and additional dynamic drawdown when pumps are operating. Base groundwater depth (static pumping lift) estimates are from data provided by the District which are converted to dynamic lift using the standard engineering formula.

#### C.5. Using the Model

Data and model organization are relatively streamlined given the complexity underlying the approach. The modeler needs only three files to run the model, although some expertise is required to adjust relevant parameters for policy simulations. The following three files are required:

- Excel workbook data input file
- Santa Clara County program file

• A small text file containing solver options

As with any model, some experience is required to understand the nuances of the modeling approach. The Santa Clara County model is written in the General Algebraic Modeling Software (GAMS) language. This is a standard language for economic models because the language is well-suited for the problem structure and the solvers are more robust than other competing model packages.

#### C.5.1. Data Input File

This is an Excel workbook that contains all of the data tables required for the model. Data are stored in a series of tabs where each tab corresponds to a specific input or parameter table. Some scalar parameters are incorporated into the model file itself rather than the data input file. Features of the data input file include the following.

- Disaggregated cost input data are stored on a separate tab in the data file. The workbook automatically aggregates the data, by region, input, and crop, for use in the Santa Clara County model.
- The input data file is automatically imported into the program file using the built-in GAMS program "xls2gms." Thus the modeler can edit data within the excel file and it will be automatically updated in the model code.
- The data input file should be saved as ".xls,"

#### C.5.2. Model Program File

The program file (.gms) contains all of the model code. This includes a routine to automatically update input data, the three-step PMP calibration routine, and a series of models used for policy simulation. Simple or parameterized data input changes can also be made within the program file. The program file contains numerous comments and references. Also, calculations are included to double-check other calculations and to display intermediate results to assist model development.

#### C.5.3. Solver Options File

The solver options file (.op2) contains user-specified commands and definitions for the CONOPT-3 solver. The modeler may need to alter this file to change memory allocation, convergence tolerance, iterations, and to diagnose numerical convergence issues.

#### C.5.4. Output File

The Santa Clara program file will output a series of summary tables directly into Excel workbooks. It is generally up to the modeler to identify relevant parameters to export. For this analysis, changes in crop revenues, water use, and acreage were exported.

#### C.6. Relevant Studies Reviewed

Howitt, R.E. 1995. "Positive Mathematical Programming." *American Journal of Agricultural Economics* 77 (2) 329-342.

Russo, C., Green, R., Howitt, R.E. 2012. "Estimation of Supply and Demand Elasticities of California Commodities." UC Davis Department of Agricultural and Resource Economics Working Paper No. 08-001.

## This Page Intentionally Left Blank

# Economic Analysis of the Open Space Credit

## Value of Open Space

- Conducted a literature review and metaanalysis to determine the value of agricultural open space
  - Open space is not directly traded in a market, the value must be inferred from nearby home values
- The value of an average home within 0.25 miles of cropland increases by 2.2 percent
- The value of an average home within 0.25 miles of rangeland increases by 2.56 percent
- The value of an average home within 0.33 miles of intensive agriculture decreases by 6.4 percent

## Value of Ecosystem Services

- Conducted a literature review and metaanalysis to determine the value of ecosystem services provided by agriculture
  - Market and non-market values
- No consensus value per acre
  - Location dependent
  - > \$500 \$6,000 "total" ecosystem value per acre
- Combined groundwater recharge and flood control ecosystem service value ranges from \$177 to \$253 per acre
  - Values are likely a conservative estimate

# Changes in the Agricultural Groundwater Charge

- Constructed an economic model of agriculture in Santa Clara County
  - 3 scenarios with 10 year phase-in
    - Baseline, 10 percent and 25 percent of M&I rates
      - 10% scenario
        - Incremental costs increase from \$26,800 to \$465,000 per year
      - 25% scenario
        - Incremental costs increase from \$80,800 to \$2.51 million per year

Scenario	Permanent Fallow (acres)	% Change in Irrigated Acres	Irrigated Acres <sup>1</sup>
Baseline	-	-	15,668
10% of M&I	17	0.11%	15,651
25% of M&I	549	3.50%	15,119
<sup>1</sup> Harvested acre	eage includes an additional 3,65	0 acres of grain hay	Attachment 2 Page 4 of 4

# Open Space Credit Policy Staff Recommendation

Santa Clara Valley
Water District

Attachment 3
Page 1 of 5



## Input from Working Group

- Maintain Open Space Credit as is; both in practice (keep ag at 6% of M&I charge) and policy (limit ag charge to 10% of M&I charge)
- 2. Weigh any decisions regarding the open space credit policy in the context of other external factors that affect agriculture
  - Credit is only one factor that impacts agricultural costs
  - Incremental increases to ag can have significant impact
- Explore other sources of money for capital and operating projects that are not fully funded or where funding sources are less than robust



### **Staff Recommendation**

- Maintain Open Space Credit Policy language as is (limit ag charge to 10% of M&I charge)
  - Clarify terminology (Use "Ag Land Preservation Policy")
- Explore other sources of money for capital and operating projects that are not fully funded or where funding sources are less than robust
- 3. Increase agricultural charge to 10% of M&I over 5 year time frame
  - Minimal impact to ag lands per economic report
  - Helps address Watershed Stream Stewardship fund financial health (\$3M savings over 10 years)

Attachment 3 Page 3 of 5



## Other Alternatives Considered by Staff

- Set ag charge at 10% of M&I and discount to 6% for those who participate in mobile lab program (a water conservation program)
  - However, incremental cost (\$300K+) would exceed incremental revenue (\$75K) and drive up the Open Space Credit subsidy
- 2. Set ag charge at 10% of M&I and discount to 6% for those who participate in Williamson Act
  - However, the discount would be inequitable because not all well owners can qualify for Williamson Act participation

## Next steps

JUNE 2013	JULY 2013	AUGUST 2013
<ul> <li>6/3/13: Special Ag Advisory Committee Mtg, 1:30 – 3:30 pm, SCVWD</li> <li>6/13/13: Working Group Mtg #1, 10:00 – 12:00 pm, SCVWD</li> <li>6/14/13: Gilroy Chamber of Commerce, 7:30 am</li> </ul>	<ul> <li>7/1/13: Ag Advisory Committee Meeting, 1:30  — 3:30 pm, SCVWD</li> <li>7/11/13: Morgan Hill Chamber of Commerce, 8:00 – 9:30 am</li> <li>7/15/13: Environmental Advisory Committee Mtg, 6:00 – 8:00 pm, SCVWD</li> <li>7/16/13: Working Group Mtg #2, 10:00 -12:00 pm, MHCC, Madrone Room</li> <li>7/23/13: Board Check-in (Board mtg), 6:00 pm, SCVWD</li> <li>7/24/13: SCV Water Commission Mtg, 12:00 - 2:00 pm, SCVWD</li> </ul>	<ul> <li>Economic Report due</li> <li>8/12/13: Community Stakeholder Mtg, 6:30 – 8:00 pm, MHCC, El Toro Room</li> <li>8/13/13: Working Group Mtg #3, 11:30 am -3:00 pm, Gilroy Chamber of Commerce</li> </ul>
SEPTEMBER 2013	OCTOBER 2013	NOVEMBER 2013
• 9/10/13: Board Check-in (Board mtg), 6:00 pm, SCVWD	<ul> <li>10/7/13: Ag Advisory Committee Meeting, 1:30 – 3:30 pm, SCVWD</li> <li>10/14/13: Los Altos Chamber of Commerce, 8am</li> <li>10/21/13: Environmental Advisory Committee Mtg, 6:00 – 8:00 pm, SCVWD</li> <li>10/23/13: SCV Water Commission Mtg, 12:00 - 2:00 pm, SCVWD</li> </ul>	11/12/13: Board Action (Board mtg), 6:00 pm, SCVWD  Attachment 3
	Page 73	Page 5 of 5

Page 5 of 5

## This Page Intentionally Left Blank

#### **LeZotte**

### Farmers' Use of District Conservation Programs R-13-0052

Staff has been asked to provide the Board with information on the number of farmers that are using district conservation programs, and, if available, the impact it has on the farming industry.

The district partnered with the Farm Bureau for three years (2009 through 2011) to offer an irrigation efficiency program for Santa Clara County farmers. This program has the benefit of reducing water waste and also improving crop yield. District staff worked extensively with twelve farmers, representing over 4,500 acres of farmland, with the goal of improving their irrigation efficiency to at least 80 percent. Ten farmers participated in the program for the three-year period. Each participant had the option of choosing which fields to include in the program, with most including the same fields throughout the three years.

The program was a success, with most farmers showing improved irrigation efficiency after the three years (above 80%). The only exceptions in measuring or achieving desired 80 percent target were due to limited data (two farmers joined the program in year three and therefore had only one year of data) and two farmers chose to include their most difficult fields in year three. Participating farmers that experienced the benefits of this program then became ambassadors, sharing their lessons learned with other farmers in the area.

In 2013 the district is partnering with Loma Prieta Resources Conservation District (LPRCD) to offer a similar program. The goal is to work with ten to twenty farmers over the next ten months to assist them in improving their irrigation efficiency. LPRCD will also be funding a nutrient management component.

The district has various educational tools and materials available on-line, including: irrigation scheduling calculators, access to local evapotranspiration data (important for irrigation scheduling), as well as various publications (e.g. Handbook for Ag Water Use Efficiency, Fertilizer Management in Coastal Cool-Season Vegetables, etc.). The district also supports local workshops such as the small acreage series developed by LPRCD. It's difficult to determine how many farmers are utilizing these tools, however we did receive 336 "page views" of our agriculture water conservation webpage in fiscal year 2013.

For further information, please contact Jerry De La Piedra at (408) 630-2257.
Schmidt Addition of Landscape Rebate Discussion to FY2014 Budget R-13-0054
Staff has been asked to include landscape rebate discussion in next year's budget process.
Staff has scheduled a discussion for the October 8, 2013 Board meeting.
For further information, please contact Jerry De La Piedra at (408) 630-2257.

## This Page Intentionally Left Blank



Meeting Date: 10/21/13

Agenda Item No.: 4.2

Staff: Charlene Sun

E-mail: csun@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

**SUBJECT:** Discuss Climate Divestment Investment Restriction

#### **RECOMMENDED ACTION:**

Conduct a policy review and prepare policy alternatives for Board consideration.

#### **POLICY RATIONALE:**

Executive Limitation Policy, EL-4.9.3, No investments will be made in fossil fuel companies with significant carbon emissions potential.

$\boxtimes$	Policy Review
	Policy Implementation

#### **SUMMARY:**

On August 27, 2013, the Board adopted a new Executive Limitation, EL-4.9.3 No investments will be made in fossil fuel companies with significant carbon emissions potential, and approved an amendment to the Fiscal Year 2013-14 Santa Clara Valley Water District Board Investment Policy (Investment Policy), adopted by the Board on May 14, 2013. As a result of these actions, going forward, no investments will be made in the top 200 fossil fuel companies as defined by 350.org and listed in Exhibit C of the Investment Policy. The Executive Limitation and the Investment Policy are included as Attachments 2 and 3 in the August 27, 2013 Board Memo attached herein.

The Board has requested that the Advisory Committees review the top 200 fossil fuel companies included in Exhibit C of the Investment Policy and identify companies that may be considered as any exceptions to Executive Limitation 4.9.3.

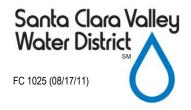
The non-profit organization, 350.org, is incorporated as a 501(c)(3) nonprofit, or nongovernmental, organization in Washington, DC, US. The mission statement of 350.org is "...building a global grassroots movement to solve the climate crisis. Our online campaigns, grassroots organizing, and mass public actions are led from the bottom up by thousands of volunteer organizers in over 188 countries." The top 200 fossil fuel companies as defined by 350.org is based on the report "Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?" published by The Carbon Tracker Initiative (Attachment 4). These top 200 fossil fuel companies hold the vast majority of the world's proven coal, oil and gas reserves. Combined, these top 200 companies are equivalent to around 27% of the global proven fossil fuel reserves, in terms of their carbon dioxide emissions potential.

#### Carbon Tracker

Carbon Tracker was founded by a Jeremy Leggett, a former oil company geologistrurned renewable energy investor. Mr. Leggett also founded SolarCentury, a solar solutions company in the UK. Carbon Tracker's work is focused on providing transparency about the carbon bubble and carbon assets. The carbon track list has appeared in testimony in two statehouses, both in Maine and Vermont which were considering state-level divestment. Also, in April 2013, the San Francisco Board of Supervisors voted unanimously to urge the city's Retirement Board to divest \$583 million of fossil fuel holdings in the city's \$16 billion retirement fund, using the Carbon Tracker list.

#### ATTACHMENT(S):

Attachment 1: Board Memo – Follow-Up to the Board's Annual Governance Policy Work Study Sessions, August 27, 2013



Meeting Date: 08/27/13
Agenda Item: 9.1
Unclassified Manager: L. Pelham
Extension: 2071
Director(s): All

#### **BOARD AGENDA MEMO**

**SUBJECT**: Follow-Up to the Board's Annual Governance Policy Work Study Sessions

#### **RECOMMENDATION:**

- A. Discuss and adopt specified policy recommendation to the Board's Governance Process Policy, GP-1;
- B. Discuss and adopt a new Executive Limitation Policy, EL-4.9.3, to include a Climate Divestment Investment Restriction;
- C. Approve amendment to the Santa Clara Valley Water District Board Investment Policy to include a Climate Divestment Investment Restriction; and
- D. Discuss and adopt Glossary definition for "customer" and replace the term "consumer" with "customer" in the policies specified.

#### SUMMARY:

During the July 22, 2013, Board Governance Policy Work Study Sessions, the Board adopted policy recommendations that have been incorporated into the Board Governance Policies. Additionally, the Board directed staff to return with the following specified policy recommendations and information for consideration.

#### 1) Governance Process Policy GP-1

The Board directed staff to revise GP-1 to reflect the Board's commitment to its governance structure and the policy categories contained therein (Attachment 1).

#### 2) <u>Executive Limitation Policy EL-4.9.3</u>

The Board directed staff to develop a climate divestment policy. There are two recommendations for the Board to consider, a new Executive Limitation, EL-4.9.3 (Attachment 2), and an amendment to the Fiscal Year 2013-14 Santa Clara Valley Water District Board Investment Policy (Investment Policy), adopted by the Board on May 14, 2013. (Attachment 3). In conjunction with these revisions, staff will add a new CEO Interpretation of EL-4.9.3, which proposes to divest from the top 200 fossil fuel

companies that control most of the world's oil, coal, and natural gas supplies (Attachment 2).

Approval of the climate divestment investment restriction will limit the flexibility for the District's investment portfolio to diversify its holdings, which may impact the liquidity and yield of the portfolio in the long term. Currently, the District owns a medium term note from Chevron Corporation, which is one of the top 200 fossil fuel companies with a \$3 million par value maturing on June 24, 2016. Staff plans on holding this note to maturity unless it can be sold at a market price higher than the original purchase price to avoid incurring an investment loss from selling the note prior to maturity. This strategy is consistent with the Investment Policy, Section 7.13 Investment Sales Prior to Maturity, which requires that "sales of outstanding investment positions prior to maturity are permitted so long as a yield enhancement on the total transaction is achieved." Should the Board adopt the proposed Investment Policy and Executive Limitation, going forward, no investments will be made in the top 200 fossil fuel companies as defined by 350.org and listed in Exhibit C of the Investment Policy.

The non-profit organization, 350.org, is incorporated as a 501(c)(3) nonprofit, or nongovernmental, organization in Washington, DC, US. The mission statement of 350.org is "...building a global grassroots movement to solve the climate crisis. Our online campaigns, grassroots organizing, and mass public actions are led from the bottom up by thousands of volunteer organizers in over 188 countries." The top 200 fossil fuel companies as defined by 350.org is based on the report "Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?" published by The Carbon Tracker Initiative (Attachment 4). These top 200 fossil fuel companies hold the vast majority of the world's proven coal, oil and gas reserves. Combined, these top 200 companies are equivalent to around 27% of the global proven fossil fuel reserves, in terms of their carbon dioxide emissions potential.

#### Carbon Tracker

Carbon Tracker was founded by a Jeremy Leggett, a former oil company geologist-turned renewable energy investor. Mr. Leggett also founded SolarCentury, a solar solutions company in the UK. Carbon Tracker's work is focused on providing transparency about the carbon bubble and carbon assets. The carbon track list has appeared in testimony in two statehouses, both in Maine and Vermont which were considering state-level divestment. Also, in April 2013, the San Francisco Board of Supervisors voted unanimously to urge the city's Retirement Board to divest \$583 million of fossil fuel holdings in the city's \$16 billion retirement fund, using the Carbon Tracker list.

A July 18, 2013, memorandum from Director Schmidt on developing a Climate Divestment Policy for the Water District is included in Attachment 5.

#### 3) Glossary

The Board directed that a definition of "consumer" be included in the Governance Policies' Glossary. One definition for the Board's consideration is the Baldrige Performance Excellence Program criteria for the term "customer" (Attachment 6).

As part of the Board's consideration, the term "customer" appears in the following Board Policies:

GP-7.2	Values Statement
GP-11.1	Inclusion, Equal Employment Opportunity,
	Discrimination/Harassment Prevention, and Diversity
EL-4.10	Financial Management
EL-8.1	Inclusion, Equal Employment Opportunity,
	Discrimination/Harassment Prevention, and Diversity
EL-8.2	Inclusion, Equal Employment Opportunity,
	Discrimination/Harassment Prevention, and Diversity
EL-6.4	(CEO Interpretation) Asset Management
	GP-11.1 EL-4.10 EL-8.1 EL-8.2

Additionally, the term "consumer" appears in the following Board Policies:

•	EL-2	Consumer Relations
•	EL-2.2	Consumer Relations
•	EL-2.4	Consumer Relations
•	EL-2.5	Consumer Relations
•	BL-5	Monitoring Board Appointed Officer Performance

Staff recommends replacing references of the term "consumer" with "customer" in EL-2, Consumer Relations, and BL-5, Monitoring Board Appointed Officer Performance (Attachment 7).

#### 4) <u>Executive Limitation Policy EL-6.7</u>

If this revision is to be pursued, the Board requested staff to come back at a future Board meeting with additional information on other agencies' policies regarding Board and CEO authorization of acquisitions or encumbrances of real property.

Staff is conducting additional analysis and, if applicable, will return to the Board when the analysis is complete.

#### **Next Steps**

Once the Board adopts the revised governance policies, these will be communicated via the District's internal and external websites and made available to the public, Advisory Committees, and throughout the organization.

#### **FINANCIAL IMPACT:**

The effort to facilitate the Board's annual review of its governance policies is budgeted by the Office of CEO Support.

Implementation of adopted policies, i.e., BAO/CEO Interpretations, may result in financial impacts associated with the development of programs and services to achieve these policies.

These impacts will be incorporated into the operational plans for the next year's budget planning effort.

Should the Board adopt the proposed Investment Policy and Executive Limitation, going forward, no investments will be made in the top 200 fossil fuel companies as defined by 350.org and listed in Exhibit C of the Investment Policy.

#### CEQA:

The recommended action does not constitute a project under CEQA because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

#### **ATTACHMENTS:**

Attachment 1: GP-1 Recommendation Attachment 2: EL-4.9.3 Recommendation

Attachment 3: Santa Clara Valley Water District Board Investment Policy

Attachment 4: Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?

Attachment 5: Director Schmidt Memorandum on Climate Divestment Policy

Attachment 6: Glossary Recommendation

Attachment 7: EL-2 and BL-5 Recommendation

Title: Global Governance Commitment

**Category:** Governance Process

Policy No. GP-1

Adopted: October 19, 1999

Latest Revision: August 21, 2012

Chair: Larry Wilson Chair: Linda J. LeZotte

The Board of Directors revised and adopted this policy at its public meeting on the latest revision date.

The purpose of the Board, on behalf of the people of Santa Clara County, is to see to it that the District provides Silicon Valley safe, clean water for a healthy life, environment, and economy. protects the public health and safety and enhances the quality of living within Santa Clara County by comprehensively managing water resources in a practical, cost-effective, and environmentally-sensitive manner.

In pursuit of this purpose, <u>consistent with the District Act</u>, the Board of the District <u>adopts</u> <u>has adopted the following</u> policies <u>to govern its own processes</u>; <u>delegate its power</u>; <u>communicate the District mission</u>, <u>general principles and ends</u>; and to provide constraints on executive authority.

- 1.1. The District will provide a healthy, clean, reliable, and affordable water supply that meets or exceeds all applicable water quality regulatory standards in a cost-effective manner. Utilizing a variety of water supply sources and strategies, the District will pursue a comprehensive water management program both within the county and statewide that reflects its commitment to public health and environmental stewardship.
- 1.2. As an integral part of its comprehensive water management program, the District will conjunctively manage its groundwater basins to maximize water supply reliability. Critical aspects of this effort are to proactively and aggressively protect the basins from contamination and the threat of contamination as well as reflecting the District's stewardship of stream resources.
- 1.3. As an integral part of its comprehensive water management program, the District will, in a cost-effective manner consistent with its overall water supply mix, aggressively pursue opportunities to expand water recycling within Santa Clara County in partnership with other public entities as appropriate.
- 1.4. To secure the health, safety, and quality of life in Santa Clara County, the District will carry out a prudent flood management program that reduces the potential for flood damage, balances costs and benefits (including possible environmental restoration and enhancement), and comprehensively addresses the expectations of the community.
- 1.5. As an integral part of its comprehensive water, energy and environmental management programs, the District will incorporate understanding of, preparation for, and adaptation to climate change, as well as

apply a climate change mitigation prism to assess ongoing administrative and core business practices. In addition, so as not to exacerbate climate change, the District will strive to achieve carbon neutrality as soon as practicable and ensure reductions attributable to water conservation programs are properly credited to the Santa Clara County community.

- 1.6. The District is a steward of the watersheds in Santa Clara County, the streams and the natural resources therein, and will strive to ensure their benefits to the community's quality of life are protected and when appropriate, enhanced or restored. Consistent with the District's primary responsibility to provide for public health and safety, water quality, and water supply, the District's approach in flood management and the water utility shall reflect an ongoing commitment to conserving the environment as a priority in the District's mission of comprehensive public service.
- 1.7. As an integral part of its comprehensive water management program, the District will carry out a prudent watershed stewardship program that seeks to preserve and restore stream and bay habitat conditions conducive to sustainable ecological health.

Title: Financial Management Category: Executive Limitations

Policy No. EL-4

Adopted: September 28, 1999

Latest Revision: July 22, 2013

Chair: Larry Wilson Chair: Nai Hsueh

The Board of Directors revised and adopted this policy at its public meeting on the latest revision date.

Financial planning for any fiscal year shall be aligned with the Board's Ends, not risk fiscal jeopardy, and be derived from a multi-year plan. With respect to the actual, ongoing financial condition and activities, the BAOs shall provide for the development of fiscal sustainability. See BAO/CEO Interpretation.

Further, a BAO shall:

#### **Conditions and Activities**

- 4.1. Expend only those funds that have been appropriated in the Operating and Capital budgets, reserves, and debt service.
- 4.2. Spend in ways that are cost-efficient. See BAO/CEO Interpretation

#### **Planning and Budgeting**

- 4.3. Include credible projection of revenues and expenses, separation of capital and operational items, cash flow, and disclosure of planning assumptions.
  - 4.3.1. Produce an annual Rolling Five-Year Capital Improvement Plan with the first year serving as the adopted capital budget and the remaining years in place as a projected capital funding plan.
- 4.4. Plan the expenditure in any budget period within the funds that are conservatively projected to be received or appropriated from reserves in that period.
  - 4.4.1. Demonstrate to the Board the planned expenditures for the identified and selected capital projects in the Rolling Five-Year Capital Improvement Plan are aligned with the Board's capital priorities.
  - 4.4.2. Not allocate state subvention reimbursements for use and/or spending.
- 4.5. Budget fund reserves at or above reserve policy minimums.

4.6. At least annually present the Board with information about the District's financial reserves and schedule an opportunity for the public to comment thereon.

#### **Treasury, Investment and Debt Management**

- 4.7. Not indebt the organization, except as provided in the District Act, and in an amount greater than can be repaid by certain, otherwise unencumbered revenues within 90 days, or prior to the close of the fiscal year.
  - 4.7.1. Not issue debt (long or short-term obligations that are sold within the financial marketplace) that conflicts with the District Act or the legal authority of the District, and without Board authorization;
  - 4.7.2. Not issue debt without a demonstrated financial need:
  - 4.7.3. Meet debt repayment schedules and covenants of bond documents;
  - 4.7.4. Establish prudent District Debt Policies that are consistent with Board policies and provide guidance to District staff in regards to administering the debt programs and agreements, including consideration for the appropriate level of debt for the District to carry and structuring debt repayment to address intergenerational benefits;
  - 4.7.5. Be consistent with the District's Debt Policies and any addendums when issuing debt;
  - 4.7.6. Maintain strong credit ratings and good investor relations.
- 4.8. Not use any unappropriated long-term reserves or undesignated fund balance.
- 4.9. Not invest or hold funds of the District in accounts or instruments that are inconsistent with the following statement of investment policies:
  - 4.9.1. Public funds not needed for the immediate necessities of the District should, to the extent reasonably possible, be prudently invested or deposited to produce revenue for the District consistent with the Board Investment Policy and applicable law.
  - 4.9.2. The Treasurer or his or her designee shall submit quarterly investment reports to the Board as specified under Government Code Section 53646.
  - No investments will be made in fossil fuel companies with significant carbon emissions 4.9.3. potential. See BAO/CEO Interpretation

#### **General Accounting**

- 4.10. Not invoice/charge or demand payment from water customers (raw, ground, treated, or recycled) of the District that is not accurate, legal, and consistent with District and Board policies.
- 4.11. Not conduct unbudgeted interfund transfers in any amount greater than can be repaid by certain, otherwise unencumbered revenues within 90 days, or prior to the close of the fiscal year.
- 4.12. Settle payroll and debts in a timely manner.
- 4.13. Not allow tax payments or other government ordered payments or filings to be overdue or inaccurately filed.
- 4.14. Pursue receivables after a reasonable grace period in a timely and business-like manner.
- 4.15. Receive, process or disburse funds under controls which meet audit standards. See BAO/CEO Interpretation

### **BAO/CEO Interpretations**

of the Board's Governance Policies

Title: Financial Management Category: BAO/CEO Interpretations

Interpretation of Policy No. EL-4

CEO Approval: April 8, 2008 Latest R

Latest Revision: August 20, 2012

Financial planning for any fiscal year shall be aligned with the Board's Ends, not risk fiscal jeopardy, and be derived from a multi-year plan. With respect to the actual, ongoing financial condition and activities, the BAOs shall provide for the development of fiscal sustainability.

#### BAO Interpretation:

A multi-year financial plan shall include, but is not limited to, options and alternatives for prefunding the
unfunded liability for other post-employment benefits and other strategies for cost reduction or cost
containment to reduce the unfunded liability and ensure financial sustainability of the District.

#### 4.2. Spend in ways that are cost-efficient.

#### CEO Interpretation:

- Costs of the long-term Delta solution should be allocated fairly to all beneficiaries.
- The District favors a flexible approach to cost allocation that maximizes the opportunity for discretionary allocations of cost based on incremental benefits.
- The FAHCE Draft Settlement Agreement of 2003 established a balanced framework to achieve reliable future water supply, protect water rights, and enhance the quality of life in Santa Clara County without spending extravagantly or in ways more costly than necessary.
- 4.15. Receive, process or disburse funds under controls which meet audit standards.

#### BAO Interpretation:

 The Clerk of the Board and the District Counsel will utilize the controls developed by the CEO to meet the audit standards.

4.9.3. No investments will be made in fossil fuel companies with significant carbon emissions potential.

#### **CEO** Interpretation:

• No investments will be made in the top 200 fossil fuel companies that control most of the world's oil, coal, and natural gas supplies.

#### Santa Clara Valley Water District Board Investment Policy

(Revised Excerpts)

#### 7.12 Prohibited Investments

**7.12.1** Prohibited investments include securities not listed in this section 7, as well as inverse floaters, range notes, interest only strips derived from a pool of mortgages and any security that could result in zero interest accrual if held to maturity, as specified in Section 53601.6 of the California Government Code.

7.12.2 Climate Divestment Investment Restriction - No investments will be made in the top 200 fossil fuel companies that control most of the world's oil, coal, and natural gas supplies. See Exhibit C for the list of 200 companies as defined by the organization, "350.org".

#### Exhibit C- Top 200 listed companies by estimated carbon reserves

350.org http://gofossilfree.org/companies/

		Coal			Oil	
#	Coal Companies	(GtCO2)	#	Oil & Gas Companies	(GtCO2)	Gas (GtCO2)
1	African Rainbow Minerals Ltd.	0.95	101	Anadarko Petroleum Corp.	3.14	0.33
2	AGL Energy	0.89	102	Apache Corp.	3.32	0.33
3	Alcoa Inc.	0.23	103	Arc Resources Ltd.	0.3	0.03
4	Allete Inc.	0.72	104	ATP Oil & Gas Corp.	0.24	0.01
5	Alliance Resource Partners L.P.	1.47	105	Bankers Petroleum Ltd.	0.25	-
6	Alpha Natural Resources Inc.	2.29	106	Bashneft	7.25	0.01
7	Anglo American PLC	16.75	107	Baytex Energy Corp.	0.3	0
8	Aquila Resources Ltd.	0.53	108	Berry Petroleum Co. (Cl A)	0.4	0.03
9	ArcelorMittal	0.62	109	BG Group PLC	2.29	0.48
10	Arch Coal Inc.	5.57	110	BHP Billiton	1.82	0.2
11	Aston Resources Pty Ltd.	0.93	111	Bonavista Energy Corp	0.18	0.03
12	Bandanna Energy Ltd.	0.25	112	BP PLC	32.68	1.92
13	Banpu PCL	2.55	113	Cairn Energy PLC	0.35	0
14	BHP Billiton	16.07	114	Canadian Natural Resources Ltd.	4.35	0.14
15	Black Hills Corp.	0.27	115	Canadian Oil Sands Ltd.	0.78	-
16	Bumi Resources	3.28	116	Cenovus Energy Inc.	1.4	0.06
17	Capital Power Corp.	0.38	117	Chesapeake Energy Corp.	0.39	0.57
18	China Shenhua Energy Co. Ltd.	6.91	118	Chevron Corp.	20.11	1.11
19	Churchill Mining PLC	1.74	119	Cimarex Energy Co.	0.18	0.05
20	Cliffs Natural Resources Inc.	0.47	120	CNOOC Ltd.	1.85	0.09
21	Cloud Peak Energy Inc.	0.85	121	Compania Espanola de Petroleos S.A.	0.21	-
22	CLP Holdings Ltd.	0.83	122	Concho Resources Inc.	0.44	0.02
23	Coal India Ltd.	6.69	123	ConocoPhillips	18.11	1.03
24	Coal of Africa Ltd.	0.59	124	Continental Resources Inc. Oklahoma	0.54	0.02
25	Consol Energy Inc.	4.5	125	Crescent Point Energy Corp.	0.47	0
26	Datang International Power Generation Co. Ltd.	11.21	126	Denbury Resources Inc.	0.6	0
27	Datong Coal Industry Co. Ltd.	4.3	127	Devon Energy Corp.	3.77	0.42

		Coal			Oil	
#	Coal Companies	(GtCO2)	#	Oil & Gas Companies	(GtCO2)	Gas (GtCO2)
28	Eurasian Natural Resources Corp. PLC	1.93	128	Ecopetrol S.A.	0.35	0.01
29	Evraz Group S.A.	4.86	129	El Paso Corp.	0.23	0.1
30	Exxaro Resources Ltd.	13.37	130	EnCana Corp.	0.24	0.47
31	FirstEnergy Corp.	0.5	131	Energen Corp.	0.34	0.04
32	Fortune Minerals Ltd.	0.28	132	Enerplus Corp.	0.34	0.03
33	Fushan International Energy Group Ltd.	0.34	133	ENI S.p.A.	7.51	0.53
34	Gansu Jingyuan Coal Industry & Electricity Power	0.26	134	EOG Resources Inc.	0.97	0.38
35	Grupo Mexico S.A.B. de C.V.	0.26	135	EQT Corp.	0.01	0.17
36	Gujarat NRE Coke Ltd.	0.4	136	Exxon Mobil Corp.	38.14	2.89
37	Gujarat NRE Coking Coal Ltd.	0.12	137	Forest Oil Corp.	0.22	0.07
38	Homeland Energy Group Ltd.	0.23	138	Gazprom OAO	14.87	13.96
39	Huolinhe Opencut Coal Industry Corp. Ltd.	0.41	139	GDF Suez S.A.	0.17	0.05
40	Idemitsu Kosan Co. Ltd.	1.58	140	Global Energy Development PLC	0.17	0
41	Inner Mongolia Yitai Coal Co. Ltd.	7.78	141	Hess Corp.	3.01	0.12
42	International Coal Group Inc.	0.95	142	Husky Energy Inc.	1.76	0.06
43	Irkutskenergo	0.23	143	Imperial Oil Ltd.	0.75	0.01
44	Itochu Corp.	0.34	144	INA-Industrija Nafte	0.17	-
45	James River Coal Co.	0.57	145	Inpex Corp.	2.44	0.1
46	Jindal Steel & Power Ltd.	0.26	146	Linn Energy LLC	0.49	0.03
47	Jizhong Energy Resources Co. Ltd.	0.3	147	Lukoil Holdings	42.59	0.97
48	Kazakhmys PLC	0.99	148	Lundin Petroleum AB	0.31	0
49	Kuzbassenergo	2.03	149	Marathon Oil Corp.	2.51	0.12
50	Macarthur Coal Pty Ltd.	0.53	150	Mariner Energy	0.27	0.02
51	Magnitogorsk Iron & Steel Works	2.2	151	MOL Hungarian Oil and Gas Plc	0.19	0.01
52	Massey Energy Co.	1.93	152	Murphy Oil Corp.	0.69	0.03
53	Mechel OAO	8.9	153	Newfield Exploration Co.	0.53	0.11
54	Mitsubishi Corp.	4.31	154	Nexen Inc.	1.4	0.02
55	Mitsui & Co. Ltd.	1.03	155	Noble Energy Inc.	1.04	0.12
56	Mitsui Matsushima Co. Ltd.	0.28	156	Novatek	-	1.73
57	Mongolian Mining Corp.	0.75	157	Occidental Petroleum Corp.	7.36	0.22
58	NACCO Industries Inc. (Cl A)	1.33	158	Oil & Natural Gas Corp. Ltd.	-	0.18
59	New Hope Corp. Ltd.	1.3	159	Oil India Ltd.	0.16	0.01

		Coal			Oil	
#	Coal Companies	(GtCO2)	#	Oil & Gas Companies	(GtCO2)	Gas (GtCO2)
60	New World Resources N.V.	1.07	160	Oil Search Ltd.	0.91	-
61	Neyveli Lignite Corp. Ltd.	0.19	161	OMV AG	1.02	0.06
62	Noble Group Ltd	0.34	162	PA Resources AB	0.16	-
63	Northern Energy Corp. Ltd.	0.29	163	Pacific Rubiales Energy Corp.	0.5	0.02
64	Novolipetsk Steel OJSC	1.3	164	Pengrowth Energy Corp.	0.3	0.02
65	NTPC Ltd.	0.28	165	Penn West Petroleum Ltd.	0.91	0.03
66	Optimum Coal Holdings Ltd.	0.67	166	PetroBakken Energy Ltd.	0.21	0
67	Patriot Coal Corp.	0.94	167	Petrobank Energy & Resources Ltd.	0.31	0
68	Peabody Energy Corp.	10.23	168	Petrobras	11.45	0.17
69	Pingdingshan Tianan Coal Mining Co. Ltd.	2.97	169	Petroleum Development Corp.	-	1.51
70	Polo Resources Ltd.	0.82	170	Pioneer Natural Resources Co.	1.5	0.11
71	Polyus Gold OAO	2.47	171	Plains Exploration & Production Co.	0.67	0.04
72	Prophecy Resource Corp.	0.28	172	Premier Oil PLC	0.18	0.03
73	PT Adaro Energy	0.74	173	PTT PCL	0.33	0.12
74	PT Bayan Resources	1.14	174	Questar Corp.	0.12	0.11
75	Public Power Corp. S.A.	4.56	175	Quicksilver Resources Inc.	0.36	0.08
76	Raspadskaya OJSC	2.09	176	Range Resources Corp.	0.27	0.11
77	Rio Tinto	5.23	177	Repsol YPF S.A.	2.75	0.29
78	RWE AG	1.94	178	Resolute Energy Corp.	0.16	0
79	Sasol Ltd.	2.51	179	Rosneft	10.7	0.08
80	Severstal JSC	141.6	180	Royal Dutch Shell PLC	14.11	2.09
81	Shanxi Coking Co. Ltd.	14.98	181	SandRidge Energy Inc.	0.33	0.03
82	Sherritt International Corp.	1.15	182	Santos Ltd.	0.19	0.17
				SINOPEC Shandong Taishan Petroleum		
83	Straits Asia Resources Ltd.	0.39	183	Co.Ltd.	6.61	0.22
84	Tata Power Co. Ltd.	1.49	184	SK Holdings Co. Ltd.	1.56	-
85	Tata Steel Ltd.	2.96	185	SM Energy Co.	0.17	0.02
86	Teck Resources Ltd.	2.7	186	Soco International PLC	0.25	-
87	Tokyo Electric Power Co. Inc.	0.89	187	Southwestern Energy Co.	0	0.16
88	TransAlta Corp.	1.23	188	Statoil ASA	2.23	0.25
89	United Co. Rusal PLC	3.02	189	Suncor Energy Inc.	3.74	0.07
90	United Industrial Corp. Ltd.	2.48	190	Swift Energy Co.	0.2	0.01
91	Vale SA	3.01	191	Talisman Energy Inc.	1.47	0.19

		Coal			Oil	
#	Coal Companies	(GtCO2)	#	Oil & Gas Companies	(GtCO2)	Gas (GtCO2)
92	Walter Energy, Inc.	0.45	192	Total S.A.	16.9	1.12
93	Wescoal Holdings Ltd.	0.46	193	Tullow Oil PLC	0.36	0.01
94	Wesfarmers Ltd.	1.86	194	Ultra Petroleum Corp.	-	0.16
95	Western Coal Corp.	0.49	195	Venoco Inc.	0.16	0.01
96	Westmoreland Coal Co.	0.56	196	Whiting Petroleum Corp.	0.7	0.01
97	Whitehaven Coal Ltd.	0.79	197	Williams Cos.	-	0.18
98	Xstrata PLC	11.6	198	Woodside Petroleum Ltd.	0.54	0.27
99	Yanzhou Coal Mining Co. Ltd.	4.46	199	YPF S.A.	1.68	0.12
100	Zhengzhou Coal Industry & Electric Power	0.15	200	Zhaikmunai L.P.	0.22	0.01
Gran	nd Total	389.19		Grand Total	319.13	37.34

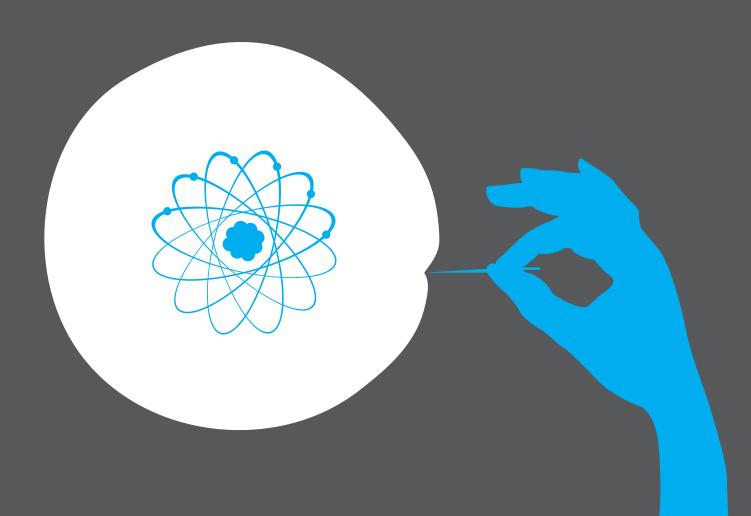
#### **Source:**

 $Unburnable\ Carbon\ -\ Are\ the\ world's\ financial\ makets\ carrying\ a\ carbon\ bubble?\ Fig.\ 5\ on\ page\ 14/15$   $https://docs.google.com/file/d/1tsmQREK21woVhOQxS2bvmRgSydRbrSpI8BVkq\_RmOkDvrM7s47A5RkjpphX9/edit$ 



## **Unburnable Carbon –**

Are the world's financial markets carrying a carbon bubble?



**ATTACHMENT 4 PAGE 1 of 36** 



### About Carbon Tracker

The Carbon Tracker initiative is a new way of looking at the carbon emissions problem. It is focused on the fossil fuel reserves held by publically listed companies and the way they are valued and assessed by markets. Currently financial markets have an unlimited capacity to treat fossil fuel reserves as assets. As governments move to control carbon emissions, this market failure is creating systemic risks for institutional investors, notably the threat of fossil fuel assets becoming stranded as the shift to a low-carbon economy accelerates.

In the past decade investors have suffered considerable value destruction following the mispricing exhibited in the dot.com boom and the more recent credit crunch. The carbon bubble could be equally serious for institutional investors – including pension beneficiaries - and the value lost would be permanent.

We believe that today's financial architecture is not fit for purpose to manage the transition to a low-carbon economy and serious reforms are required to key aspects of financial regulation and practice firstly to acknowledge the carbon risks inherent in fossil fuel assets and then take action to reduce these risks on the timeline needed to avoid catastrophic climate change.

#### Carbon Tracker's goal is to prevent a carbon crash by:

- Working with capital market regulators and investors to assess systemic climate change risks and propose practical measures to minimise these risks to market stability and the operation of an orderly market.
- Revisiting the way fossil fuel companies are valued including the accounting treatment of fossil fuel-based reserves to ensure that carbon limits are fully integrated;
- Evaluating the concentration risk facing key global markets which are currently over-weight fossil fuels (such as the UK), and how indices, benchmarks and tracking products can be reformed to protect investors
- Improving the quality and utility of disclosures required by regulators and listings authorities to ensure that future carbon risks associated with fossil fuel reserves are fully dealt with to enable investors to make informed decisions;
- Updating the way fossil fuel companies are brought to the capital markets by investment banks;

We believe the regulatory regimes covering the capital markets need realigning to provide transparency for investors on the assumptions behind valuing unburnable carbon. With the global economy following the fortunes of the financial sector, it is essential to create capital markets which are robust enough to deliver an economy which can prevent dangerous climate change. Unless a more long-term approach is required by regulators, the shift in investment required to deliver a low carbon future will not occur.

## Contents

Executive Summary	2
Introduction	4
Part A: The analysis	5
1. The global carbon budget	6
2. Global reserves of coal, oil and gas	7
3. Do listed fossil fuel reserves take us to unburnable carbon?	8
4. Top 200 listed companies by estimated carbon reserves	13
5. Focus on the UK	15
Part B: What this analysis means for those involved in raising capital on the financial markets  6. Valuation of companies  7. Corporate disclosure  8. Capitalising carbon through the listing process  9. Regulators and stock exchanges  10. Relevance for investors  11. Recommendations for resolving the capital markets' carbon bubble	17 19 22 23 24 25 28
Appendix 1: Methodology	29
References	32

## **Executive Summary**

#### Global carbon budget

Research by the Potsdam Institute calculates that to reduce the chance of exceeding 2°C warming to 20%, the global carbon budget for 2000-2050 is 886 GtCO<sub>2</sub>. Minus emissions from the first decade of this century, this leaves a budget of 565 GtCO<sub>2</sub> for the remaining 40 years to 2050.

#### Global warming potential of proven reserves

The total carbon potential of the Earth's known fossil fuel reserves comes to 2795 GtCO<sub>2</sub>. 65% of this is from coal, with oil providing 22% and gas 13%. This means that governments and global markets are currently treating as assets, reserves equivalent to nearly 5 times the carbon budget for the next 40 years. The investment consequences of using only 20% of these reserves have not yet been assessed.

#### Global warming potential of listed reserves

The fossil fuel reserves held by the top 100 listed coal companies and the top 100 listed oil and gas companies represent potential emissions of 745  $\rm GtCO_2$ . This exceeds the remaining carbon budget of 565  $\rm GtCO_2$  by 180  $\rm GtCO_2$ . This means that using just the listed proportion of reserves in the next 40 years is enough to take us beyond 2°C of global warming. On top of this further resources are held by state entities. Given only 20% of the total reserves can be used to stay below 2°C, if this is applied uniformly, then only 149 of the 745  $\rm GtCO_2$  held by listed companies can be used unabated. Investors are thus left exposed to the risk of unburnable carbon. If the 2°C target is rigorously applied, then up to 80% of declared reserves owned by the world's largest listed coal, oil and gas companies and their investors would be subject to impairment as these assets become stranded.

#### The carbon intensity of stock exchanges

The top 100 coal and top 100 oil & gas companies have a combined value of \$7.42 trillion as at February 2011. The countries with the largest greenhouse gas potential in reserves on their stock exchanges are Russia, (253 Gt  $CO_2$ ), the United States, (156.5 Gt  $CO_2$ ) and the United Kingdom, (105.5 Gt  $CO_2$ ). The stock exchanges of London, Sao Paulo, Moscow, Australia and Toronto all have an estimated 20-30% of their market capitalisation connected to fossil fuels.

#### London - a green capital?

The UK has less than 0.2% of the world's coal, oil and gas reserves, and accounts for around 1.8% of global consumption of fossil fuels. Yet the  $CO_2$  potential of the reserves listed in London alone account for 18.7% of the remaining global carbon budget. The financial carbon footprint of the UK is therefore 100 times its own reserves. London currently has  $105.5 \, \text{GtCO}_2$  of fossil fuel reserves listed on its exchange which is ten times the UK's carbon budget for 2011 to 2050, of around  $10 \, \text{GtCO}_2$ . Just one of the largest companies listed in London, such as Shell, BP or Xstrata, has enough reserves to use up the UK's carbon budget to 2050. With approximately one third of the total value of the FTSE 100 being represented by resource and mining companies, London's role as a global financial centre is at stake if these assets become unburnable en route to a low carbon economy.

#### Transferring risk to the markets

In addition to the coal, oil and gas reserves of established companies, new fossil fuel companies continue to list on exchanges to raise capital through share issues, in order to fund further exploration and development. Recently London has seen Glencore, Vallar/Bumi and Vallares list on its exchange with no consideration by the regulators of potential systemic risks to financial markets of the increased exposure to climate change risk. In addition, former state-owned companies are coming to the markets, bringing huge carbon reserves to western investment portfolios (e.g. Indian and Monglian coal mining companies).

#### The asset owners response

We believe investors need to respond to this systemic risk to their portfolios and the threat it poses of a carbon bubble bursting. Our research poses the following questions for asset owners:

- Which capital markets regulators are responsible for oversight of systemic risks and protecting your investments from systemic climate change risk?
- To what extent are you exposed to markets which have higher than average exposure to fossil fuels and are more prone to the stranding of assets?
- Are conventional fossil fuel-heavy indices still appropriate performance benchmarks for your portfolios?
- Are your asset allocation decisions based on obsolete data regarding the full risks facing fossil fuel reserves and what proportion of your investments may be unburnable carbon?

#### The reporting challenge

Corporate disclosure of carbon risks has improved markedly over the past decade, but arguably the most material climate change risk remains hidden from most reports issued by fossil fuel companies. For these companies, it is not the scale of operational emissions that is the strategic challenge, but the emissions associated with their products which are currently locked into their reserves. The potential carbon footprints of reserves are material numbers which are not transparent. The long-term viability of these businesses rests on their future ability to extract and sell carbon, rather than their past emissions. For investors to gain a greater understanding of these risks, a change of mindset is required to consider the scale of the systemic risk posed by fossil fuel reserves. This will require moving beyond annual reporting of last year's emissions flows to more forward-looking analysis of carbon stocks. This is a logical step as carbon reporting becomes mainstream and integrated with financial analysis.

#### The regulator's responsibility

The recent financial crisis has shown that capital markets were not-self-regulating and required unprecedented intervention; regulators were not monitoring the biggest systemic risks and so missed key intervention points. Listing authorities will need to take greater responsibility for reviewing the provision of information on embedded carbon by quoted companies. They need to ensure that taking the capital markets as a whole, systemic risks posed by the carbon asset bubble are addressed. Further regulation, guidance, and monitoring are needed to shift practices across the exchanges.

#### Do the maths

#### It's a simple formula:

Company-level: Reserves x carbon factor = carbon dioxide potential.

Exchange-level: Sum of company carbon dioxide potentials = Exchange total.

Global-level: Sum of exchange totals > Global carbon budget.

Today, these numbers do not add up. Moreover those responsible for the stability of financial markets have not yet started to collect this data or assimilate it into their risk models. It's time that asset owners and capital market regulators made sure they did.

#### **Recommendations:**

#### Regulators should:

- Require reporting of fossil fuel reserves and potential CO<sub>2</sub> emissions by listed companies and those applying for listing.
- Aggregate and publish the levels of reserves and emissions using appropriate accounting guidelines.
- Assess the systemic risks posed to capital markets and wider economic prosperity through the overhang of unburnable carbon
- Ensure financial stability measures are in place to prevent a carbon bubble bursting.

### Introduction

This research provides the evidence base which confirms what we have long suspected – that there are more fossil fuels listed on the world's capital markets than we can afford to burn if we are to prevent dangerous climate change. Having satisfied that curiosity, this report marks a new phase of dealing with the implications for the investment world.

The missing element in creating a low carbon future is a financial system which will enable that to happen. Political will, technology and behaviour change all play their part, but finance will be critical to tackling climate change. This analysis demonstrates why a greater focus on changing the financial system is required to align it with emissions reduction objectives.

The global nature of capital markets means that fossil fuel reserves are distributed very differently in terms of ownership compared to their physical location. This places the responsibility for financing the development of fossil fuel reserves in industrialising countries with western investors.

Now is the time to move into the second generation of investor action on climate change, which tackles the system that is locked into financing fossil fuels. Climate change poses a great threat to the global economy and it is not unrealistic to expect regulators responsible for assessing new systemic risks to address the carbon bubble.

The goal now is for regulators to send clear signals to the market that cause a shift away from the huge carbon stockpiles which pose a systemic risk to investors. This is the duty of the regulator – to rise to this challenge and prevent the bubble bursting.

#### Mark Campanale & Jeremy Leggett

#### **Acknowledgements**

This report was authored by James Leaton on behalf of Investor Watch, to fulfil an idea conceived by its founding directors. Thanks are due to Jeremy Leggett, Nick Robins, Mark Campanale and Cary Krosinsky, for reviewing draft reports; to Jon Grayson for support and suggestions on the financial data; and to Dave at dha communications for the design.

The research was made possible by grants from Tellus Mater Foundation, Rockefeller Brothers Fund, Growald Family Fund, and the Joseph Rowntree Charitable Trust.

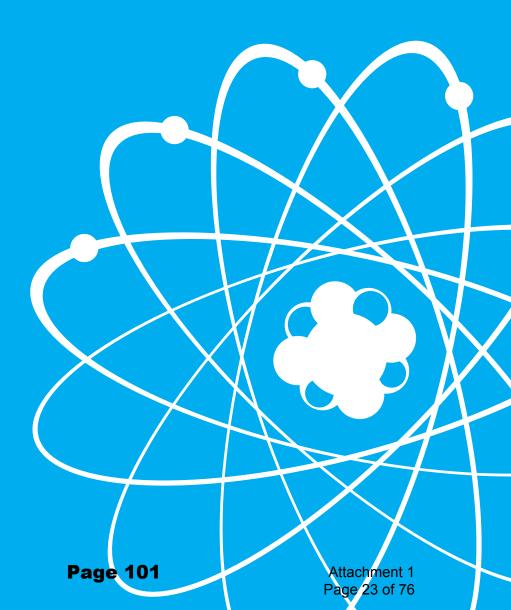
#### Contact details

If you would like to know more or get in touch:

#### www.carbontracker.org

- e: jleaton@carbontracker.org
- e: mark@campanale.co.uk
- e: jeremy.leggett@solarcentury.com

## Part A: The Analysis



#### 1. The global carbon budget

The Cancun Agreement in December 2010 captured an international commitment to limit global warming to two degrees Celsius (°C) above pre-industrial levels. It also noted the potential need to tighten this target to 1.5°C.¹ This agreement provides a reference point against which global emissions scenarios can be compared to assess whether the world is on track to achieve the two degrees target. We are focused on how the world's financial markets are aligned with this pathway as it is clear a shift to a low carbon economy needs capital markets to rise to this challenge.

The Potsdam Climate Institute has calculated a global carbon budget for the world to stay below 2°C of warming. This uses probabilistic climate change modelling to calculate the total volume of carbon dioxide ( $CO_2$ ) emissions permitted in the first half of the 21st century to achieve the target. This revealed that to reduce the chance of exceeding 2 °C warming to 20%, the global carbon budget for 2000 -2050 is 886  $GtCO_2$ . (N.B. All emissions are expressed in carbon dioxide only, rather than the equivalent of the full suite of greenhouse gases.)

#### What have we already used since 2000?

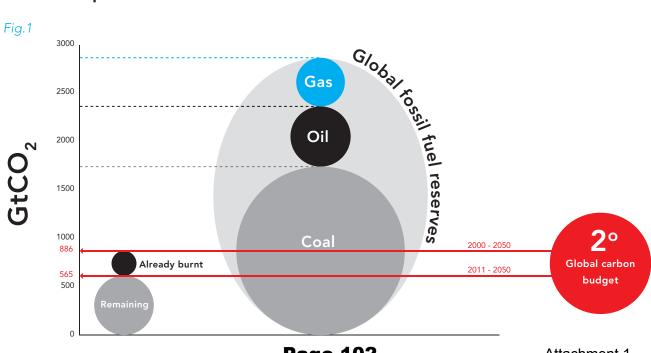
By 2011, the global economy has already used up over a third of that 50 year budget in the first decade alone. Calculations of global emissions published in Nature indicate 282  ${\rm GtCO_2}$  have already been emitted in the first decade of this century from burning fossil fuels, with land use change contributing a further 39  ${\rm GtCO_2}$ . This leaves a budget of around 565  ${\rm GtCO_2}$  for the remaining 40 years to 2050. This budget could be further contracted if a position is adopted to limit global warming to 1.5°C or even lower.

#### What are the potential emissions from global fossil fuel reserves?

The Potsdam Climate Institute also calculated the total potential emissions from burning the world's proven fossil fuel reserves (coal, oil and gas). This is based on reserve figures reported at a country level and UNFCCC emissions factors for the relevant fossil fuel types. Oil was split into conventional and unconventional types, whilst coal was split into three different bands to reflect the range of carbon intensity.

The total CO<sub>2</sub> potential of the earth's proven reserves comes to 2795 GtCO<sub>2</sub>. 65% of this is from coal, with oil providing 22 % and gas 13%. This means that governments are currently indicating their countries contain reserves equivalent to nearly 5 times the carbon budget for the next 40 years. Consequently only one-fifth of the reserves could be burnt unabated by 2050 if we are to reduce the likelihood of exceeding 2°C warming to 20%.

## Comparison of the global 2°C carbon budget with fossil fuel reserves ${\rm CO_2}$ emissions potential



#### 2. Global reserves of coal, oil and gas

The global distribution of fossil fuels reserves creates energy superpowers and consequently produces energy security issues for other nations, especially as political risk and catastrophic events ratchet up energy prices. The top ten countries for each of the three fossil fuels are shown below, with additional data for countries with major stock exchanges.

Fig.2

OIL		
Country	Reserves (bbl)	% world
Saudi Arabia	264.6	17.9%
Canada	176.5	12.0%
Venezuela	172.3	11.7%
Iran	137.6	9.3%
Iraq	115	7.8%
Kuwait	101.5	6.9%
UAE	97.8	6.6%
Russia	74.2	5.0%
Libya	44.3	3.0%
Kazakhstan	39.8	2.7%
		82.9%

GAS		
Country	Reserves (tn cm)	% world
Russia	44.38	23.7%
Iran	29.61	15.8%
Qatar	25.37	13.5%
Turkmenistan	8.1	4.3%
Saudi Arabia	7.92	4.2%
US	6.93	3.7%
UAE	6.43	3.4%
Venezuela	5.67	3.0%
Nigeria	5.25	2.8%
Algeria	4.5	2.4%
		76.8%

COAL				
Country	Reserves (tn cm)	% world		
US	238308	28.9%		
Russia	157010	19.0%		
China	114500	13.9%		
Australia	76200	9.2%		
India	58600	7.1%		
Ukraine	33873	4.1%		
Kazakhstan	31300	3.8%		
South Africa	30408	3.7%		
Poland	7502	0.9%		
Brazil	7059	0.9%		
		91.5%		

UK	3.1	0.2%
India	5.8	0.4%
China	14.8	1.0%
US	28.4	1.9%
World		1476.4

UK	0.29	0.2%
India	1.12	0.6%
China	2.46	1.3%
World	187.49	

UK	155	0.02%
World	826001	

Source: BP Statistical Review of World Energy 2010<sup>4</sup>

The UK is a major global finance centre, but a relatively small country in terms of geographic size, which has less than 0.2% of the world's fossil fuel reserves. The rapidly industrialising economies of India and China have significant reserves of coal, but not oil and gas.

These reserves are split between those that are still owned by governments (National Oil Companies - NOCs), and those that are assets licensed to the private sector (International Oil Companies – IOCs). A number of state enterprises, particularly in the BRICS economies, are raising finance internationally via capital markets, in order to develop their coal and oil reserves. This trend is leading to a steady transfer of parts of the national companies to international investors.

The scale of the reserves held by these companies means that even a partial listing - such as Coal India in 2010 can result in a significant addition of potential carbon emissions to the private sector and thus to the transfer of climate risk to the pension funds of ordinary citizens.

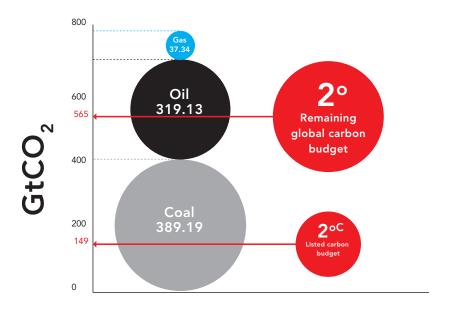
The figures used here are the proven reserves (i.e. those which have a 90% certainty of being extracted).5 Companies also have probable (50% chance of being extracted) and possible (10% chance of being extracted) reserves which only add to the levels of unburnable carbon. Page 103

#### 3. Do listed fossil fuel reserves take us to unburnable carbon?

We estimate the fossil fuel reserves held by the top 100 listed coal companies and the top 100 listed oil and gas companies represent potential emissions of 745 GtCO<sub>2</sub>. This exceeds the remaining carbon budget of 565 GtCO<sub>2</sub> by 180 GtCO<sub>2</sub>. The potential emissions from listed fossil fuel reserves show that just over half the carbon comes from coal reserves, whilst only 5% is attributable to gas.

#### Carbon dioxide emissions potential of listed fossil fuel reserves

Fig.3



'using just the reserves listed on the world's stock markets in the next 40 years would be enough to take us beyond 2°C of global warming.'

This has profound implications for the world's energy finance structures and means that using just the reserves listed on the world's stock markets in the next 40 years would be enough to take us beyond 2°C of global warming. This calculation also assumes that no new fossil fuel resources are added to reserves and burnt during this period – an assumption challenged by the harsh reality that fossil fuel companies are investing billions per annum to find and process new reserves. It is estimated that listed oil and gas companies had CAPEX budgets of \$798 billion in 2010.6 In addition, over two-thirds of the world's fossil fuels are held by privately or state owned oil, gas and coal corporations, which are also contributing even more carbon emissions.

Given that only one fifth of the total reserves can be used to stay below 2°C warming, if this is applied uniformly, then only 149 of the 745 GtCO<sub>2</sub> listed can be used unmitigated. This is where the carbon asset bubble is located. If applied to the world's stock markets, this could result in a repricing of assets on a scale that would dwarf past profit warnings and revaluation of reserves. This situation persists because no financial regulator is responsible for monitoring, collating or interpreting these risks.

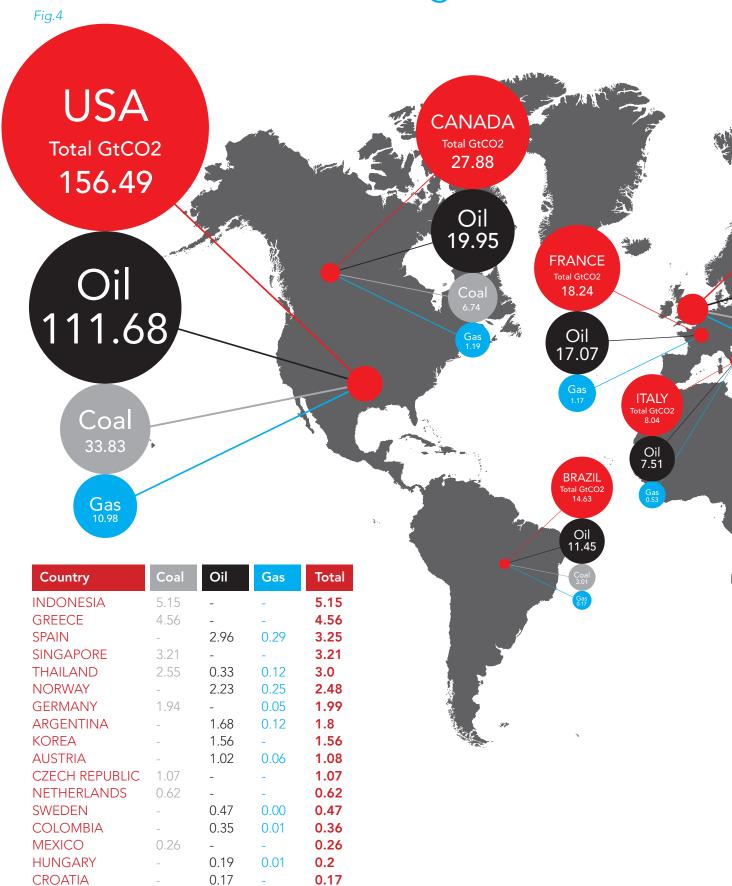
#### How quickly would we reach unburnable carbon if emissions continue business as usual?

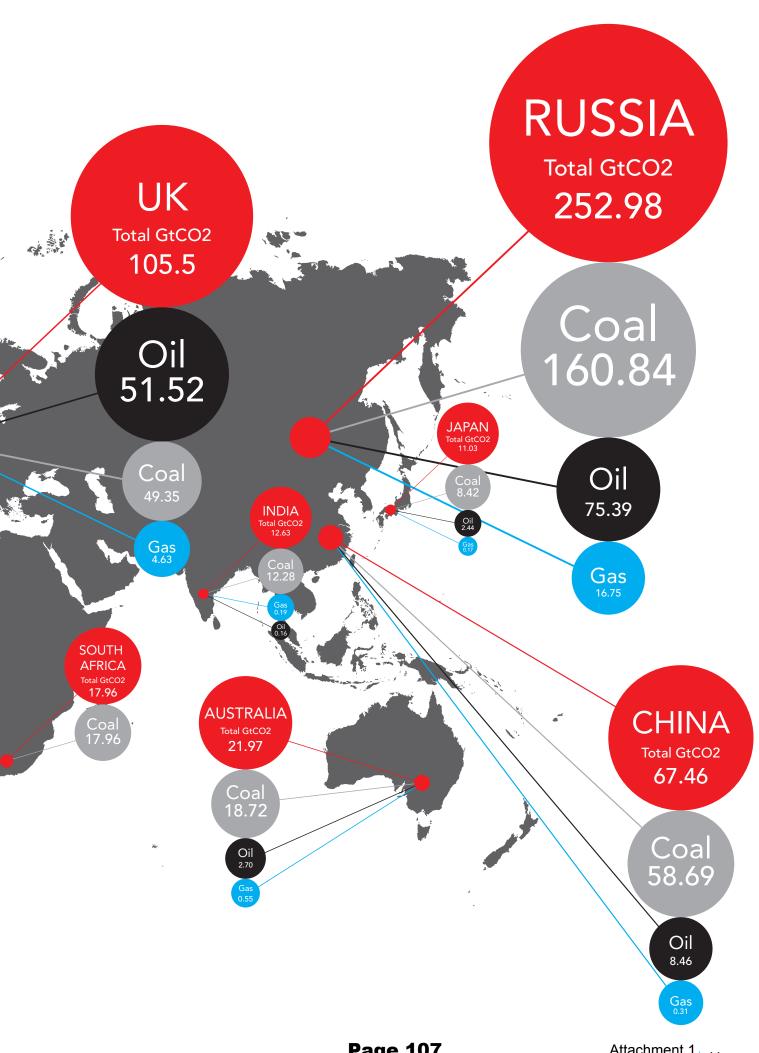
According to the latest IEA projections of energy-related fossil fuel CO, emissions, unburnable carbon will be reached in just 16 years if energy consumption continues unfettered. This is based on global annual energy emissions increasing from 30.12 GtCO<sub>2</sub> in 2011 to 37.58 GtCO<sub>2</sub> in 2027, totalling 570.11 GtCO<sub>2</sub> over the period.

#### Where are these reserves listed?

The following map shows the carbon dioxide emissions potential of the reserves that are listed in each country, broken down by the three types of fossil fuel. Russia, the US, the UK and China dominate the picture. However some exchanges, for example US and France, are skewed towards oil reserves, whilst Russia, China, Australia and South Africa are concentrated in coal reserves. This is in stark contrast to the limited fossil fuel reserves in the UK and the limited oil reserves in the US.

# Distribution of fossil fuel reserves between stock exchanges





# How much of each exchange's market capitalisation is based upon these reserves?

It is difficult to produce accurate figures due to the involvement of diversified mining companies who also extract metals and minerals other than coal. It would exaggerate the proportion of the market capitalisation linked to fossil fuels if, for example, the whole figure for Rio Tinto or BHP Billiton were included. If a conservative estimate is used which reduces the contribution from mining companies, then we believe 20 - 30% of the market capitalisation is linked to fossil fuel extraction in on the Australian, London, MICEX, Toronto and Sao Paulo exchanges. Paris, Shanghai, Hong Kong and Johannesburg are currently less exposed with less than 10% market capitalisation linked to fossil fuel extraction.

#### What proportions of global reserves are listed?

The companies assessed here represent the majority of listed reserves, with companies below this threshold contributing less than  $0.15~\rm{GtCO}_2$  each to the total. These top 200 coal, oil and gas extraction companies are equivalent to the potential emissions from:

- 20% of global coal reserves
- 50% of global conventional oil reserves
- 12% of global unconventional oil reserves
- 10% of global gas reserves.

Combined, these top 200 companies are equivalent to around 27% of the global proven fossil fuel reserves, in terms of their carbon dioxide emissions potential. Oil therefore has a much higher representation on the financial markets. The low proportion of gas listed reflects the concentration of reserves in Russia and the Middle East, where oligarchs and National Oil Companies (NOCs) are dominant.

#### An unmitigated disaster?

Energy and emissions predictions often include potential solutions such as carbon capture and storage (CCS) which would allow some fossil fuels to be burnt with a much lower rate of carbon emissions. Viable CCS would certainly provide some extra carbon budget in the medium term. However it could only be applied to power generation by coal and gas, leaving the entire oil-based transport system unmitigated. It is also worth noting that even fossil fuel companies believe commercial application is at least a decade away and doesn't appear to be getting much closer. This means that the global carbon budget may be used up before CCS can even start to make a contribution. Cleaner combustion technologies will also stretch the budget, but will not address the fundamental problem.

#### Unconventionals

The figure for unconventional oil is artificially low, we believe, due to Canadian accounting practices which result in oil sands reserves not being booked upon discovery. Instead, they are only reported under Canadian rules once production is believed to be 'imminent'. The Canadian stock exchanges in particular may therefore have some hidden CO<sub>2</sub> potential as a result.

There has recently been more interest in unconventional gas deposits, for example shale gas, which are also not included in these figures and have a higher carbon factor than traditional gas. The current limited treatment of unconventionals suggests the reserve figures may be even higher and more carbon intensive, cancelling out mitigation gains.

#### 4. Top 200 listed companies by estimated carbon reserves

Fig.5

Rank	Coal Companies	COAL	Oil & Gas Companies	OIL	GAS
	0 100	(GtCO2)		(GtCO2)	(GtCO2)
1	Severstal JSC	141.60	Lukoil Holdings	42.59	0.97
2	Anglo American PLC	16.75	Exxon Mobil Corp.	38.14	2.89
3	BHP Billiton	16.07	BP PLC	32.68	1.92
4	Shanxi Coking Co. Ltd.	14.98	Gazprom OAO	14.87	13.96
5	Exxaro Resources Ltd.	13.37	Chevron Corp.	20.11	1.11
5	Xstrata PLC	11.60	ConocoPhillips	18.11	1.03
7	Datang International Power Generation Co. Ltd.	11.21	Total S.A.	16.90	1.12
}	Peabody Energy Corp.	10.23	Royal Dutch Shell PLC	14.11	2.09
)	Mechel OAO	8.90	Petrobras	11.45	0.17
0	Inner Mongolia Yitai Coal Co. Ltd.	7.78	Rosneft	10.70	0.08
1	China Shenhua Energy Co. Ltd.	6.91	ENI S.p.A.	7.51	0.53
2	Coal India Ltd.	6.69	Occidental Petroleum Corp.	7.36	0.22
3	Arch Coal Inc.	5.57	Bashneft	7.25	0.01
4	Rio Tinto	5.23	SINOPEC Shandong Taishan Petroleum Co. Ltd.	6.61	0.22
5	Evraz Group S.A.	4.86	Canadian Natural Resources Ltd.	4.35	0.14
6	Public Power Corp. S.A.	4.56	Devon Energy Corp.	3.77	0.42
7	Consol Energy Inc.	4.50	Suncor Energy Inc.	3.74	0.42
<u>/</u> 8	Yanzhou Coal Mining Co. Ltd.	4.46	Apache Corp.	3.32	0.33
9	Mitsubishi Corp.	4.31	Anadarko Petroleum Corp.	3.14	0.33
<del>7</del> !0	Datong Coal Industry Co. Ltd.	4.30	Hess Corp.	3.01	0.33
.0 !1	Bumi Resources	3.28	Repsol YPF S.A.	2.75	0.12
				-	
2	United Co. Rusal PLC	3.02	BG Group PLC	2.29	0.48
23	Vale SA	3.01	Marathon Oil Corp.	2.51	0.12
24	Pingdingshan Tianan Coal Mining Co. Ltd.	2.97	Inpex Corp.	2.44	0.10
25	Tata Steel Ltd.	2.96	Statoil ASA	2.23	0.25
26	Teck Resources Ltd.	2.70	BHP Billiton	1.82	0.20
27	Banpu PCL	2.55	CNOOC Ltd.	1.85	0.09
28	Sasol Ltd.	2.51	Husky Energy Inc.	1.76	0.06
29	United Industrial Corp. Ltd.	2.48	YPF S.A.	1.68	0.12
80	Polyus Gold OAO	2.47	Novatek	-	1.73
31	Alpha Natural Resources Inc.	2.29	Talisman Energy Inc.	1.47	0.19
2	Magnitogorsk Iron & Steel Works	2.20	Pioneer Natural Resources Co.	1.50	0.11
3	Raspadskaya OJSC	2.09	SK Holdings Co. Ltd.	1.56	-
4	Kuzbassenergo	2.03	Petroleum Development Corp.	-	1.51
5	RWE AG	1.94	Cenovus Energy Inc.	1.40	0.06
6	Massey Energy Co.	1.93	Nexen Inc.	1.40	0.02
7	Eurasian Natural Resources Corp. PLC	1.93	EOG Resources Inc.	0.97	0.38
8	Wesfarmers Ltd.	1.86	Noble Energy Inc.	1.04	0.12
9	Churchill Mining PLC	1.74	OMV AG	1.02	0.06
0	Idemitsu Kosan Co. Ltd.	1.58	Chesapeake Energy Corp.	0.39	0.57
1	Tata Power Co. Ltd.	1.49	Penn West Petroleum Ltd.	0.91	0.03
2	Alliance Resource Partners L.P.	1.47	Oil Search Ltd.	0.91	-
3	NACCO Industries Inc. (Cl A)	1.33	Woodside Petroleum Ltd.	0.54	0.27
4	Novolipetsk Steel OJSC	1.30	Canadian Oil Sands Ltd.	0.78	-
<u>.</u> 5	New Hope Corp. Ltd.	1.30	Imperial Oil Ltd.	0.75	0.01
<u> </u>	TransAlta Corp.	1.23	Murphy Oil Corp.	0.69	0.03
7	Sherritt International Corp.	1.15	Whiting Petroleum Corp.	0.70	0.03
8	PT Bayan Resources	1.14	EnCana Corp.	0.70	0.01
9	New World Resources N.V.	1.07	Plains Exploration & Production Co.	0.24	0.47
			Hairis Exploration & Production Co.	- V.O/	U.U4

Rank	Coal Companies	COAL (GtCO2)	Oil & Gas Companies	OIL (GtCO2)	GAS (GtCO2)
51	Kazakhmys PLC	0.99	Denbury Resources Inc.	0.60	0.00
52	African Rainbow Minerals Ltd.	0.95	Continental Resources Inc. Oklahoma	0.54	0.02
53	International Coal Group Inc.	0.95	Linn Energy LLC	0.49	0.03
54	Patriot Coal Corp.	0.94	Pacific Rubiales Energy Corp.	0.50	0.02
55	Aston Resources Pty Ltd.	0.93	Crescent Point Energy Corp.	0.47	0.00
56	AGL Energy	0.89	Concho Resources Inc.	0.44	0.02
57	Tokyo Electric Power Co. Inc.	0.89	Quicksilver Resources Inc.	0.36	0.08
58	Cloud Peak Energy Inc.	0.85	PTT PCL	0.33	0.12
59	CLP Holdings Ltd.	0.83	Berry Petroleum Co. (Cl A)	0.40	0.03
60	Polo Resources Ltd.	0.82	Range Resources Corp.	0.27	0.11
61	Whitehaven Coal Ltd.	0.79	Energen Corp.	0.34	0.04
62	Mongolian Mining Corp.	0.75	Enerplus Corp.	0.34	0.03
63	PT Adaro Energy	0.74	Tullow Oil PLC	0.36	0.01
64	Allete Inc.	0.72	Ecopetrol S.A.	0.35	0.01
65	Optimum Coal Holdings Ltd.	0.67	Santos Ltd.	0.19	0.17
66	ArcelorMittal	0.62	SandRidge Energy Inc.	0.33	0.03
67	Coal of Africa Ltd.	0.59	Cairn Energy PLC	0.35	0.00
68	James River Coal Co.	0.57	Arc Resources Ltd.	0.30	0.03
69	Westmoreland Coal Co.	0.56	El Paso Corp.	0.23	0.10
70	Aguila Resources Ltd.	0.53	Pengrowth Energy Corp.	0.30	0.02
71	Macarthur Coal Pty Ltd.	0.53	Lundin Petroleum AB	0.31	0.00
72	FirstEnergy Corp.	0.50	Petrobank Energy & Resources Ltd.	0.31	0.00
73	Western Coal Corp.	0.49	Baytex Energy Corp.	0.30	0.00
74	Cliffs Natural Resources Inc.	0.47	Forest Oil Corp.	0.22	0.07
75	Wescoal Holdings Ltd.	0.46	Mariner Energy	0.27	0.02
76	Walter Energy, Inc.	0.45	ATP Oil & Gas Corp.	0.24	0.01
77	Huolinhe Opencut Coal Industry Corp. Ltd.	0.41	Bankers Petroleum Ltd.	0.25	-
78	Gujarat NRE Coke Ltd.	0.40	Soco International PLC	0.25	-
79	Straits Asia Resources Ltd.	0.39	Zhaikmunai L.P.	0.22	0.01
80	Capital Power Corp.	0.38	Cimarex Energy Co.	0.18	0.05
81	Fushan International Energy Group Ltd.	0.34	Questar Corp.	0.12	0.11
82	Noble Group Ltd	0.34	GDF Suez S.A.	0.17	0.05
83	Itochu Corp.	0.34	Swift Energy Co.	0.20	0.01
84	Jizhong Energy Resources Co. Ltd.	0.30	Compania Espanola de Petroleos S.A.	0.21	-
85	Northern Energy Corp. Ltd.	0.29	PetroBakken Energy Ltd.	0.21	0.00
86	NTPC Ltd.	0.28	Premier Oil PLC	0.18	0.03
87	Prophecy Resource Corp.	0.28	Bonavista Energy Corp	0.18	0.03
88	Mitsui Matsushima Co. Ltd.	0.28	MOL Hungarian Oil and Gas Plc	0.19	0.01
89	Fortune Minerals Ltd.	0.28	SM Energy Co.	0.17	0.02
90	Black Hills Corp.	0.27	Williams Cos.	-	0.02
91	Jindal Steel & Power Ltd.	0.26	EQT Corp.	0.01	0.17
92	Grupo Mexico S.A.B. de C.V.	0.26	Oil & Natural Gas Corp. Ltd.		0.17
93	Gansu Jingyuan Coal Industry & Electricity Power	0.26	Global Energy Development PLC	0.17	0.00
94	Bandanna Energy Ltd.	0.25	Oil India Ltd.	0.16	0.01
95	Irkutskenergo	0.23	Venoco Inc.	0.16	0.01
96	Alcoa Inc.	0.23	INA-Industrija Nafte	0.17	-
97	Homeland Energy Group Ltd.	0.23	PA Resources AB	0.17	-
98	Neyveli Lignite Corp. Ltd.	0.19	Ultra Petroleum Corp.		0.16
99	Zhengzhou Coal Industry & Electric Power Co. Ltd.	0.17	Resolute Energy Corp.	0.16	0.00
100	Gujarat NRE Coking Coal Ltd.	0.12	Southwestern Energy Co.	0.00	0.16
Grand T		389.19	Grand Total	319.13	37.34

#### 5. Focus on the UK

#### The established home of fossil fuel companies

The UK market is the financial home to many of the world's largest oil, gas and coal companies, including BP, Royal Dutch Shell, Rio Tinto, BHP Billiton, Anglo American, and Xstrata. Recently these established stocks have been joined by Glencore in the FTSE100. Fossil fuel asset acquisition vehicles Vallar and Vallares are also aiming to enter this benchmark index. This wave of capital raising for fossil fuel extraction on the London Stock Exchange suggests the appetite of investors remains undiminished.

#### Raising capital

The London Stock Exchange has a higher number of foreign listed companies than any other exchange and is one of the leading centres for foreign equity trading. It is also one of the leading locations for raising capital with 13% of global further share issues in 2009 and 9% of international Initial Public Offerings (IPOs).<sup>8</sup> In the first 24 weeks of 2011, 70.8% of new IPO's in London were for mining companies.<sup>9</sup> UK fund managers are responsible for over £4.1 trillion in assets. Two-thirds of these represent savings of UK citizens through, for example, pensions and life assurance policies.<sup>10</sup>

#### **UK Carbon budget**

The UK has established emissions reductions targets through the Climate Change Act 2008 to cut emissions by 34% by 2020 and 80% by 2050 against a 1990 baseline. The UK's domestic carbon budgets put the significance of its financial markets in context. London currently has  $105.5 \, \text{GtCO}_2$  of fossil fuel reserves listed on its exchange. This compares with the UK's carbon budget for 2011 to 2050, which is estimated as  $9.5 - 10.5 \, \text{GtCO}_2$ , depending on the precise rate of reduction achieved, (N.B. this excludes non-CO<sub>2</sub> greenhouse gas emissions). The LSE therefore currently has reserves equivalent to around ten times the UK CO<sub>2</sub> budget between now and 2050.

Individual companies such as BP, Royal Dutch Shell, Xstrata, BHP Billiton and Anglo American, each have greater  $CO_2$  potential in their reserves than can be emitted under the UK carbon budget to 2050. We take it as a positive sign that the Financial Reporting Review Council took measures to require Rio Tinto to augment its reporting of environmental and social risks in its annual reporting, <sup>13</sup> but more scrutiny is required across the board.

#### **UK Carbon footprint**

Conventional assessments of a country's carbon footprint merely look at the emissions generated within its borders and fail to include emissions embedded in trade or investment flows. Just as the UK's carbon performance deteriorates significantly once the emissions embedded in its imports are included, so London's over-weight position in fossil fuels makes the financial transition to a low-carbon economy that much harder. The bulk of these assets will not only be located outside the UK, but will also be consumed outside the UK. But the carbon risks associated with these assets rebound back onto the UK market and those who invest in it, including the bulk of the savings and investments of its ordinary citizens.

#### Overweight?

The UK has less than 0.2% of the world's coal, oil and gas reserves and accounts for around 1.8% of global consumption of fossil fuels.  $^{14}$  The carbon dioxide potential of the reserves listed in London account for 18.7% of the remaining global carbon budget. So the UK is the financial home to the  $CO_2$  potential of around 100 times its own reserves. It has already been identified that the extent to which the FTSE100 has become dominated by mining, oil and gas companies leaves those tracking the index exposed to commodities prices risk. It follows that this also constitutes a carbon exposure risk.  $^{15}$ 

#### **Green capital?**

London's strong position in capitalising fossil fuels could expose the UK economy, which is centred on its financial markets, to a disproportionate systemic risk due to a concentration of value placed in coal, oil and gas stocks. It has been identified by political leaders that London's financial centre has an opportunity to become part of the solution to climate change, as a green finance centre. A significant reallocation of capital is required to shift London from perpetuating the dominance of fossil fuels.

#### Boris Johnson, Mayor of London, has set out his vision for the city's future:

'A century ago London was cashing in on carbon, but I am determined we now harness the wealth of investment opportunities coming from the shift away from the use of increasingly costly fossil fuels' (Boris Johnson, London Major, April 2011)<sup>16</sup>.

Climate change Minister Greg Barker launched the Capital Markets Climate Initiative (CMCI) in 2010, stating: "We want the City of London, with its unique expertise in innovative financial products, to lead the world and become the global hub for green growth finance. We need to put the sub-prime disaster behind us and focus back on investment in genuine wealth creation and in ways that don't damage the environment".<sup>17</sup>

We support these objectives. However, the government will need to address both sides of the equation; renewables will not develop to the extent required to meet climate change targets until fossil fuel risk is repriced by the capital markets.

#### Financial stability

The UK government has been conducting a number of reviews of the financial sector as it deals with the fallout from the financial crisis. It envisages that the Financial Policy Committee (FPC) will contribute to the Bank of Englands financial stability objective by 'identifying, monitoring, and taking action to remove or reduce, systemic risks with a view to protecting and enhancing the resilience of the UK financial system'. An important initial task will be to undertake preparatory work and analysis into potential macro-prudential tools.

#### Chancellor George Osbourne described the role of the FPC is to:18

"Monitor overall risks in the financial system, identify bubbles as they develop, spot dangerous inter-connections and deploy new tools to deal with excessive levels of leverage before it is too late".

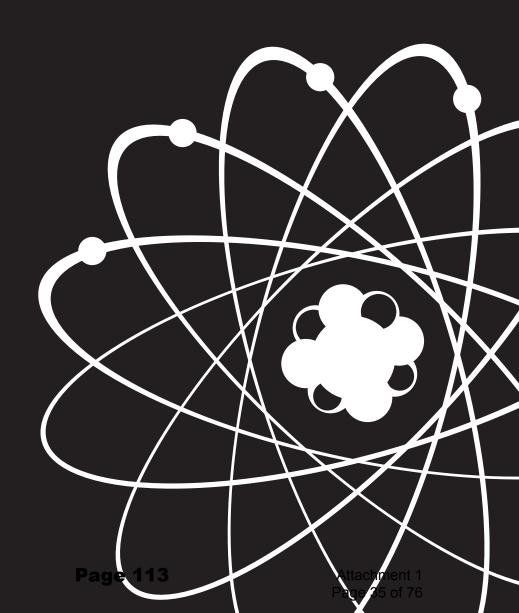
As the UK revises the structure of its financial regulatory bodies in 2011/12, it should consider how to address systemic risks including climate change. We believe it is essential that the FPC addresses the carbon bubble.

Minister for Business, Innovation and Skills, Vince Cable, has initiated an independent review of investment in UK equity markets, which will be conducted by Professor John Kay.<sup>19</sup> The review follows BIS's call for evidence entitled "A long-term focus for corporate Britain", which identified that short-termism was a structural problem in the investment chain. The Kay review is specifically tasked with making recommendations on altering the timescales applied in investment practices and improving transparency, which would appear very relevant to tackling the carbon bubble.

'In the first 24 weeks of 2011, 70.8% of new IPO's in London were for mining companies.'

Part B:

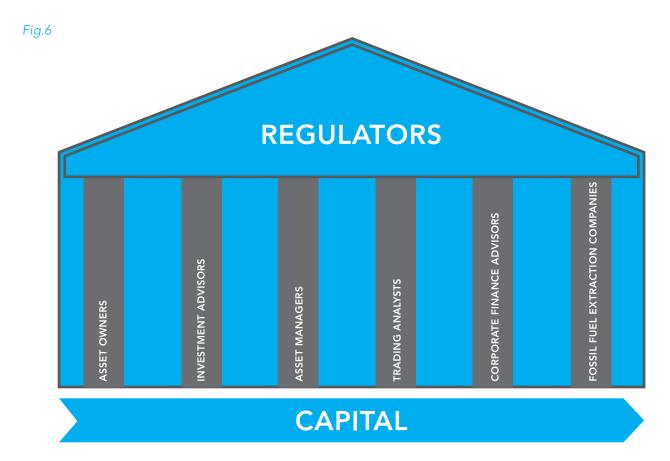
What this analysis means for those involved in raising capital on the financial markets



# What this analysis means for those involved in raising capital on the financial markets

New players continue to come to the markets to raise capital for exploration and development. But the figures show that five times the fossil fuel reserves needed to take us to 2°C warming have already been found. Current energy consumption trends are set to use up the global carbon budget in approximately 16 years. In this context it is clear the capital markets are continuing to finance new exploration, adding new reserves which are unlikely to be developed if we are to tackle climate change.

The following types of organisation are involved in the investment process which continues to make capital available to finance further exploration and development of reserves and resources which may be unburnable carbon.



The current system of market oversight and regulatory supervision is not adequate to send the required signals to shift capital towards a low carbon economy at the speed or scale required. The current short-term approach of the investment industry leaves asset owners exposed to a portfolio of assets whose value is likely to be seriously impaired.

Until international regulatory frameworks and accounting methodologies for valuing reserves change, it is perfectly logical for investors, and their advisors, analysts, and brokers, to ignore long-term problems for fear of missing out on short term gain. Corporates are driven by the same quarterly results cycle and in the extractives sector are valued for increasing reserves.

Active shareholders need to push harder for actions which would reflect their long-term ownership position. Few to date have shifted down a gear in terms of their exposure to fossil fuel assets. In the same way that universal owners held Lehman Brothers and HBOS to their collapse, asset owners cannot accept that a problem exists until the carbon asset bubble bursts. Only changes in market oversight and regulation will drive the improvements in transparency, risk assessment and reserves valuation practices which are required to deliver the shift in capital to finance the low carbon future we need.

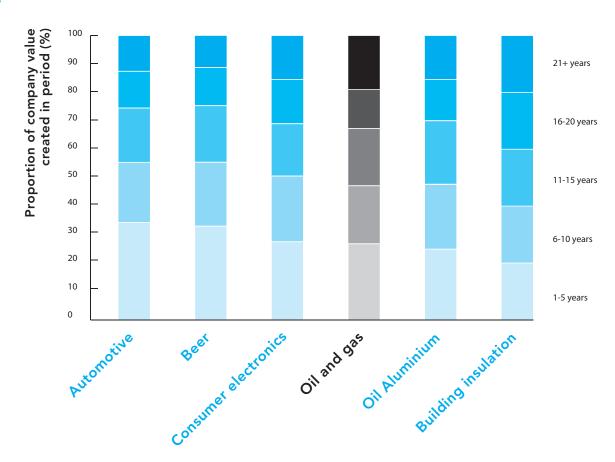
#### 6. Valuation of companies

For extractives companies the level of reserves and the company's success in replacing them as they are exploited feed directly into the valuation placed on the company. The huge investment made by oil and gas companies in exploring for future production demonstrates the importance to the sector of securing access to production to come onstream over the next decade as more mature fields decline.

Analysis by McKinsey and the Carbon Trust demonstrates that greater than 50% of the value of an oil and gas company resides in the value of cash flows to be generated in year 11 onwards. 20 The context for accessing, exploiting and utilising reserves should look very different in 10 years time. This poses a significant risk to the value tied up in the extractives sector.

The significance of reserves for a company's share price was demonstrated by the impact of Shell restating its reserves in January 2004. Shell reduced its level of reserves by around 20% which saw the share price drop by 10% in a week, removing around £3billion of the company's value. 21 This also indicates that an oil major's reserves contribute around 50% of the financial value attributed to the company by investors.

Fig.7



Source: Carbon Trust and McKinsey & Co. analysis

Note: Analysis based on discounted cash flow valuations of hypothetical but typical companies, using typical company discount rates.

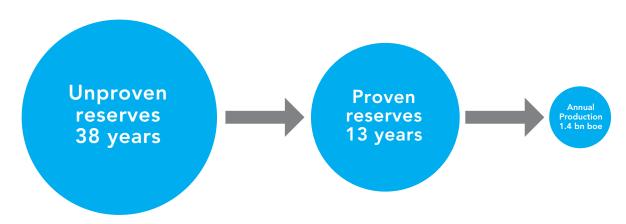
#### **Existing listed carbon stocks**

The reserves of companies already listed on exchanges are updated regularly to reflect depletion, revisions and new finds. For example, oil companies focus on their reserves replacement ratio which indicates whether they have found new reserves to at least replace the amount they have produced that year. The reserves-to-production ratio indicates the number of years of production at current rates a company could enjoy from existing reserves. For example Shell has a production-to-reserves ratio of 11.5 years, yet is still investing \$25-27 billion CAPEX each year to develop more production.<sup>22</sup>

BP has around 13 years of proven reserves at its current level of production and a CAPEX of around \$17bn <sup>23</sup>. However waiting in the wings for BP is a further 35 years of unproven reserves, waiting to be further developed and proven so they can be added to the official stockpile. This means there is an even larger unproven reserves bubble hidden on the capital markets.

#### The relationship between BP's unproven and proven reserves

Fig.8



There is obviously a time lag involved in the exploitation of any new asset, with 5 to 10 years passing between exploration and the start of its ultimate development which may then continue for decades. The reserves data feeds into the valuations placed on a company's shares and assumes exploitation of the assets at a certain production level and price at a discounted rate going forward. If 'proven' reserves become less viable they may have to be reclassified as 'contingent' reserves.

"Valuations of the oil and gas sector still assume that they will be able to take all proven and probable reserves out of the ground and burn them. Based on credible data we cannot be allowed to do that, because it is likely to leave us north of 700 parts per million (ppm) of  $CO_2$  in the atmosphere." (Steve Waygood, Aviva Investors)<sup>24</sup>

The conventional wisdom on the world's stock markets is that all listed reserves will be exploited and burnt. However, analysis in this report shows that this would lead to emissions exceeding the level regarded as necessary to control global warming. One clear implication is that a significant proportion of current listed reserves – as well as future reserves that are generated from current CAPEX – will need to remain in the ground. The imposition of this carbon constraint will act as a de facto reduction in demand threatening a reduction in the value of these assets. The key issue for markets and investors is that this rebalancing takes place with as little damage to investment values as possible.

More analysis is required to identify which reserves are more likely to be burnt and which will be stranded. There will be winners and losers in such a scenario. The outcomes will also depend on how sudden a transition is required and what hedging strategies are employed by different companies. This leads to questions such as:

- Which of the assets you have an interest in are amongst the 20% of fossil fuel reserves we can afford to burn in the next 40 years?
- If you sanction capital expenditure on finding and developing more reserves, just how likely is it that those new reserves can ever be burned?
- What discount rates would it be prudent for investors to use when valuing reserves? Are historical discount rates too optimistic given the likely haircut to reserves values that corporate owners of fossil fuels are likely to have to take?

Furthermore, as the regulators of the capital markets will need to look closely at disclosures and reporting requirements around how reserves are presented, accountants and auditors will need to revise guidelines on how value is recorded:

- If not all reserves that are exchange listed can be burnt, how should auditors account for these stranded assets?
- What assumptions need to be reviewed in order to create a reliable assessment of which assets are contingent or impaired?

#### 7. Corporate disclosure

#### Carbon Flows & Carbon Stocks: From voluntary to mandatory disclosure

Voluntary efforts to provide investment analysts with standardised data on climate risks across and within sectors have been developed by the Global Reporting Initiative and the Carbon Disclosure Project. Many oil, coal and gas companies have provided information on their annual direct carbon emissions and management strategies. A few have also published estimates of the emissions associated with the use of their products (Scope 3 emissions under the GHG Reporting Protocol).

While disclosure of carbon flows is becoming established, there is little reporting on the carbon stocks represented by fossil fuel reserves. As a result, arguably the most material climate change risk remains hidden from corporate reports as the future of the business rests on future licenses to emit carbon rather than past emissions.

# A change of mindset is required to consider whether stocks of fossil fuel reserves may pose a long-term systemic risk.

This will require moving beyond annual reporting of last year's production and emissions flows to a much more forward-looking analysis. Essentially what is needed is a mandatory requirement for extractives companies to apply scope 3 in a forward looking way to cover the future emissions embedded in reserves.

#### From standalone to integrated reporting

The materiality of climate change for fossil fuel corporations means that standalone reports are insufficient. Truly integrated reporting means that all issues are considered together, applying the same tests of materiality and reliability. The International Federation of Accountants has brought out a revised version of its sustainability framework which acts as a reference point for accountants working with an integrated reporting approach.<sup>25</sup>

The trend towards integrated reporting has become global with the establishment of the International Integrated Reporting Committee (IIRC).<sup>26</sup> This offers an opportunity to consider how to marry the reporting of reserves and carbon reporting in the primary output of an extractives company of its material issues. South Africa is leading the way with the Johannesburg Stock Exchange releasing a draft framework for integrated reporting in 2011.

The Integrated Reporting Council of South Africa released a guide at the start of 2011 which is seeking to initiate a fundamental shift in how companies provide information to their stakeholders. It states:<sup>27</sup>

"The overarching objective of integrated reporting in general, and the integrated report in particular, is to report to stakeholders on the strategy, performance and activities of the organisation in a manner that enables stakeholders to assess the ability of the organisation to create and sustain value over the short, medium and long-term. Further, it is to foster appreciation, both within the organisation and among its stakeholders, of the extent to which the organisation's ability to create and sustain value is based on financial, social, economic and environmental systems and by the quality of its relationships with its stakeholders."

#### 8. Capitalising carbon through the listing process

#### **Key global IPO statistics**

The equity markets continue to be a major source of capital to the extractive industries, either through initial public offerings or further share issues. The materials and energy sectors raised \$61.7bn in 2010 in a weak market. The top 5 exchanges in terms of total capital raised were Hong Kong (\$57.4bn), New York (\$34.7bn), Shenzhen — SME (\$30.2bn), Shanghai (\$27.9bn), Tokyo (\$14.3bn).<sup>28</sup>

More recently, the rapidly developing economies of China, Brazil, India and Russia have also been bringing their state enterprises to the markets. Shenhua Energy, Petrobras, Coal India, and Gazprom are examples of this trend. This leads to a truly global market linking western investors with fossil fuel giants around the world. There is continuing competition between the major markets to be the leading stock exchange and capital market centres of choice for fossil fuel developers.

#### **IPO Prospectuses**

Reserves continue to be listed on markets with limited reference to potential climate change risk. The current system places the responsibility for the contents of an IPO prospectus firmly with the entity seeking to raise capital. The book runners and listings authorities disclaim responsibility for the accuracy and reliability for the contents of these documents. Such documents do sometimes make reference to potential climate change risks. However, this can appear as more of a catch-all approach to mention all risks rather than a clear description of what is most material.

There has been much debate around not introducing onerous carbon reporting requirements on companies. Shareholders should be able to expect a company to make a clear statement of its reserves and translate these into potential carbon dioxide emissions. This simple requirement would enable regulators to produce cumulative figures and indicate which direction the carbon intensity of the market is heading. Additionally, those responsible for market stability would be able to see broad market risks, much called for post the banking collapse.

#### **Bookrunners**

In our view, the Investment banks which advise on the preparation of prospectuses and are the lead bookrunners and managers for IPOs should apply environmental and social risk policies in the advisory services they provide. There has been some consideration of this under extending the scope of application of the Equator Principles and following the development of the Climate Principles.<sup>29</sup> For example HSBC states its Energy policy applies as follows:

"The financial services covered by the policy include all lending and other forms of financial assistance, debt and equity capital markets activities, project finance and advisory work."30

However, according to the 2011 Climate Principles review the signatories have struggled with implementation across investment banking functions such as underwriting share issues.<sup>31</sup> It is not uncommon for an investment bank with a dedicated climate change research division to put its name on an IPO prospectus for a fossil fuel company which fails to even mention climate change.<sup>32</sup>

The American investment banks dominate equity capital-raising services, with JPMorgan, Morgan Stanley, Goldman Sachs and Bank of America Merrill Lynch all earning more than \$1bn in fees in 2010 during a slow year on the markets.<sup>33</sup> 2011 is predicted to be a bumper year for IPOs as prices strengthen and companies have more confidence in going to the markets.

#### 9. Regulators and stock exchanges

The structure of stock exchanges and their regulators varies around the world. A government body will be the listing authority regulating the market and, in some cases, they may also run the stock exchange as a public entity. In other jurisdictions the stock exchange has been privatised.

The World Federation of Exchanges (WFE) has hosted dialogues on sustainable stock exchanges over the last couple of years and in 2010 UNCTAD sponsored a publication outlining options for more sustainable stock exchanges.<sup>34</sup> It is encouraging to see the UN and the world's exchanges recognising this role and we would encourage them to promote specific disclosures by corporate owners of embedded carbon on exchanges. The suggestions for integrating sustainability at exchanges included:

- Enhancing the Environmental, Social & Governance (ESG) due diligence capacity in the pre-IPO ecosystem
- Supporting efforts to quantify ESG criteria and define reporting KPIs by sector and incorporate them into guidelines
- Assisting in the development of integrated financial reporting and comparable financial statements across borders
- Supporting collaborative initiatives which work towards eradicating market short termism.

Investors representing \$1.6trillion under management are working with the UNPRI to engage with exchanges about their plans to integrate ESG issues into listing requirements.<sup>35</sup> Greater focus on these areas by stock exchanges would certainly contribute to aligning the world's financial markets with the climate change policy agenda.

#### Changing behaviour?

The research conducted by the Climate Disclosure Standards Board (CDSB) on behalf of DEFRA concludes that the regulator needs to act:

"The scale of environmental investing is expected to grow only if the entire market would first swing towards it and that without structural intervention of some sort, an impasse is likely to remain." <sup>36</sup>

This indicates that the benefits of voluntary measures have now peaked and those that are likely to choose to act have already done so. The UK is proud of its role as a global financial centre. Indeed the UK economy has become increasingly reliant on it. However, if the UK is to take a leadership position on climate change it cannot continue to ignore the failure of its financial market to change its fundamental approach and decarbonise energy investment.

#### Taking responsibility

We believe listing authorities need to take greater responsibility for reviewing the provision of information by listed companies and ensuring that systemic risks are addressed. Further regulation, guidance, and monitoring will be needed to shift practices across exchanges with a much more active role required from the listings authorities.

#### 10. Relevance for investors

#### **Exposure**

The UK and US markets account for around three quarters of global mutual funds and had \$0.88 trillion under management invested in index-tracker funds. Beyond this, even actively managed mainstream funds rarely deviate significantly from the sector distribution of the major indices. This can be partly explained by the tendency for performance to be measured against a benchmark index. In the UK, 72.6% of corporate pension funds used an index benchmark as the primary investment objective in 2009.37

#### **Knock-on effects**

Exchanges with above average investment in fossil fuel assets expose their domestic and international investors to, as yet, unquantified risks of stranded carbon. These risks increase in direct proportion to their absolute exposure to fossil fuels. Where exchanges have a high proportion of listed fossil fuel companies owning unburnable carbon the knock-on effects to others within the financial markets risks are worth noting. Pension funds risk funding shortfalls to their member pension entitlements if they are unable to realise value from their fossil fuel investments. Bank lending exposures to the sector may mean that central bank regulators will require significant haircuts to be taken to the value of their fossil fuel loan books. Savers as a group will face considerable uncertainty as to the true value of their portfolios if their investments blindly track carbon intensive markets.

#### Gross capital misallocation

The latest UNEP report into creating a green economy starts by describing an 'era of gross capital misallocation'. In describing the crises of climate, biodiversity, fuel, food, water, and of late in the financial system and the economy as a whole, UNEP state:

"Although the causes of these crises vary, at a fundamental level they all share a common feature: the gross misallocation of capital. During the last two decades, much capital was poured into property, fossil fuels and structured financial assets with embedded derivatives, but relatively little in comparison was invested in renewable energy, energy efficiency, public transportation, sustainable agriculture, ecosystem and biodiversity protection, and land and water conservation."

#### Universal ownership and systemic risk

The LAPFF guide for trustees to address climate change outlines why it is important for them to address systemic issues:

"Institutional investors are often viewed as 'universal owners' and, as such, the performance of their portfolios is tied to the performance of the markets, economies and sectors they invest in as much as that of individual companies. This vested interest in the general long-term health of economies provides a strong case for addressing issues that are systemic in nature – particularly for passive managers whose fortunes are tied up with those of the market. To a large extent exposure to climate change and its impacts is systemic in nature. It has the potential to impact a broad range of sectors and the value at risk from climate change can be of the same magnitude as that of other investment risks. All managers, both passive and active, are exposed to risks associated with climate change which makes it an area of concern for trustees."

#### Fiduciary duty

The responsibilities of those entrusted with managing the assets of others; from pension fund trustees to fund managers, have been cited as both a justification for and a barrier against addressing environmental and social risks. It has been suggested by the 'Freshfields II' report from UNEPFI that failing to address non-financial risks could be a breach of fiduciary duty.<sup>39</sup> In our view, pension fund members certainly have a right to know how those managing their fund are addressing systemic risks including the climate change risk identified in this report.

From the investor perspective, the continuing short-term approach of investing in assets that attempt to generate benchmark beating returns means that fund managers are incentivised to focus upon quarterly returns and not to deviate too far from the overall market to reduce the risk of underperforming.

#### Performance benchmarks

This is a structural problem that is reflected in the benchmarks that are used to measure the performance of active equity managers and the indices that are used as the basis for passive, tracker funds. It would be almost impossible for a mainstream asset manager in Australia or the UK, for example, to reduce her/his weighting to fossil fuel assets compare to the global average without seriously questioning the market risk this would involve given the way that risk is measured in terms of beta. This means that, even with rising awareness of climate change as an investment challenge, there is limited scope in current market frameworks to make informed choices. Passive funds have no ability to reduce their carbon risk through active management and so the structural constraints are even more fundamental.

#### Investment policy

A recent survey conducted by the investor groups working on climate change found that 98% of asset owners view climate change issues as a material investment risk/opportunity across their organisation's entire investment portfolio.<sup>40</sup> More than 80% of asset managers and 57% of asset owners make specific reference to climate change risk in their investment policy.

The survey identified that further analysis is needed around portfolio level risk and opportunity exposure. A key constraint on improved investor practice was cited as being the lack of comprehensive and comparable data on carbon emissions, emissions reductions, and energy efficiency cost savings associated with assets.

The survey concluded: "the question of materiality remains a key issue, which is closely linked to a wider industry problem of "short-termism" and policy. It was suggested that asset owners have a critical role to play in signalling to their managers that they are long-term investors and consider climate-related risks and opportunities material to their strategic long-term investment decisions".

In the UK, 72.6% of corporate pension funds used an index benchmark as the primary investment objective in 2009.<sup>37</sup>

#### Climate change policy risk in asset allocation

A study from Mercer proposing scenarios as a means of factoring in climate change to strategic asset allocation was sponsored by some of the world's largest pension funds.<sup>41</sup> This research indicates that uncertainty around climate change policy presents significant portfolio risk to institutional investors; equivalent to 10% of total risk factors (for a portfolio with 47% in equities). Our analysis provides a further layer to consider; sector level risk associated with the distribution of overcapitalised fossil fuel reserves across exchanges. We believe the evidence presented in this report demonstrates the need for investors to increase their engagement with the exchanges and regulators around the listing process and disclosure requirements so that they are able to assess systemic climate change risk.

#### Forward-looking data requirements

Despite the efforts of voluntary initiatives, a recent survey by the CDSB indicated that nearly 60% of the investment community are dissatisfied (in varying degrees) with company carbon reports in terms of their appropriateness, completeness and reliability for portfolio analysis.<sup>42</sup>

There is a surprisingly limited amount of information available through mainstream financial data providers on the levels of fossil fuel reserves. In sourcing data for this research, the coverage of reserves data was not sufficient to provide a clear overview, even for the most traded global stocks. Some efforts have been made to integrate carbon emissions data into research platforms and climate change risk into ratings. However, there is an opportunity to develop a comprehensive database on reserves and  $CO_2$  potential for investors and provide analysis of the figures.

#### Investor demand

The Institutional Investors Group on Climate Change (IIGCC) has also produced a 'Global Climate Disclosure Framework for Oil & Gas companies'. This provides reporting templates which include emissions throughout the lifecycle of products, including product use. The template also asks for reserves data, split by different types of hydrocarbon (gas, conventional oil, heavy oil, other).<sup>43</sup> In the US, CERES has produced a guide to disclosing climate risks and opportunities in SEC filings which calls for reporting of:

• Estimated future direct and indirect emissions of greenhouse gases from their operations, purchased electricity, and products/services.

These requests from investor groups demonstrate that there is a strong requirement for more forward-looking information. The current limitations of voluntary reporting also demonstrate the need for investors to push for revised disclosure requirement by listing authorities.

#### 11. Recommendations for resolving the capital markets' carbon bubble

Our report shows that fossil fuels appear to be overcapitalised. The capital markets have financed future fossil fuel development based on a false assumption: that what the corporate sector have asked investors to finance can actually be burnt. We believe this poses a large and currently unappreciated risk for the capital markets. In our view, the regulators charged with ensuring financial stability, tackling systemic risks and promoting long-term investment need to produce a common understanding of the financial consequences of unburnable carbon. We urge other stakeholders in the capital markets to give the regulators a strong message that they need to act to prevent the carbon bubble bursting.

#### Regulators

- Require reporting of fossil fuel reserves and potential CO<sub>2</sub> emissions by listed companies and those applying for listing
- Aggregate and publish the levels of reserves and emissions using appropriate accounting guidelines
- Assess the systemic risks posed to capital markets and wider economic prosperity through the overhang of unburnable carbon
- Ensure financial stability measures are in place to prevent a carbon bubble bursting

#### **Asset owners**

- Review how the scale and concentration of fossil fuels on stock exchanges fits with long-term investment policies on climate change
- Review your exposure to systemic risk through passively invested funds tracking fossil fuel intensive indices
- Assess whether you have interests in potentially stranded assets if only 20% of the world's fossil fuel reserves can be burnt
- Revise performance benchmarks for fund managers to disconnect incentives from the short-term performance of fossil-fuel intensive indices.

# Investment Consultants / Brokers / Analysts / Ratings Agencies / Data Providers

- Review the potential risks of asset allocation related to the overcapitalisation of reserves
- Explore how this analysis impacts on the valuation of reserves and ultimately companies
- Provide data on CO<sub>2</sub> potential of stocks and indices.

#### **Investment Banks**

- Apply environmental and social risk policies to advisory services, i.e. underwriting share issues and assessing risks during the IPO process.

#### Accountants

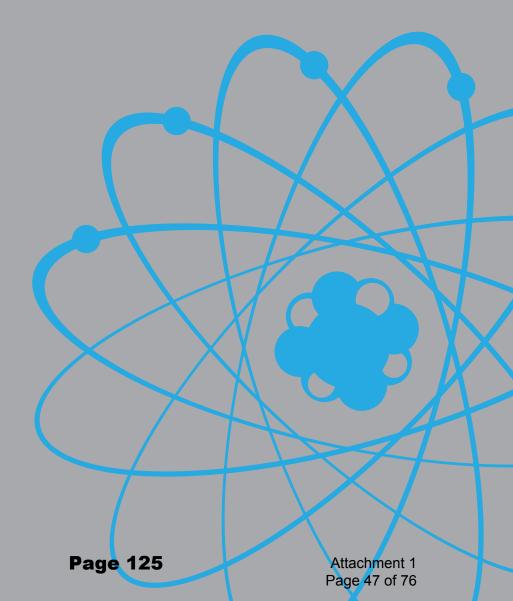
- Integrate reporting of reserves, emissions, climate change risk and asset valuation to take account of the potential for unburnable carbon and the resulting impaired assets.

#### **Extractives Companies**

- Report potential climate change emissions and material risks associated with fossil fuel reserves.

We would welcome the opportunity to work with you on tackling this challenge and improving understanding of the potential systemic risk this poses to the world's capital markets.

# Appendix 1: Methodology



#### Reserves data

Coal reserves data was provided by Raw Materials Group (RMG). More information is available at www.rmg.se Oil and gas reserves data was provided by Evaluate Energy. More information is available at www.evaluateenergy. com

The reserves data was based on the most recent reported information on proven reserves at the end of 2010. As with any snapshot analysis, ownership of reserves will continue to change and reserves will be extracted and added to a company's portfolio of assets. The research providers are leaders in their sectors and have the most complete dataset available. However, reporting of reserves and ownership in some parts of the world is not as transparent as others.

#### Carbon dioxide emissions factors

The formula for calculating the carbon emissions from the reserves was taken from the methodology used by the Potsdam Climate Institute. This estimates potential emissions from proven recoverable reserves of fossil fuels, according to  $E = R \times V \times C \times f$ , where E are the potential emissions (GtCO $_2$ ), R the proven recoverable reserves (Gg), V the net calorific value (TJ/Gg), C the carbon content (tC/TJ) and f a conversion factor (GtCO $_2$ /tC). At V and C come from the IPCC Guidelines for National Greenhouse Gas Emissions Inventories. The Potsdam methodology applies  $CO_2$ -only factors to the fuels, as IPCC factors for all the Kyoto gases to give  $CO_2$ -equivalent are specific to the use of the fuels. The total level of greenhouse gases will therefore be higher; however the  $CO_2$ -only data is used consistently throughout for calculating both the budgets and emissions from reserves. Care must be taken if you wish to compare these figures to  $CO_2$ e data.

#### Reserves classification

The fossil fuel reserves were split into six classes, again mirroring the Potsdam Institute methodology. These types correspond with the data tables for the elements which make up the carbon emissions formula. The six classes were:

- Natural Gas
- Oil Conventional
- Oil Unconventional
- Coal (Bitumous & Anthracite)
- Coal (Sub-Bitumous)
- Coal (Lignite)

Not all coal assets in the RMG database indicate the type of coal in the mine. Where this data was not available it was assumed it was bitumous coal, the most common type.

#### Canadian tar sands reserves figures

We believe the figures used for Canadian tar sands underestimate the reserves held by companies. This is due to the reserves booking approach stipulated by the Canadian Oil and Gas Evaluation Handbook whereby "quantities must not be classified as reserves unless there is an expectation that the accumulation will be developed and placed on production within a reasonable timeframe."

Typically Canadian companies interpret this as meaning that production is imminent. Given the start-stop history of tar sands projects with fluctuations in the oil price there is a precautionary approach to booking reserves. This results in companies with tar sands assets, which are known physical reserves, not always booking them due to uncertain economic viability. The SEC has produced more guidance on this topic which is starting to come through in the latest reserve reporting for US listed companies. This stipulates that unconventional reserves must be broken out from an overall oil reserves figure, and that economic viability should be based on the average of the 12-month average crude price of the first day of each month in the reporting period, rather than the end of year price.

#### **Equity basis**

Reserves, and therefore potential emissions, were attributed to each company on an equity ownership basis. Where companies still had a government interest of more than 10% only the publicly listed proportion was attributed to the stock, and therefore its exchange.

#### **Exchange allocation**

The reserves were attributed to the primary exchange of the company. For companies with dual listings the reserves were split equally between the two exchanges. This provides an indication of the primary regulator for the company. However, many companies have several listings often using depositary receipts and other mechanisms to access other markets.

#### Top 100 selection

The companies selected to be included in this assessment were the top 100 coal companies and the top 100 oil and gas companies, assessed on the potential carbon emissions from their reserves. There will be further fossil fuel reserves listed on the world's financial markets. However, the levels of reserves reported by these companies would not significantly affect the findings of this report. Each company beyond the top 100 coal and oil & gas companies considered here has less than  $0.15~\rm GtCO_2$  in reserves. This extra carbon only adds to the overall volume that is listed on the world's stock markets.

#### **Market Capitalisation**

Verification of the stock listings and their market capitalisation was completed in February 2011. Obviously this will be changing on a daily basis and new listings, mergers and acquisitions and corporate restructures are occurring all the time.

#### **Data accuracy**

The approach taken is based on the best available data and provides a conservative estimate of the total reserves and potential resulting emissions attributable to listed entities and their associated stock exchanges. We believe the dataset to be of sufficient quality to test the overall hypothesis that there is sufficient carbon listed to use up the global carbon budget to 2050 and give a reasonable representation of the geographical distribution across the exchanges. We welcome comments on how to improve the analysis and suggestions of useful outputs for future versions.

#### Disclaimer

The information used to compile this report has been collected from a number of sources in the public domain and from Investor Watch's licensors. Some of its content may be proprietary and belong to Investor Watch or its licensors. Whilst every care has been taken by Investor Watch in compiling this report, Investor Watch accepts no liability whatsoever for any loss (including without limitation direct or indirect loss and any loss of profit, data, or economic loss) occasioned to any person nor for any damage, cost, claim or expense arising from any reliance on this report or any of its content (save only to the extent that the same may not be in law excluded). The information in this report does not constitute or form part of any offer, invitation to sell, offer to subscribe for or to purchase any shares or other securities and must not be relied upon in connection with any contract relating to any such matter.

## References

- <sup>1</sup> http://unfccc.int/files/meetings/cop\_16/application/pdf/cop16\_lca.pdf
- <sup>2</sup> http://www.nature.com/nature/journal/v458/n7242/full/nature08017.html
- http://www.nature.com/ngeo/journal/v3/n12/full/ngeo1022.html
- 4 http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622
- <sup>5</sup> http://www.bp.com/sectiongenericarticle800.do?categoryId=9037318&contentId=7068756
- <sup>6</sup> http://www.investorideas.com/Research/PDFs/CAPEX\_PR.pdf
- <sup>7</sup> http://www.eia.doe.gov/oiaf/ieo/emissions.html
- <sup>8</sup> http://www.thecityuk.com/what-we-do/news/articles/2010/september/record-issuance-confirms-london's-leading-role-in-international-equity-markets.aspx
- http://www.ft.com/cms/s/0/7411f846-9843-11e0-ae45-00144feab49a,dwp\_uuid=d1245916-4f9c-11da-8b72-0000779e2340.html#axzz1Po7W1kuO
- http://www.thecityuk.com/media/192976/key%20facts%20about%20financial%20and%20professional%20services.pdf.pdf
- 11 http://www.decc.gov.uk/en/content/cms/legislation/cc\_act\_08/cc\_act\_08.aspx
- Based on the underlying data for the Fourth Carbon Budget (2010) The Climate Change Committee. http://www.theccc.org.uk/reports/fourth-carbon-budget/supporting-data
- 13 http://www.frc.org.uk/frrp/press/pub2539.html
- 14 http://www.bp.com/productlanding.do?categoryld=6929&contentld=7044622
- 15 http://news.bbc.co.uk/1/hi/business/7437535.stm
- 16 http://www.london.gov.uk/media/press\_releases\_mayoral/mayor-announces-%C2%A370m-fund-%E2%80%98open-business%E2%80%99-finance-greener-waste-and-rec
- <sup>17</sup> http://www.decc.gov.uk/en/content/cms/news/pn\_098/pn\_098.aspx
- 18 http://www.bbc.co.uk/news/business-13782849
- 19 http://www.bis.gov.uk/news/speeches/vince-cable-association-british-insurers-2011
- 20 http://www.carbontrust.co.uk/Publications/pages/publicationdetail.aspx?id=CTC740
- <sup>21</sup> http://news.bbc.co.uk/1/hi/business/3890045.stm
- http://www.shell.com/home/content/investor/news\_and\_library/2011\_media\_releases/2011\_strategy\_update\_15032011.html
- <sup>23</sup> http://www.bp.com/liveassets/bp\_internet/globalbp/STAGING/global\_assets/downloads/B/bp\_fourth\_quarter\_2010\_results\_presentation\_slides.pdf
- <sup>24</sup> http://www.aldersgategroup.org.uk/report\_controller/15
- <sup>25</sup> http://viewer.zmags.com/publication/052263e2#/052263e2/1
- <sup>26</sup> http://www.integratedreporting.org/

- <sup>27</sup> http://www.sustainabilitysa.org/Portals/0/IRC%20of%20SA%20Intergrated%20Reporting%20Guide%20 Jan%2011.pdf
- 28 http://www.ey.com/GL/en/Services/Strategic-Growth-Markets/Global-IPO-trends-2011
- <sup>29</sup> http://www.theclimategroup.org/\_assets/files/The-Climate-Principles-English.pdf
- 30 http://www.hsbc.com/1/PA\_1\_1\_S5/content/assets/csr/110124\_hsbc\_energy\_sector\_policy.pdf
- <sup>31</sup> http://www.theclimategroup.org/\_assets/files/Climate-Principles-review-2011.pdf
- 32 http://www.scribd.com/doc/54605519/Glencore-IPO-Prospectus
- 33 http://markets.ft.com/investmentBanking/tablesAndTrends.asp
- <sup>34</sup> http://www.responsibleresearch.com/Responsible\_Research\_\_\_Sustainable\_Stock\_Exchanges\_2010.pdf
- 35 http://www.unpri.org/sustainablestockexchanges/
- <sup>36</sup> http://www.cdsb-global.org/uploads/pdf/Financial%20Institutions%20and%20Climate%20Change%20 Draft%20Summary%202011.pdf
- <sup>37</sup> http://www.investmentfunds.org.uk/assets/files/press/2010/20100726-imaams.pdf
- <sup>38</sup> Investing in a changing climate a guide for trustees to address climate change (2011) LAPPF
- <sup>39</sup> http://www.unepfi.org/fileadmin/documents/fiduciaryII.pdf
- 40 http://www.iigcc.org/\_\_data/assets/pdf\_file/0014/15224/Global-Investor-Survey-on-Climate-Change-Report-2011.pdf
- <sup>41</sup> http://www.mercer.com/attachment.dyn?idContent=1407480&filePath=/attachments/English/04028-IC\_ClimateChangeAssetAllocationStudy\_Report\_FNL\_lowres.pdf
- 42 http://www.cdsb-global.org/uploads/pdf/Financial%20Institutions%20and%20Climate%20Change%20 Draft%20Summary%202011.pdf
- <sup>43</sup> http://www.iigcc.org/\_\_data/assets/pdf\_file/0015/267GlobalClimateDisclosureFrameworkforOilandGasComp anies.pdf
- 44 http://www.nature.com/nature/journal/v458/n7242/extref/nature08017-s1.pdf
- 45 http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2\_Volume2/V2\_1\_Ch1\_Introduction.pdf





#### **MEMORANDUM**

TO: Board of Directors and Staff FROM: Brian Schmidt

**SUBJECT**: Recommendation on developing a Climate

Divestment Policy for the Water District

**DATE**: July 18, 2013

Our residents and the Water District itself are paying millions of dollars and incurring significant risks from climate change. We are losing water supplies in the Sierras, forced to use more water in reaction to rising temperatures, face increased risks from stream and tidal flooding, and manage environmental degradation from climate change. Why then should we finance the industry promoting the same problem that we work so hard to fix?

I urge the Board to direct staff to return at an appropriate time with a proposed Climate Divestment Policy using the model under consideration in a number of cities (see attachments) developed by the non-profit 350.org. The effect would be to exclude from investment the top 200 fossil fuel companies. Our reserve investments in corporate financial instruments are relatively small and limited to bonds, so I assume it will not be difficult to put a policy into place with few if any financial implications. Pension funds and OPEB funds are controlled by CalPERS, so I recommend in addition that we direct staff to return to the Board with a draft letter that the Board can send to CalPERS asking it to begin climate divestment.

In addition to climate divestment being in the best interest of our residents, not to mention the general public interest, it may also be in our direct financial interest. Recent studies have shown fossil fuel companies underperforming the broader market. More generally, the stock and collateral value of the industry is based in large part on the value of their fossil fuel reserves, but those reserves contain far more carbon that can be burnt safely. This "unburnable carbon" constitutes overvalued equity and underestimated risk.

We have made a commitment to achieve carbon neutrality by 2020. I believe we can make use of the 350.org list and exempt any company that makes a similar commitment. While eliminating fossil fuels is impossible right now, I believe this proposal is a practical and feasible way to help get us to a global carbon neutrality as soon as is practicable, something we should do for our own sake and that of everyone else.

#### Attachments:

Attachment 1: Memo from Councilmember Worthington, City of Berkeley, including draft letter to

**CalPERS** 

Attachment 2: Staff Report, City of Santa Monica

Attachment 3: 350.org article on financial performance of fossil fuel industries, available at

http://gofossilfree.org/analysts-fossil-fuel-free-portfolios-outperform-investments-

that-include-carbon-polluters/



#### Kriss Worthington

Councilmember, City of Berkeley, District 7 2180 Milvia Street, 5<sup>th</sup> Floor, Berkeley, CA 94704 PHONE 510-981-7170 FAX 510-981-7177 kworthington@ci.berkeley.ca.us

> CONSENT CALENDAR April 30, 2013

To: Honorable Mayor and Members of the City Council

From: Councilmember Kriss Worthington

Subject: City Manager Referral: Examine the Feasibility of Divesting all City Funds

from Fossil Fuel Companies and Send to a Letter to CalPERS Requesting

they also Consider Divesting from Fossil Fuel Companies

#### RECOMMENDATION

Refer to the City Manager to examine the feasibility of divesting all City funds from direct ownership of fossil fuel companies and any commingled funds that include fossil fuel public equities and corporate bonds and send a letter to CalPERS requesting they also consider divesting from fossil fuel companies.

#### **BACKGROUND**

The 2012 Go Fossil Free Campaign has sparked a national movement with over 300 educational institutions and more than 40 City and State governments starting campaigns encouraging the divestment from fossil fuel companies. The Associated Students of the University of California has introduced a bill that would divest all of the organizations holdings from fossil fuel companies in hopes that students and the UC Board of Regents will follow suit. The San Francisco Board of Supervisors is considering a resolution that would divest the funds in the San Francisco Employees' Retirement System from fossil fuel companies. And in Seattle, Mayor Mike McGinn sent a letter to the city's two primary pension funds formally requesting that they "refrain from future investments in fossil fuel companies and begin the process of divesting [the] pension portfolios from those companies."

According to the sample resolution released by 350.org, the 200 fossil fuel companies were chosen because they control the vast majority of the world's coal, oil and gas reserves. Nearly 80% of those reserves must go unburned in order to maintain global warming below 2 °C, a target that the United States has agreed to meet. "Through the 2009 Copenhagen Accord almost every government in the world has agreed that any warming above a 2 °C (3.6 °F) rise would be unsafe, and that humans can only pour about 565 more gigatons of carbon dioxide into the atmosphere to maintain this limit." "Fossil fuel companies hold more than 2,795 gigatons of CO2 in their reserves, which is five times the amount that can be released without exceeding 2 °C of warming." There is also a growing set of investing concerns about what a future price on Carbon might mean for fossil-fuel-intensive investments.

350.org's Go Fossil Free Campaign urges divestment from direct ownership and "any commingled funds that include fossil fuel public equities and corporate bonds" within 5 years along with the immediate halt of new investments in fossil fuel companies. 350.org urges fossil fuel divestment on the grounds that fossil fuel companies plan to burn an amount of carbon that would be catastrophic to the atmosphere, and maintains that city and state governments have a responsibility to divest from an industry that is destroying the future (and blocking political progress) and reinvest in solutions to climate change.

The City should send a letter to CalPERS urging them to consider divesting from the 200 fossil fuel companies identified by 350.org and request a breakdown of fossil fuel investment in stocks and mutual funds, including the approximate percentage of total holdings these 200 companies would comprise. The City of Berkeley has deposited nearly \$1 billion into CalPERS on behalf of city employees. Therefore this information from CalPERS shall be shared with the Service Employees International Union, International Brotherhood of Electrical Workers, Local One, Berkeley Fire Fighters Association, Berkeley Police Association, and unrepresented employees before a final decision is made.

The City should also request that the City Manager produce a report on the divestment feasibility for all city accounts within 3 months.

The list of the 200 Fossil Fuel companies the campaign is urging divestment from is available at their website, <a href="http://gofossilfree.org/companies/">http://gofossilfree.org/companies/</a>.

#### FINANCIAL IMPLICATIONS

One study indicates minimum investment risk:

http://www.aperiogroup.com/system/files/documents/building\_a\_carbon\_free\_portfolio.pdf

#### CONTACT PERSON

Councilmember Kriss Worthington 510-981-7170

#### Attached:

- 1. Draft letter to CalPERS
- 2. Sample Municipal Resolution

#### 1. Draft letter to CalPERS

To the members of the California Public Employees' Retirement System:

We, the City of Berkeley, request to immediately cease any new investment in fossil fuel companies, and begin the process of divesting our CalPERS portfolio.

Climate change has become more real as we have come to experience extreme weather events like Super Storm Sandy that caused significant damage and financial losses to cities and states on the East Coast. We cannot escape the reality that our cities are vulnerable to natural disasters and the implications of climate change, as coastal cities face the threat of flooding from rising sea levels and turbulent weather.

While fossil fuel companies provide an attractive return in investment, Berkeley will suffer greater economic and financial losses from the impact of unchecked climate change. Our infrastructure, our businesses, and our communities would face greater risk of damages and losses due to that climate change.

Before any action is taken, we request that you provide us with a breakdown of the investments in stocks or mutual funds, including the approximate percentage of total holdings of these 200 companies, of any group or organization that would be impacted by the divestment so that we may consult with them prior to the divestment.

Sincerely, Berkeley City Council

#### 2. Sample Municipal Resolution

Resolution urging the City of Berkeley to begin to divest from publicly-traded fossil fuel companies.

- 1. WHEREAS the climate crisis is a serious threat to current and future generations here in Berkeley and around the world;
- 2. WHEREAS, The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report found that global warming is already causing costly disruption of human and natural systems throughout the world including the melting of Arctic ice, the ocean's rise in acidity, flooding and drought; and
- 3. WHEREAS, Almost every government in the world has agreed through the 2009 Copenhagen Accord that any warming above a 2°C (3.6°F) rise would be unsafe, and that humans can only pour about 565 more gigatons of carbon dioxide into the atmosphere to maintain this limit: and
- 4. WHEREAS, For the purposes of this ordinance, a "fossil fuel company" shall be defined as any of the two hundred publicly-traded companies with the largest coal, oil, and gas reserves as measured by the gigatons of carbon dioxide that would be emitted if those reserves were extracted and burned, as listed in the Carbon Tracker Initiative's "Unburnable Carbon" report; and
- 5. WHEREAS, In its "Unburnable Carbon" report, the Carbon Tracker Initiative found that fossil fuel companies possess proven fossil fuel reserves that would release approximately 2,795 gigatons of CO2 if they are burned, which is five times the amount that can be released without exceeding 2°C of warming; and
- 6. WHEREAS the City of Berkeley has a responsibility to protect the lives and livelihoods of its inhabitants from the threat of climate change; and,
- 7. WHEREAS the City of Berkeley believes that its investments should support a future where all citizens can live healthy lives without the negative impacts of a warming environment; and,
- 8. WHEREAS, students at more than two hundred colleges and universities in the United States have launched campaigns to have their institutions divest from fossil fuel companies; now, therefore, be it

THEREFORE, BE IT RESOLVED, That the Berkeley City Council urges the City Manager and CalPERS to identify any holdings that include direct or indirect investments in fossil fuel companies; and, be it

FURTHER RESOLVED, That the Berkeley City Council urges the City Manager and CalPERS to immediately cease any new investments in fossil fuel companies or in commingled assets that include holdings in fossil fuel companies; and, be it

FURTHER RESOLVED, That, for any investments in commingled funds that are found to include fossil fuel companies, the Berkeley City Council urges the City Manager and CalPERS to consider contacting the fund managers and request that the fossil fuel companies be removed from the funds; and, be it

FURTHER RESOLVED, That the Berkeley City Council urges the City Manager and CalPERS to ensure that none of its directly held or commingled assets include holdings in fossil fuel public equities and corporate bonds within 5 years as determined by the Carbon Tracker list; and, be it

LET IT BE FURTHER RESOLVED that the Berkeley City Council urges the City Manager and City Council to prepare a report and options for investing the pension fund in a way that further maximizes the positive impact of the fund by seeking out investments in opportunities to limit the effects of burning fossil fuels or help to mitigate its effects including, but not limited to, clean technology & renewable energy, sustainable companies or projects, and sustainable communities. We particularly urge that policies be put in place that support local projects and local jobs; and, request that timeline for implementing the findings of said report in a manner consistent with our fiduciary duty.

FURTHER RESOLVED, That the Berkeley City Council urges the City Manager and CalPERS to release quarterly updates, available to the public, detailing progress made towards full divestment.



### City Council and Successor Agency Report

City Council Meeting: February 26, 2013

Agenda Item: 3-L

To: Successor Agency Governing Board, Mayor and City Council

From: Gigi Decavalles-Hughes, Director of Finance

Subject: Annual Update on City Investment Policy

#### Recommended Action

Staff recommends that the City Council:

- 1. Review and approve the City's revised Investment Policy;
- 2. Approve divestment of all City investments from fossil fuel companies as defined by 350.org guidelines;
- 3. Extend the delegation of investment authority to the Director of Finance, as City Treasurer, from March 1, 2013 through February 28, 2014;
- Adopt the attached resolution updating the list of persons authorized to conduct transactions with the State Local Agency Investment Fund (LAIF) on behalf of the City; and
- 5. Adopt the attached resolution modifying investment guidelines for the Cemetery and Mausoleum Perpetual Care Funds.

Staff also recommends that the Successor Agency Governing Board:

- 1. Review and approve the City Investment Policy for Successor Agency Investments:
- 2. Approve divestment of all Successor Agency investments from fossil fuel companies as defined by 350.org guidelines;
- 3. Extend investment authority to the Treasurer of the Successor Agency, from March 1, 2013 through February 28, 2014;
- 4. Adopt the attached resolution authorizing the establishment of bank and brokerage accounts and approving the list of persons authorized to conduct transactions with the State Local Agency Investment Fund (LAIF) on behalf of the Successor Agency.

#### **Executive Summary**

State law requires that the City adopt an investment policy (Attachment 1) and that the City Council annually consider the policy at a public meeting. The Santa Monica City

Charter delegates the authority for investing City funds to the Director of Finance as the City Treasurer. State law requires that the Council delegate investment authority to the City Treasurer for a one-year period, renewable annually. The current delegation of authority carries through February 28, 2013.

The City must also pass the attached resolution updating the list of persons authorized to conduct transactions with LAIF due to a position title change.

At the <u>November 27, 2012</u> Council meeting, Council directed staff to evaluate options for divestment of City investments from fossil fuel companies and return with policy options. Based on the evaluation conducted, Staff recommends that the City divest from all fossil fuel companies as defined by the 350.org organization.

#### Background

Per State law, City Council annually considers and approves the City's Investment Policy (Attachment 1) and delegates investment authority to the City Treasurer for a one-year period, renewable annually. The current delegation of authority carries through February 28, 2013. Also, Santa Monica City Charter Section 711 delegates the authority to invest City funds to the City Treasurer.

At the <u>November 27, 2012</u> Council meeting, Council directed staff to evaluate options for divestment of City investments from fossil fuel companies and return with policy options.

#### Discussion

City investments are made only in those instruments specifically authorized by California State laws, primarily Sections 53601, 16429.1, and 53684 et seq. of the Government Code. Within these legal guidelines, the three primary objectives of the City's Investment Policy, in priority order are:

- Safety Safety of principal is the foremost objective of the City's investment program. City investments shall be undertaken in a manner that seeks to ensure the preservation of capital in the overall portfolio by diversifying its investments among a variety of securities offering independent returns.
- Liquidity City investments are kept sufficiently liquid to enable the City to meet all operating requirements which might be reasonably anticipated by structuring

the portfolio so that securities mature concurrently with anticipated cash needs to the extent possible. Investments are primarily made in securities with active secondary or resale markets. Additionally, an adequate liquidity buffer is maintained for extraordinary circumstances.

 Rate of Return – The City's investment portfolio is designed with the objective of attaining a benchmark rate of return throughout budgetary and economic cycles taking into account safety and liquidity requirements. The benchmark may vary from time to time depending on the economic and budgetary conditions present.

The City continues to abide by the highest professional standards in the management of public funds. While the investment strategy is flexible and can change based on market and economic conditions, the legal and policy guidelines governing these investment decisions remains relatively static. The only significant change recommended to the Investment Policy is adding divestment of fossil fuel companies to the Policy's socially responsible investment guidelines. In addition, there are several minor wording changes. The City's Investment Policy has been certified by the Association of Public Treasurers United States and Canada (APT) and is periodically submitted for recertification per APT guidelines.

LAIF accounts are subject to a maximum deposit balance of \$50 million (per account) per LAIF regulations. LAIF accounts provide flexibility to the investment process and increase short term returns while maintaining the primary objectives of safety and liquidity of City funds.

### **Divestment from Fossil Fuels**

While the City portfolio does not have any current investments in fossil fuel companies, the Cemetery and Mausoleum funds (the trust funds holding funds paid by customers at the time of internment) do. Although these funds are not truly City funds, the Council is responsible for setting the guidelines for their investment. Investments have followed and continue to follow the City's guidelines for socially responsible investing.

Mutual funds use screens that help determine the structure of the fund's investment portfolio. These screens could range from limiting the amount that the fund invests in certain categories of investments to eliminating certain categories of investments. Many of these screens are similar to the socially responsible investment guidelines contained in the City's Investment Policy. For example, Section 17 (a) of the policy states that "Investments are to be made in entities that support clean and healthy environment, including following safe and environmentally sound practices."

Staff has not been able to locate a widely used screen related to investment in fossil fuel companies. The organization 350.org, which works on climate change issues, is spearheading an effort to encourage universities and other public institutions to divest from fossil fuel companies. The movement defines fossil fuel companies as the two hundred companies that control most of the world's oil, coal, and natural gas supplies. It does not include companies ancillary to the fossil fuel industry such as oilfield servicing companies.

The Cemetery and Mausoleum Perpetual Care funds currently generate approximately \$400,000 annually that is used for perpetual care services at the Woodlawn Cemetery and Mausoleum. The current strategy for the funds is to invest in equities that pay a high dividend as well as corporate and government bonds. Approximately 10% of the Cemetery and Mausoleum portfolio (value slightly under \$1 million) is currently held in firms that could be classified as fossil fuel companies generating \$30,000-\$40,000 annually in interest and dividend income. Under divestment, these investments would be replaced with investments in other sectors. However, it should be noted that reducing portfolio diversification could increase portfolio volatility, and in the long term, could result in a decrease in the total return of the portfolio.

Staff recommends that the City divest from all investments in fossil fuel companies as defined by the 350.org guidelines. This divestment would be made as soon as possible without fiscally impacting the Cemetery and Mausoleum Perpetual Care funds, but in all

cases would be done within two years. No further investments would be made in fossil fuel companies in either the Cemetery and Mausoleum Perpetual Care funds or any other City investment portfolio. The City's Investment Policy would be amended to reflect this action.

### **Alternative Actions**

Make no changes to current Investment Policy or practices.

### Financial Impacts & Budget Actions

Staff provides monthly reports to the City Council and the City Manager describing the present status of City investments and monies held by the City, as well as summarizing all investment transactions for the month. Interest earnings from the City's pooled investment portfolio are allocated to the various City funds based upon each fund's share of total City cash and investments. Projected revenues for each fund are included in the FY 2012-13 Revised Budget. No budget action is required at this time.

Approved:	Forwarded to Council:	
Gigi Decavalles-Hughes	Rod Gould	
Director of Finance	City Manager	

#### Attachments:

- 1. Updated City Investment Policy
- 2. Resolution designating City employees authorized to conduct business with LAIF for the City account
- 3. Resolution designating Successor Agency employees authorized to conduct business with LAIF for the City account
- 4. Resolution establishing investment instructions for the Cemetery and Mausoleum Perpetual Care funds

Log In to Manage Your Campaign (http://campaigns.gofossilfree.org/users/sign\_in)

# ANALYSTS: FOSSIL FUEL-FREE PORTFOLIOS OUTPERFORM INVESTMENTS THAT INCLUDE CARBON POLLUTERS

POSTED BY ALLYSE - JULY 17, 2013

OAKLAND — Two new analyses of stock market performance have found that stockholder portfolios without fossil fuel energy producers do better than those with investments in energy companies that create carbon pollution.

In a report entitled <u>Beyond Fossil Fuels: The Investment Case for Fossil Fuel Divestment</u>

(<a href="http://www.impaxam.com/media/178162/20130704">http://www.impaxam.com/media/178162/20130704</a> impax white paper fossil fuel divestment uk final.pdf), Impax Asset Management tracked the past seven years of international equity markets, showing that if fossil fuel companies are removed from the MSCI World index, then the resulting portfolio would have made 2.3% per year. A portfolio with fossil fuel companies like Exxon and Chevron would net an average annual return of 1.8% for the same period.

In another paper, MSCI, an index provider, found results that almost mirror those in the Impax report (http://www.msci.com/resources/factsheets/MSCI%20ESG%20Research FAQ%20on%20Fossil-Free% 20Investing June%202013.pdf).

Impax author's wrote: "The 200 largest listed fossil fuel companies had a market value of some \$4 trillion at the end of 2012, but the models used to make those valuations do not take into account how credible action to address climate change might slash the value of their fossil fuel reserves."

Earlier this month, Norwegian pension fund and insurer Storebrand moved to divest funds from tar sands production and Holland-based Rabobank announced it will stop lending money for unconventional energy extraction projects like shale gas. The moves follow the release of a new analysis of UK-based think tank Carbon Tracker's latest Unburnable Carbon report, which said 80% of fossil fuel reserves need to be left in the ground if the worst effects of climate change are to be avoided.

Christine Tørklep Meisingset, Storebrand's head of sustainable investment, was quoted as saying "these resources are worthless financially...they do not contribute to sustainable development in the extent and the pace we want."

"It's almost as if the financial sector is in a race with climate activists to see who can discredit the fossil fuel industry the fastest," said Phil Aroneanu, 350.org co-founder and US Campaigns Director. "It's becoming increasingly clear that the smart money is going against the carbon polluters, right when we need climate action so desperately."

Environmentalist and 350.org founder Bill McKibben helped launch a fossil fuel divestment campaign last November with a 21-city US tour urging college students and activists to take up the cause. Since then, the campaign has spread to over 300 colleges and universities and more than 100 cities, states and religious institutions.

In the fall, McKibben will be touring Europe with his "Do the Math" show. Stops include Berlin, Amsterdam, Birmingham, and London.

**Page 145** 

More than 15 US city councils and mayors have committed to pursue fossil fuel divestment, including the San Francisco Board of Supervisors who voted unanimously in April to urge the city's retirement board to divest over \$583 million from the fossil fuel industry. Six colleges and universities have also agreed to divest, from San Francisco State University to Unity College in Maine. A growing number of religious institutions are also taking up the cause: The United Church of Christ, claiming 1.1 million members in 5,100 congregations passed a resolution to divest over the next five years at their General Synod in June.

###

The Fossil Free divestment campaign is supported by 350.org, As You Sow, Energy Action Coalition, Responsible Endowments Coalition, and the Sierra Student Coalition.

© 2013 Fossil Free .

### VII. Glossary

### **Glossary of Terms**

### "CEO interpretation" and "BAO interpretation"

It is the Chief Executive Officer's (CEO's) or a Board Appointed Officer's (BAO's) interpretation of Board's policies (Ends and Executive Limitations) intended to clarify direction to staff. Board policies in Policy Governance are set at the detail level at which the Board is willing to accept any "reasonable interpretation" of its policy statements. If the Board knows that it is not willing to accept certain interpretations of its current policy, it must proceed to a further level of detail.

### "creation"

Action taken by the District to develop a specific habitat at a site where the habitat did not previously exist, resulting in a gain in habitat area.

### "customer"

An actual or potential user of the District's products, programs, or services. Customers include the end users of the District's products, programs, or services as well as others who are immediate purchasers or users, such as distributors, agents, or organizations that process the District's products, programs, or services as a component of theirs.

#### "environmental enhancement"

Action taken by the District that benefits the environment, is NOT mitigation, and is undertaken voluntarily. Enhancement actions may include environmental restoration, rehabilitation, preservation or creation. In instances where enhancements are located in the same vicinity as a mitigation project, actions must exceed required compliance to compensate for environmental impacts to be considered environmental enhancements.

### "integrated and balanced"

An integrated and balanced approach 1) takes into account work undertaken to achieve one goal will seek to preserve and protect the ability to achieve other goals; and 2) seeks opportunities and synergies that will enhance achievement of all goals.

#### "integrated environmental enhancements"

Actions considered minor that are integral to the primary objectives of a flood protection or water supply project (e.g., channel widening to allow for additional vegetation within district right-of-way).

### "independent environmental enhancements"

Actions that could be designed and implemented as a stand-alone project.

### "mitigation"

Action taken by the District to fulfill CEQA/NEPA, permit requirements and court mandated mitigation to avoid, minimize, rectify or reduce adverse environmental impacts, or compensate for the impact(s) by replacing or providing substitute resources or environments.

### "natural flood protection"

A multiple-objective approach to providing environmental quality, community benefit and protection from creek flooding in a cost effective manner through integrated planning and management that considers the physical, hydrologic and ecologic functions and processes of streams within the community setting.

### "preservation"

Action taken by the District to protect an ecosystem or habitat area for compatible uses by removing a threat to that ecosystem or habitat, including regulatory actions and the purchase of land and easements.

#### "rehabilitation"

Action taken by the District to assist in improving disturbed and degraded environments through the reparation of ecosystem processes and productivity. Rehabilitation does not necessarily reestablish the pre-disturbance condition, but strives to establish stable landscapes that support the natural ecosystem mosaic.

#### "restoration"

Action taken by the District, to the extent practicable, toward the re-establishment of an ecosystem's pre-disturbance structure, function, and value, where it has been degraded, damaged, or otherwise destroyed.

### "stewardship"

To entrust the careful and responsible management of the environment and natural resources to one's care for the benefit of the greater community.

Title: Customer Consumer Relations

**Category:** Executive Limitations

Policy No. EL-2

Adopted: December 21, 1999

Latest Revision: August 20, 2012

Chair: Larry Wilson Chair: Linda LeZotte

The Board of Directors revised and adopted this policy at its public meeting on the latest revision date.

The BAOs shall promote conditions, procedures, and decisions that fulfill reasonable <u>customer</u> consumer expectations for good service, are safe, dignified, and nonintrusive. <u>Customers</u> Consumers include any persons transacting business or interacting with the District.

### Further, a BAO shall:

- 2.1. Use application forms that elicit information for which there is a clear necessity.
- 2.2. Use methods of collecting, reviewing, transmitting, or storing <u>customer</u> consumer information that protects against improper access to the material elicited.
- 2.3. Provide appropriate accessibility and privacy in facilities.
- 2.4. Establish with <u>customers</u> consumers a clear understanding of what may be expected and what may not be expected from the service offered.
- 2.5. Inform <u>customers</u> consumers of this policy, and provide a way for persons to be heard who believe they have not been accorded a reasonable interpretation of their protections under this policy.
- 2.6. Provide correspondence addressed to the Board to each Board member within 5 working days from receipt and respond within 30 working days of receipt. In those individual situations where it is not possible for the BAOs to respond completely to an inquiry, sending a response to the originator, acknowledging receipt of the inquiry and an explanation of actions being taken and timelines for preparing the complete response is acceptable for complying with this 30 day response time.

Title: Monitoring Board Appointed Officer Performance

Category: Board-Board Appointed Officer Linkage

Policy No. BL-5

Adopted: May 18, 2004

Latest Revision: August 21, 2012

Chair: Joe Judge Chair: Linda LeZotte

The Board of Directors revised and adopted this policy at its public meeting on the latest revision date.

Systematic and rigorous monitoring of BAO job performance will be solely against the only expected BAO job outputs: organizational accomplishment of Board policies on Ends and organizational operation within the boundaries established in Board policies on Executive Limitations.

### Accordingly:

- 5.1. Monitoring is simply to determine the degree to which Board policies are being met. Data which does not do this will not be considered to be monitoring data.
- 5.2. The Board will acquire monitoring data by one or more of three methods: (a) by internal report, in which the BAOs disclose compliance information to the Board, (b) by external report, in which an external, disinterested third party selected by the Board assesses compliance with Board policies, and (c) by direct Board inspection, in which a designated member or members of the Board assess compliance with the appropriate policy criteria.
- 5.3. In every case, the standard for compliance shall be any reasonable BAO interpretation of the Board policy being monitored.
- 5.4. All policies which instruct the BAOs will be monitored at a frequency and by a method chosen by the Board. The Board can monitor any policy at any time by any method, but will ordinarily depend on a routine schedule (see following table).
- 5.5. Monitoring of each BAO's job performance will be against the expected BAO job output: accomplishment of the duties for which he/she is accountable to the Board, and performance within the applicable limitations established by the Board. The monitoring shall occur through review of reports submitted by the BAO, through annual formal evaluation of the BAO's performance, and through such other methods deemed appropriate by the Board.

Policy	Method	Frequency
Ends	Budget Milestones	Quarterly
Customer Consumer Relations	Ad Hoc Report	Upon Discovery of Non-Compliance
Human Resources	Ad Hoc Report	Upon Discovery of Non-Compliance
Financial Management	Ad Hoc Report	Upon Discovery of Non-Compliance
Purchasing and Contracts	Ad Hoc Report	Upon Discovery of Non-Compliance
Asset Protection	Ad Hoc Report	Upon Discovery of Non-Compliance
Communication and Support	Ad Hoc Report	Upon Discovery of Non-Compliance
Inclusion, Equal Employment Opportunity, Discrimination/ Harassment Prevention and Diversity	Ad Hoc Report	Upon Discovery of Non-Compliance



Meeting Date: 10/21/13

Agenda Item No.: 5.1

Staff: Debra Caldon

Beth Dyer

E-mail: <u>dcaldon@valleywater.org</u>;

bdyer@valleywater.org

Committee: Environmental

### ADVISORY COMMITTEE AGENDA MEMO

**SUBJECT:** Update on the Three Creeks Habitat Conservation Plan

#### **RECOMMENDED ACTION:**

Receive Information on the status of the Three Creeks Habitat Conservation Plan.

#### **POLICY RATIONALE:**

This project is linked to Board Ends Policy E-1 – The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner for current and future generations.

This project is linked to the Board Ends Policy 2.1 - Current and future water supply for municipalities, industries, agriculture and the environment is reliable, including (E-2.1.2) "Protect, maintain and develop local water." CEO Strategies associated with this policy include:

- S 2.1.2.2. Manage, operate and maintain dams and reservoir assets to maximize reliability, to minimize life cycle costs and to minimize impacts to the environment.
- S 2.1.2.3. Aggressively implement dam remediation projects.
- S 2.1.2.4. Work with the wildlife agencies to address the impact of district water supply operations on fish.
- S 2.1.2.5. Secure water rights through FAHCE.

This project is linked to the CEO Interpretation of Executive Limitation 6.5. (The CEO shall not...) Fail to protect water rights, rights of way and flood control facilities. As stated in the FAHCE draft Settlement Agreement of 2003, a primary purpose of the FAHCE Program is to protect the District's water rights.

	Policy Review
$\boxtimes$	Policy Implementation

### **SUMMARY:**

This item reports on the progress of the Three Creeks Habitat Conservation Plan (Three Creeks HCP) development during the fourth quarter of Fiscal Year 2012-13 (April through June 2013). The Three Creeks HCP supports the permit application, required by the federal Endangered Species Act (ESA), to address the impacts of District water supply operations on steelhead in the Guadalupe River and Coyote and Stevens Creeks (Three Creeks).

During this quarter, the California Department of Fish and Wildlife (DFW) and the National Marine Fisheries Service (NMFS) provided comments on the first three chapters of the Three Creeks HCP (submitted to the agencies on March 29, 2013) and on a draft interagency agreement. The agreement is intended to establish a clear framework and schedule for completion of the Three Creeks HCP and associated documents. DFW submitted timely comments (Attachment 1) and recognized the improvement in the organization and clarity of the submittal, as well as the description of covered activities and the layout of water utility facilities. Other significant DFW comments inquired about aspects of the Three Creeks HCP that will be addressed in the second and third submittals, such as the effects on species, specific details of the conservation program, linkage between effects and the conservation program, and clarification of CEQA baseline. The DFW comment letter and the District response are included in Attachment 1. NMFS provided extensive comments at the end of June; this letter and the District response is provided in Attachment 2.

NMFS and DFW management generally concurred with the proposed expedited milestone schedule to complete the Three Creeks HCP, although both agencies expressed concern that more time may be needed to develop an acceptable conservation program. The milestone schedule has been modified to reflect accomplishments and status (Attachment 3).

DFW comments will be addressed substantively in the two subsequent submittals that are on track to be completed in this year (October and December). DFW declined the invitation to be a signatory to the interagency agreement because, as a responsible agency under the California Environmental Quality Act (CEQA), DFW will review and comment on the Environmental Impact Report (EIR). NMFS provided comments on the draft interagency agreement requesting a new independent scientific review process that could cause considerable schedule delays. Staff are working to identify mutually acceptable resolution to NMFS's comments to avoid delay.

### **Overall Project Costs**

During the May update the Board requested information on overall project costs. Expenditures on FAHCE and the Three Creeks HCP from FY 1998-99 through May 2013 averaged \$1.1 million per year, totaling some \$17 million to date. The funds supported the technical work to develop the draft settlement agreement; six complete (and several partial) drafts of the Three Creeks HCP; extensive monitoring of stream temperatures, a few targeted monitoring of fish populations, and ongoing coordination and collaboration with regulatory agency staff and other stakeholders. These costs also include \$600,000 to fund fish barrier removals at Blackberry Farm on Stevens Creek; but not other larger capital projects such as the fish barrier removals conducted as part of the flood control projects on the Guadalupe River.

### Fish Monitoring

District staff monitored the outmigration of steelhead smolts on Stevens Creek (see Attachment 4 for location) from early March through the end of May. The goal of the effort was to establish a better baseline of fish population numbers and reproduction in the stream. Despite the very dry year, several adult steelhead were observed spawning in the creek upstream of the trap. Redds and young of the year were observed indicating that the adult spawners effort were successful since steelhead young emerged from this stream. The following table provides data for the native fishes sampled; all captured fish were released after collecting data.

Common Name	Scientific Name	Number Captured
Steelhead (smolts)	Oncorhynchus mykiss	16
Steelhead (fry, or young of the year)	Oncorhynchus mykiss	1,176
California roach	Hesperoleucus symmetricus	3,855
Stickleback	Gasterosteus aculeatus	41
Sacramento sucker	Catostomus occidentalis	74

Smolts are fish that are undergoing the physiological transformation that allows them to survive in the ocean. This stage of development occurs after the fish have spent a year growing in the freshwater stream. To monitor the outmigrating smolts, staff installed and checked a fyke net trap daily.

<sup>‡</sup> Young of the year (also known as fry) indicates that the fish were born in the current year, emerging from redds.

<sup>†</sup> Redds are the nests that spawners make out of gravel and are indicators of spawning activity.

This year's monitoring effort was a pilot program and staff are currently evaluating how to best address monitoring needs in the Coyote Creek and Guadalupe River watersheds. To continue development of baseline conditions on Stevens Creek, outmigrant trapping will continue there in the spring of 2014; a detailed report of the 2013 monitoring results will be available in January 2014.

### **Next Steps**

On April 10, 2013, the District entered into a \$220,000 sole source contract with HDR, Inc., to provide biological consulting expertise in support of Three Creeks HCP development. HDR has a long track record of providing successful technical assistance regarding the balancing of instream flows to support fisheries and water operations. A kickoff meeting was held at District headquarters on May 5, and the consultant is currently assisting the project team with developing key aspects of the HCP, including the approach to the effects analysis and biological goals and objectives. Deliverables include assistance with negotiations with NMFS and technical memoranda that address the specifics of incidental take authorization and linkages among the covered activities, the effects of those activities on covered species, the biological goals and objectives, and the conservation program. The contract term is through June 30, 2014.

### ATTACHMENT(S):

- 1) CDFW comment letter, S. Wilson to J. Fiedler, dated May 30, 2013, and response letter, J. Fiedler to S. Wilson, dated July 10, 2013
- 2) NMFS comment letter, D. Butler to J. Fiedler, dated June 25, 2103, and response letter, J. Fiedler to D. Butler, August 26, 2013
- 3) Three Creeks Milestone Schedule & Dashboard, and Agency Review and Iterative Negotiations Process
- 4) Map of Project Location: Stevens Creek Trap Site

## This Page Intentionally Left Blank



# State of California – The Natural Resources Agency DEPARTMENT OF FISH AND WILDLIFE Bay Delta Region 7329 Silverado Trail Napa, CA 94558 (707) 944-5500

EDMUND G. BROWN JR., Governor CHARLTON H. BONHAM, Director



May 30, 2013

www.wildlife.ca.gov

Mr. James Fiedler, Chief Operating Officer Water Utility Enterprise Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118

Dear Mr. Fiedler:

Subject: Three Creeks Habitat Conservation Plan Submittal #1

The California Department of Fish and Wildlife (CDFW) has reviewed the Santa Clara Valley Water District's (SCVWD) Three Creeks Habitat Conservation Plan (HCP) Submittal #1 (Submittal), which contains drafts of the first three chapters of the Three Creeks HCP. We have the following general comments, questions, and recommendations for issues to be addressed in further development of both the provided chapters and upcoming chapters of the Three Creeks HCP:

- The overall organization and format of the chapters is clear and easy to follow. This is a vast improvement over previous drafts of chapters that have been submitted to CDFW for review.
- The numbering of the covered activities and the inclusion of activities on the various maps appropriate to each watershed is a good approach to demonstrating exactly which activities are applicable to which streams/watersheds.
- 3. The Submittal gives a good overview of the layout of the water utility facilities in Santa Clara County (County), and provides a clear explanation of the purposes of the facilities and how they help SCVWD achieve their purposes and goals of providing drinking water and flood protection in the County.
- 4. While the Submittal lists the covered activities proposed for the Three Creeks HCP, there is a lack of any details describing the covered activities. This lack of details makes it impossible for CDFW to fully assess the impacts and determine whether the proposed Conservation Program Framework will be adequate to avoid, minimize, and mitigate for the impacts incurred by SCVWD as part of the covered activities.
- 5. While the Submittal lists the anticipated preliminary effects of the proposed covered activities on covered species and their habitats, there is a lack of any details pertaining to the impact analysis. Please provide a detailed impact analysis relevant to any special-status species that may be impacted as a result of the implementation of the proposed covered activities.

Conserving California's Wildlife Since 1870

Mr. James Fiedler May 30, 2013 Page 2

- 6. While the Submittal lists several conservation measures in the proposed Conservation Program Framework, there is a lack of any details pertaining to these measures. The Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Rule Curves, which are a major component of the Conservation Measure Framework, are not described or provided graphically in the Submittal. Please provide a detailed description of each of the proposed conservation measures and provide any relevant tables or figures that would help in demonstrating the adequacy of the proposed Conservation Program Framework in compensating for the impacts of the covered activities.
- 7. Please clarify whether SCVWD intends to obtain incidental take coverage to state-listed species (California tiger salamander) as a result of the Three Creeks HCP, or whether this take coverage is anticipated to be obtained through the Santa Clara Valley Habitat Plan.
- 8. Section 1.3.2 of the Submittal refers only to Central California Coast steelhead as a covered species under the Three Creeks HCP. However, Section 1.4 on page 1-8 lists Central Valley fall-run Chinook salmon as a covered species. There is no other mention of Chinook salmon throughout the rest of the Submittal. Please clarify whether the list of covered species includes Chinook salmon, or whether it is limited only to steelhead.
- 9. In describing the Lake and Streambed Alteration Agreement process in Section 1.7, the Submittal states that SCVWD has been in the process of obtaining such Agreements for SCVWD operations in the creeks covered under the Three Creeks HCP. This statement is incorrect, as SCVWD has not submitted any Notifications pursuant to Section 1600 et seq. of the Fish and Game Code for water supply operations in any of these creeks.
- 10. In the chart on Page 1-10, there is reference to BAOs. Please provide a definition of this acronym. In addition, please explain what is meant by BAO/CEO Interpretation is this in reference to an attachment that was supposed to be included?
- 11. The proposed Conservation Program Framework does not appear to include a Fish Habitat Restoration Plan which is identified in Section 6.2.4.3 of the FAHCE Draft Settlement Agreement (DSA). The Fish Habitat Restoration Plan was intended to include several components, including gravel augmentation to enhance spawning habitat, introduction of habitat complexity components to enhance rearing habitat, and improved fish passage in order to provide access to suitable spawning and rearing habitat. Please note that the fish passage component of the Fish Habitat Restoration Plan is distinct from the Continuing Efforts to Improve Fish Passage described in Section 6.2.4.2 of the FAHCE DSA. Please clarify whether SCVWD does not intend to include a Fish Habitat Restoration Plan, as described in the FAHCE DSA. If it is not intended to be included, please explain why.

Mr. James Fiedler May 30, 2013 Page 3

- 12. The proposed Conservation Program Framework does not appear to include a Geomorphic Functions Study, as described in Section 6.2.4.4 of the FAHCE DSA. Please clarify whether SCVWD does not intend to include a Geomorphic Functions Study, as described in the FAHCE DSA. If it is not intended to be included, please explain why.
- 13. The Conservation Program Framework refers to the Three Creeks Channel Enhancement (one per watershed), but it is unclear what this means. Please provide a detailed description of the proposed Three Creeks Channel Enhancement component.
- 14. For California Environmental Quality Act (CEQA) purposes, the Submittal refers to baseline conditions for SCVWD operations as pre-1996, which was prior to the establishment of FAHCE. While SCVWD may assert that some of the elements (i.e., fish passage barrier removal, gravel augmentation in Stevens Creek at Blackberry Farms, FAHCE Rule Curves in Stevens Creek) described in the FAHCE DSA have been implemented by SCVWD, it is important to note that several of these elements have been implemented as mitigation credit for impacts resulting from other SCVWD projects. It was intended that the whole FAHCE DSA (including an HCP) would be implemented within a reasonable timeframe once the FAHCE was established, but 17 years later, most elements of the FAHCE DSA have not been implemented. Therefore, it is inappropriate to compare impacts from covered activities to the conditions that were present prior to 1996. Baseline conditions should be based on current SCVWD operations for the purposes of the CEQA analysis. Additionally, the impacts of the covered activities on state and/or federal special-status species, other than salmonids, will need to be addressed in the CEQA document. Special-status species that may be impacted by covered activities listed in the Three Creeks HCP include, but are not limited to, the species of special concern western pond turtle, species of special concern San Francisco dusky-footed woodrat, species of special concern burrowing owl, federally threatened and species of special concern California red-legged frog, and federally and state threatened California tiger salamander.
- 15. Page 3-6 of the Submittal states that SCVWD anticipates a total of ten planned dewatering events for the seven dams over the permit term (seven for planned maintenance and three for seismic safety retrofits). However, the chart showing the Conservation Program Framework describes 17 dewatering events for maintenance and seismic safety retrofits and states that 7 will be urgent and 10 will be planned. Please clarify how many dewatering events are proposed to be covered under the Three Creeks HCP, and ensure that this covered activity is described consistently throughout the Submittal. In addition, please clarify what is meant by "urgent" dewatering, describe the anticipated impacts associated with urgent dewatering, and describe the conservation measures that will be in place to compensate for these impacts.
- 16. There are several references to the Pipeline Maintenance Program, but it is unclear as to whether all or any portions of the Pipeline Maintenance Program are covered activities in the Three Creeks HCP. Please clarify.

Mr. James Fiedler May 30, 2013 Page 4

- 17. There are several references to the Dam Maintenance Program, but it is unclear as to whether all or any portions of the Dam Maintenance Program are covered activities in the Three Creeks HCP. Please clarify.
- 18. Sentence 6 in the Preliminary Effects section of the chart showing the Conservation Program Framework (under Flow Management Reservoir Operations) states that "Limited storage of water in the reservoir reduces the amount of water available for summer release. [However, if there were no dams, then there would be no water available for summer release]." This sentence appears to suggest that the adverse effects of having limited storage available due to reservoir dewatering may be perceived as negligible, by implying that a benefit exists by having the dams in place, such that they hold back water that can then be utilized for summer rearing flows. Please note that if there were no dams, salmonids would have unimpeded access to the spawning and rearing habitats available in the upper watersheds and the need for artificial summer rearing flows provided by releases from dams would not exist.

CDFW appreciates the opportunity to comment on SCVWD's Three Creeks HCP Submittal #1. Please note that CDFW has reviewed the proposed Draft Memorandum of Understanding (MOU) pertaining to preparation of the Three Creeks HCP and associated Environmental Impact Statement/Environmental Impact Report. CDFW does not intend to sign the MOU, since as a responsible agency under CEQA, CDFW will be reviewing and commenting on the CEQA document. In addition, SCVWD funds a full-time position for CDFW staff to work on SCVWD projects, as prioritized by SCVWD management.

If you have any questions regarding this letter and further coordination on this project, please contact Ms. Tami Schane, Environmental Scientist, at (415) 831-4640; or Ms. Brenda Blinn, Senior Environmental Scientist, at (707) 944-5541.

Sincerely,

Scott Wilson

CC:

Acting Regional Manager

Bay Delta Region

Gary Stern, National Marine Fisheries Service - gary.stern@noaa.gov



5750 ALMADEN EXPWY SAN JOSE, CA 95118-3686 TELEPHONE (408) 265-2600 FACSIMILE (408) 266-0271 www.valleywater.org AN EQUAL OPPORTUNITY EMPLOYER

July 10, 2013

Mr. Scott Wilson Acting Regional Manager, Bay Delta Region California Department of Fish and Wildlife 7329 Silverado Trail Napa, CA 94558

Re: California Department of Fish and Wildlife (CDFW) Comment letter dated May 30, 2013, on Three Creeks Habitat Conservation Plan Submittal #1

Dear Mr. Wilson:

On behalf of the Santa Clara Valley Water District (District), thank you for the prompt review of the first elements of the Three Creeks Habitat Conservation Plan (Three Creeks HCP) Submittal #1. Your comments are greatly appreciated as is your acknowledgement of improvement in the clarity of the document. This letter responds to the comments, questions and recommendations in your May 30, 2013, letter.

The District continues to value your commitment to the FAHCE Draft Settlement Agreement (DSA); many elements of the agreement have been implemented, as the District has incorporated fish habitat improvement provisions into its flood management projects and operations and maintenance activities over the last several years. These activities were originally to be completed after the development of an HCP. Regardless of the timing of specific activities, the District believes that the fisheries resource protection and a Fish Habitat Restoration Plan should be consistent with, and in support of, incidental take coverage through the Three Creeks HCP.

The District values CDFW's participation in development of the Three Creeks HCP and the associated CEQA document. We understand that CDFW feels that an agreement regarding preparation of the Three Creeks HCP and associated Environmental Impact Report is unnecessary. We will continue to work closely with your staff as these documents are developed and provide the resources needed to ensure that collaboration.

Thank you again for your comments on Submittal #1. We look forward to working with you on the Three Creeks HCP and associated environmental review.

Sincerely.

James/M. Fiedler, P.E., D.WRE

Chief Operating Officer Water Utility Enterprise Mr. Scott Wilson Page 2 July 10, 2013

### Attachments:

- 1) Santa Clara Valley Water District Responses to Comments by California Department of Fish and Wildlife on Three Creeks Habitat Conservation Plan Submittal #1
- 2) Letter, J. Fiedler to C. Goude, March 9, 2011

cc: Dick Butler, Supervisor, Santa Rosa Office, National Marine Fisheries Service

ATTACHMENT 1 – Santa Clara Valley Water District Responses to Comments by California Department of Fish and Wildlife on Three Creeks Habitat Conservation Plan Submittal #1 -- June 18, 2013

California Department of Fish and Wildlife (CDFW) provided comments on the Three Creeks Habitat Conservation Plan Submittal #1 to the District on May 30, 2013 (S. Wilson to J. Fiedler). CDFW comments appear in italics below, followed by District responses.

- 4. While the Submittal lists the covered activities proposed for the Three Creeks HCP, there is a lack of any details describing the covered activities. This lack of details makes it impossible for CDFW to fully assess the impacts and determine whether the proposed Conservation Program Framework will be adequate to avoid, minimize, and mitigate for the impacts incurred by SCVWD as part of the covered activities.
- 5. While the Submittal lists the anticipated preliminary effects of the proposed covered activities on covered species and their habitats, there is a lack of any details pertaining to the impact analysis. Please provide a detailed impact analysis relevant to any special-status species that may be impacted as a result of the implementation of the proposed covered activities.
- 6. While the Submittal lists several conservation measures in the proposed Conservation Program Framework, there is a lack of any details pertaining to these measures. The Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Rule Curves, are not described or provided graphically in the Submittal. Please provide a detailed description of each of the proposed conservation measures and provide any relevant tables or figures that would help in demonstrating the adequacy of the proposed Conservation Program Framework in compensating for the impacts of the covered activities.

RESPONSE to Comments 4, 5 and 6: Submittal #1 includes a very preliminary effects analysis. Submittal #2 will include more detail on the covered activities and their effects, as mentioned in the Three Creeks HCP Milestone Schedule & Dashboard: FY2013-FY2015 (March 20, 2013). Details for the Conservation Program will also be provided in Submittal #2, as discussed in the April 18 teleconference among the District, CDFW and the National Marine Fisheries Service (NMFS). The level of detail provided in Submittal #1 is intended to provide a general framework that could be used as a means for gaining concurrence on the overall direction of the Three Creeks HCP, as requested by NMFS and CDFW in the January 3 teleconference among our agencies.

7. Please clarify whether SCVWD intends to obtain incidental take coverage to state-listed species (California tiger salamander) as a result of the Three Creeks HCP, or whether this coverage is intended to be obtained through the Santa Clara Valley Habitat Plan.

RESPONSE to Comment 7: The intention is to have the Santa Clara Valley Habitat Plan (Valley Plan) provide coverage for state-listed species. On February 17, 2011, Cay Goude of U.S. Fish and Wildlife Service (FWS) met with District management and indicated that FWS would issue only one incidental take permit for the study area - i.e., that associated with the Valley Plan. Outcomes from that meeting were captured in the March 9, 2011, letter to Ms. Goude (see Attachment 2).

8. Section 1.3.2 of the Submittal refers only to Central California Coast steelhead as a covered species under the Three Creeks HCP. However, Section 1.4 on page 1-8 lists Central valley fall-run Chinook salmon as a covered species. There is no other mention of Chinook salmon throughout the rest of the Submittal. Please clarify whether the list of covered species includes Chinook salmon, or whether it is limited only to steelhead.

**RESPONSE to Comment 8:** Only the Central California Coast steelhead is a federally listed species; therefore, the district is required incidental take authorization only for that species. Section 1.4 of the Three Creeks HCP will be modified accordingly.

ATTACHMENT 1 – Santa Clara Valley Water District Responses to Comments by California Department of Fish and Wildlife on Three Creeks Habitat Conservation Plan Submittal #1 – June 18, 2013

9. In describing the Lake and Streamed Alteration Agreement process in Section 1.7, the Submittal states that SCVWD has been in the process of obtaining such Agreements for SCVWD operations in the creeks covered under the Three Creeks HCP. This statement is incorrect, as SCVWD has not submitted any Notifications pursuant to Section 1600 et seq. of the Fish and Game Code for water supply operations in any of these creeks.

RESPONSE to Comment 9: It is anticipated that the Three Creeks HCP will serve as the basis for an application for a Lake and Streambed Alteration Agreement for water supply operations and maintenance activities in the Guadalupe River watershed and the Coyote and Stevens Creeks watersheds. In the Three Creeks HCP study area, the District currently has separate Lake and Streambed Alteration Agreements for instream diversions on Guadalupe Creek (Masson), Guadalupe River (Alamitos), Coyote Creek (Coyote Percolation Pond), Penitencia Creek (Mabury), and Los Gatos Creek (Kirk).

10. In the chart on Page 1-10, there is reference to BAOs. Please provide a definition of this acronym. In addition, please explain what is meant by "BAO/CEO Interpretation" – is this in reference to an attachment that was supposed to be included?

RESPONSE to Comment 10: The chart on page 1-10 presents the District's organizational goals for developing the Three Creeks HCP. The rationale presented herein must be linked to District Ends Policies and Executive Limitations, in the same manner that a municipality would link its actions to a General Plan. The acronym "BAO" signifies "Board Appointed Officer" (i.e., the CEO, District Counsel, or Clerk of the Board). In this case, it would mean the CEO. The term "BAO/CEO Interpretation" refers to how the general policy is interpreted and applied. We can revise the chart to include a footnote or a link to the District webpage that contain Board Ends Policies and Executive Limitations, and a definition of "BAO."

11. The proposed Conservation Program Framework does not appear to include a Fish Habitat Restoration Plan which is identified in Section 6.2.4.3 of the FAHCE Draft Settlement Agreement (DSA). The Fish Habitat Restoration Plan was intended to include several components, including gravel augmentation to enhance spawning habitat, introduction of habitat complexity components to enhance rearing habitat, and improved fish passage in order to provide access to suitable spawning and rearing habitat. Please note that the fish passage component of the Fish Habitat Restoration Plan is distinct from the Continuing Efforts to Improve Fish Passage described in Section 6.2.4.2 of the FAHCE DSA. Please clarify whether SCVWD does not intend to include a Fish Habitat Restoration Plan, as described in the FAHCE DSA. If it is not intended to be included, please explain why.

**RESPONSE to Comment 11**: The intention is that the Conservation Program will incorporate the elements contemplated in a Fish Habitat Restoration Plan (FHRP). The intent is to ensure that NMFS and CDFW concur with the FHRP elements to support both ESA and state goals.

12. The proposed Conservation Program Framework does not appear to include a Geomorphic Functions Study, as described in Section 6.2.4.4 of the FAHCE DSA. Please clarify whether SCVWD does not intend to include a Geomorphic Functions Study, as described in the FAHCE DSA. If it is not intended to be included, please explain why.

RESPONSE to Comment 12: Baseline Geomorphic Assessments were completed for the Guadalupe River watershed (2002) and Coyote Creek watershed (2003). The Upper Guadalupe River Flood Control Project implemented geomorphic elements into the final design, and the future Coyote flood management will strive to incorporate geomorphic approaches as well. More importantly, the Asset Management Framework for streams and watershed improvement relies on geomorphic principles to identify stream maintenance requirements. Stream Maintenance Guidelines are currently under negotiation with the Regional Board as a condition of stream maintenance permitting.

ATTACHMENT 1 – Santa Clara Valley Water District Responses to Comments by California Department of Fish and Wildlife on Three Creeks Habitat Conservation Plan Submittal #1 – June 18, 2013

13. The Conservation Program Framework refers to the Three Creeks Channel Enhancement (one per watershed), but it is unclear what this means. Please provide a detailed description of the proposed Three Creeks Channel Enhancement component.

**RESPONSE to Comment 13**: Details for the Conservation Program, including the Three Creeks Channel Enhancement, will be provided in Submittal #2.

14. For California Environmental Quality Act (CEQA) purposes, the Submittal refers to baseline conditions for SCVWD operations as pre-1996, which was prior to the establishment of FAHCE. While SCVWD may assert that some of the elements (i.e., fish passage barrier removal, gravel augmentation in Stevens Creek at Blackberry Farms, FAHCE Rule Curves in Stevens Creek) described in the FAHCE DSA have been implemented by SCVWD, it is important to note that several of the these elements have been implemented as mitigation credit for impacts resulting from other SCVWD projects. It was intended that the whole FAHCE DSA (including an HCP) would be implemented within a reasonable timeframe once the FAHCE was established, but 17 vears later, most elements of the FAHCE DSA have not been implemented. Therefore, it is inappropriate to compare impacts from covered activities to the conditions that were present prior to 1996. Baseline conditions should be based on current SCVWD operations for the purposes of the CEQA analysis. Additionally, the impacts of the covered activities on state and/or federal special-status species, other than salmonids, will need to be addressed in the CEQA document. Special-status species that may be impacted by covered activities listed in the Three Creeks HCP include, but are not limited to, the species of special concern western pond turtle, species of special concern San Francisco dusky-footed woodrat, species of special concern burrowing owl. federally threatened and species of special concern California red-legged frog, and federally and state threatened California tiger salamander.

**RESPONSE to Comment 14:** The District does not initially disagree that the CEQA baseline conditions should be based on current District operations. However, based on changes in recent case law regarding the establishment of CEQA baseline, the District needs to further analyze its options for adopting the most appropriate CEQA baseline. We agree that impacts to special-status species other than steelhead need to be addressed in the CEQA document.

15. Page 3-6 of the Submittal states that SCVWD anticipates a total of ten planned dewatering events for the seven dams over the permit term (seven for planned maintenance and three for seismic safety retrofits). However, the chart showing the Conservation Program Framework describes 17 dewatering events for maintenance and seismic safety retrofits and states that 7 will be urgent and 10 will be planned. Please clarify how many dewatering events are proposed to be covered under the three Creeks HCP, and ensure that this covered activity is described consistently throughout the Submittal. In addition, please clarify what is meant by "urgent" dewatering, describe the anticipated impacts associated with urgent dewatering, and describe the conservation measures that will be in place to compensate for these impacts.

**RESPONSE to Comment 15:** The District anticipates seventeen dam dewatering events (seven for planned, non-routine maintenance; three for planned seismic retrofit work, and seven for unplanned, urgent repairs) over the 50-year permit term. The District is also applying for coverage of reservoir releases – including those for routine maintenance - that affect routine stream flows. The Three Creeks HCP will fully describe this covered activity.

Submittal #2 of the Three Creeks HCP will include more detail about the anticipated impacts to the covered species associated with reservoir dewatering and the proposed conservation measures to compensate for those impacts.

16. There are several references to the Pipeline Maintenance Program, but it is unclear as to whether all or any portions of the Pipeline Maintenance Program are covered activities in the Three Creeks HCP. Please clarify.

ATTACHMENT 1 – Santa Clara Valley Water District Responses to Comments by California Department of Fish and Wildlife on Three Creeks Habitat Conservation Plan Submittal #1 – June 18, 2013

**RESPONSE to Comment 16:** The Pipeline Maintenance Program (PMP) includes the dewatering of pipelines for routine maintenance. The District is applying for coverage of these dewatering releases that affect routine stream flows in the Three Creeks HCP study area. The Three Creeks HCP will explain this covered activity in greater detail.

17. There are several references to the Dam Maintenance Program, but it is unclear as to whether all or any portions of the Dam Maintenance Program are covered activities in the Three Creeks HCP. Please clarify.

RESPONSE to Comment 17: The Dam Maintenance Program (DMP) includes reservoir dewatering for routine dam maintenance. The District is applying for coverage of these dewatering releases that affect routine stream flows. Water from the reservoir will be released to the adjacent stream in the Three Creeks HCP study area. The Three Creeks HCP will clearly explain this covered activity.

Submittal #2 of the Three Creeks HCP will include more detail about the anticipated impacts to the covered species associated with reservoir dewatering for dam maintenance and the proposed conservation measures to compensate for those impacts.

18. Sentence 6 in the Preliminary Effects section of the chart showing the Conservation Program Framework (under Flow Management – Reservoir Operations) states that "Limited storage of water in the reservoir reduces the amount of water available for summer release. [However, if there were no dams, then there would be no water available for summer release]." This sentence appears to suggest that the adverse effects of having limited storage available due to reservoir dewatering may be perceived as negligible, by implying that a benefit exists by having dams in place, such that they hold back water that can be utilized for summer rearing flows. Please note that if there were no dams, salmonids would have unimpeded access to the spawning and rearing habitats available in the upper watersheds and the need for summer rearing flows provided by releases from dams would not exist.

**RESPONSE to Comment 18**: SCVWD will modify this description to remove the sentence in brackets.

5750 ALMADEN EXPWY SAN JOSE, CA 95118-3686 TELEPHONE (408) 265-2600 FACSIMILE (408) 266-0271 www.valleywater.org AN EQUAL OPPORTUNITY EMPLOYER

March 9, 2011

Ms. Cay Goude
Assistant Field Supervisor, Endangered Species Program
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Re: Permitting of the Three Creeks HCP

Dear Ms. Goude:

On behalf of the Santa Clara Valley Water District (District), I would like to thank you for meeting with us on February 17, 2011, to discuss possible approaches to obtaining incidental take authorization through the Three Creeks Habitat Conservation Plan (Three Creeks Plan). Coverage under the Endangered Species Act (ESA) for U.S. Fish and Wildlife Service (FWS)-listed species is critical to District water supply operations and projects. We greatly appreciate your time, and willingness to clarify the FWS position on this matter.

I am sending this letter to confirm our understanding of points made during the meeting:

- 1. The Santa Clara Valley Habitat Plan (Valley Plan) is the primary permit application that the FWS will rely upon to evaluate incidental take for species under FWS purview. FWS does not intend to issue a second permit for the Three Creeks HCP that would result in duplicative coverage for species and areas that overlap with the Valley Plan; the Valley Plan permit is intended to provide ESA coverage for Three Creeks HCP activities with respect to terrestrial species.
- For the activities that will occur in the Three Creeks HCP plan area that are outside the Valley Plan area (Stevens Creek, Los Gatos Creek) and that have a federal nexus, the District will prepare suitable documents for coverage under Section 7 of the ESA.
- 3. For the activities that will occur in the Three Creeks HCP plan area that are outside the Valley Plan area (Stevens Creek, Los Gatos Creek) and that do not have federal nexus, FWS is willing to work with the District to develop avoidance and minimization measures for those activities to ensure that the activities are not likely to affect ESA-listed terrestrial species.
- 4. When the District petitions the State Water Resources Control Board to resolve the water rights complaint, FWS is willing to support the approach of having the Valley Plan cover terrestrial species and Three Creeks HCP focus on fish s covered as described by #2 or #3 above, as appropriate.

Ms. Cay Goude

Page 2

March 9, 2011

- The District can get credit for conservation measures under the Valley Plan for Three Creeks HCP activities for those activities that are beneficial to one or more terrestrial species covered by the Valley Plan.
- The District should have a staff person follow, and be engaged in, the development of the Valley Plan as it moves into implementation (as has been done through development of the Valley Plan to date).
- The District is retaining terrestrial species discussion in the current draft of the Three Creeks HCP If the permit process for Valley Plan is completed by the end of 2012, the District will remove the language regarding terrestrial species from the Three Creeks HCP.

Please let me know if any of the points above needs revision. I can be reached at 408-265-2607 x2736. Thank you again for your help with clarifying these matters. We look forward to successfully working with you to complete the Valley Plan and obtain any incidental take coverage from FWS that would be needed by activities included in the Three Creeks HCP.

Sincerely,

James M. Fiedler

Chief Operating Officer Water Utility Enterprise

cc: Richard Butler, Supervisor, Santa Rosa Office, National Marine Fisheries Service



### UNITED STATES DEPARTMENT OF COMMERCE

### **National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE Southwest Region 777 Sonoma Ave., Room 325 Santa Rosa, CA 95404-4731

June 25, 2013

In response, refer to: SWR/F/SWR4:GRS

Jim Fiedler Chief Operating Officer, Water Utility Enterprise Santa Clara Valley Water District 5700 Almaden Expressway San Jose, California 95118

Dear Mr. Fiedler:

Thank you for the opportunity to review Submittal #1 of the April 2013 draft of the Santa Clara Valley Water District's Three Creeks Habitat Conservation Plan (Three Creeks HCP). Submittal #1 contains drafts of the first three chapters of the Three Creeks HCP. NOAA's National Marine Fisheries Service (NMFS) has reviewed the document and we offer the following comments, questions, and suggested revisions for these chapters:

- (1) **General Comment:** The three chapters provided in Submittal #1 bear little resemblance to the first three chapters of the April 2009 draft Three Creeks. Although the new draft is well organized and clear, many of the details, tables, and photos presented in the first three chapters of April 2009 draft HCP were useful.
- (2) Chapter 1 Comment, HCP Conservation Goal: Chapter 1 presents a relatively modest goal for the Three Creeks HCP. The purpose of the Three Creeks HCP needs to be more than "... minimize and mitigate the effects of district water supply activities ...". The HCP's conservation program should preserve and protect Covered Species populations within the Study Area by achieving, during the term of the plan, the essential habitat functions required for their long-term survival while allowing for incidental take.
- (3) **Chapter 1 Comment, Study Area:** The document appears to use the terms "study area" and "planning area" interchangeably. The "planning" area (sometimes referred to as "study" area) typically includes the area in which covered activities would occur, impacts would be evaluated, and conservation activities would be implemented. "Permit" area is the geographic area specified on the permit where the authorized incidental take would occur and it includes specific land ownerships where the permittee has direct control. It is often a subset of the planning area.



- (4) **Chapter 1 Comment, Geographic Scope of Study Area:** Chapter 1, on page 1-4, defines the planning area for the Three Creeks HCP as stream reaches below district reservoirs. This is too narrow a geographic scope for this HCP, because several district reservoirs block steelhead from access to historical habitat. The impact of district dams on salmonid migration and current habitat availability needs to be included in the HCP's assessment.
- (5) Chapter 1 Comment, County-Wide Overview: Is the *Water Supply Operations Overview* presented in Chapter 1 for the HCP's permit area, study area, or for all of Santa Clara County?
- (6) Chapter 1 Comment, ESA: Portions of section 1.3.3 Regulatory Context, Federal Endangered Species Act are incorrect. Section 9 of the ESA prohibits the taking of any endangered fish or wildlife. It is the Protective Regulations provision in section 4(d) that allows for the prohibition of take of threatened species. In addition to incidental take permits, section 10 of the ESA provides for the issuance of permits for scientific purposes. The NMFS process for completing an internal section 7 is not accurately described in this section, and there may not be any consultation by USFWS for this HCP.
- (7) **Chapter 1 Comment, NEPA:** In the section regarding the *National Environmental Policy Act*, NMFS recommends this chapter only discuss the general process and not include specific dates and information regarding the NMFS NEPA document. The district will need to finalize the HCP prior to NMFS completion of the NEPA environmental review.
- (8) **Chapter 1 Comment, Covered Species:** The document does not clearly state the Covered Species. Are both CCC steelhead and fall-run Chinook salmon proposed for inclusion as Covered Species in the HCP?
- (9) Chapter 1 Comment, Goals and Objectives: Pursuant to the NMFS/USFWS Five Point Policy, HCPs must contain biological goals and objectives that clarify the purpose and direction of the conservation program and measures. Section 1.7 of Chapter 1 describes district institutional goals. The relationship of the district's goals to the HCP's biological goals/objectives for Covered Species is not clear.
- (10) Chapter 1 Comment, HCP's Technical Foundation: Chapter 1 should include a section which briefly describes the development of the HCP, including the parties involved and the technical foundation. There should be an overview of the data collected, scientific information compiled, and any technical reports that were generated during the formulation of the HCP's conservation strategy and measures.
- (11) **Chapter 2 Comment, Environmental Setting:** Chapter 2 provides a limited and unbalanced description of the physical and biological resources in the study area. For example, the *Hydrologic Setting* section of Chapter 2 consists of 14+ pages of text and figures, while the *Biological Setting* consists of 6 pages. The hydrologic information presented in the chapter focuses on channel conditions and intermittent flows in stream reaches downstream of existing dams, and the only discussion regarding perennial flows conditions in upper watershed areas occurs briefly in the section on the Coyote Creek Watershed. If the goal of this chapter is to "characterize the historic and current habitat conditions of the covered species to provide context

for proposed habitat conservation", it is important that there be discussion of the conditions in upper watershed reaches that historically supported the Covered Species.

(12) Chapter 2 Comment, Setting and Biological Resources: A significant problem with Chapter 2 relates to the selective presentation of hydrologic, physical, and biological information. Although there are major habitat problems in the HCP study area, the chapter presents a very negative view of conditions for salmonids and omits information regarding the positive habitat attributes within the watersheds. For example, pages 2-18 and 2-19 summarize conditions in the Guadalupe River Watershed and the closing paragraph states "Overall, the quality of the rearing habitat in the Guadalupe River is rated as poor. Thirty percent of the Guadalupe River was rated as having no rearing habitat and 52% was rated as having poor". This information, from the 2000 habitat inventory report prepared by Entrix, is correct for the Guadalupe River, but the same report also states that in Alamitos Creek "habitat conditions are favorable, and suitable rearing conditions are present based on physical habitat conditions" (SCVWD 2000). For Guadalupe Creek, SCVWD (2000) reports the stream contains approximately 3.8 miles of "good quality rearing habitat for juvenile salmonids".

Steelhead have developed a life history strategy that allows for migration from the ocean (*i.e.*, San Francisco Bay) through intermittent stream reaches during the winter months, and they utilize creeks in headwater areas with perennial flows for spawning and summer rearing. Prior to the development of the Santa Clara Valley, the mainstem Guadalupe River likely provided marginal hydrologic conditions in the summer/fall months and relatively poor quality rearing habitat for steelhead. Alamitos Creek, Guadalupe Creek and Los Gatos Creek in the Guadalupe Watershed were historically (and currently) the areas with the highest value freshwater steelhead habitat and the HCP's conservation program should embody this steelhead life history strategy. The selective presentation of information in Chapter 2 creates an incomplete view of the conditions and salmonid habitat potential in these watersheds. Chapter 2 should be revised to reflect the full range of conditions in the HCP's study area.

- (13) **Chapter 2 Comment, Steelhead in the Study Area:** The description of steelhead in *Study Area Species Summary* is lacking information regarding the district's fisheries sampling and research, as well as, the results of the biological investigations conducted for the FAHCE program. This section needs a more complete description of the status of steelhead in the study area.
- (14) Chapter 3 Comment, Effects Analysis: The chapter title included "effects analysis", but the chapter text is limited to an overview of the district's county-wide facilities and covered activities. NMFS suggests that "effects analysis" be removed from the chapter heading.
- (15) Chapter 3 Comment, Scope of Covered Activities: Portions of sections 3.1 and 3.2 describe county-wide facilities which are not part of the Three Creeks HCP. Inclusion of the district's county-wide facilities and operations may provide some context for the Covered Activities within the Three Creeks HCP, but it can also lead to some confusion. NMFS suggests that discussion of district facilities that are not Covered Activities be removed from the chapter, or text be added throughout sections 3.1 and 3.2 to clarify which facilities are not part of the HCP.

- (16) Chapter 3 Comment, Relationship to Other District Programs: Within Chapter 3, there are references to the district's Stream Maintenance Program, Pipeline Maintenance Program, and Dam Maintenance Program. The relationship between these on-going programs and proposed Covered Activities should be clarified.
- (17) Chapter 3 Comment, Seismic Safety Retrofit Projects: The chapter is not clear regarding the inclusion of seismic retrofit activities at district dams. On page 1-9 in Chapter 1, the document states "seismic safety retrofit activities" are included in the HCP. However, on page 3-6 in Chapter 3 the proposed covered activity appears to be limited to "... water supply operations during seismic safety retrofits of three of those dams...". Is the district proposing that the Three Creeks HCP only address water operations during three seismic safety retrofit projects (i.e., Guadalupe Dam, Almaden Dam and Calero Dam) and not address the other components of these three retrofit projects. Tables in Chapter 3 also make references to "non-routine dam retrofit change to releases (dewatering releases)" at three additional dams: Stevens Creek Dam, Lexington Dam, and Coyote Dam. Do Covered Activities include seismic safety projects at these dams, too? For purposes of planning, analysis, and development of conservation measures, all aspects of the seismic retrofit projects need to be addressed by the district for Covered Species. If the district proposes to include water operations during seismic safety retrofit projects, the other aspects of the retrofit projects should also be included as Covered Activities in the HCP.
- (18) Chapter 3 Comment, Anderson Dam Retrofit Project: Chapter 3 identifies a fourth dam seismic safety retrofit project at Anderson Dam, but indicates this project is not included in the Three Creeks HCP because "that activity is being covered by an ESA Section 7 consultation." NMFS has not been contacted by any federal agency regarding consultation for the Anderson Dam seismic project. We recommend the district and the federal action agency initiate coordination with NMFS as soon as possible to identify potential conflicts with listed species and develop appropriate conservation measures. As discussed with the district at the December 14, 2011, meeting of partners to the Statements of Understanding Central California Coast Steelhead Recovery Program, draft recovery actions are proposed for steelhead at Anderson Dam and for Coyote Creek.
- (19) Chapter 3 Comment, Almaden Dam Retrofit Project: Chapter 3 indicates that the seismic safety retrofit project for Almaden Dam will be completed between 2015 and 2017. If Almaden Dam is scheduled to be completed prior to the Anderson Dam retrofit project (estimated to be completed between 2016-2018), shouldn't Almaden Dam also be addressed through an ESA Section 7 consultation?
- (20) Chapter 3 Comment, Interim Storage Restrictions: Regarding interim storage restrictions (ISR) established by the Division of Safety of Dams, Chapter 3 describes ISRs at four district facilities: Coyote Reservoir, Guadalupe Reservoir, Almaden Reservoir and Calero Reservoir. Are Covered Activities limited to these four existing ISRs?
- (21) Chapter 3 Comment, Facilities Descriptions: Chapter 3 presents an excellent overview of facilities and their general operations by watershed, but lacks the details required to assess

potential impacts and define the range of operations included under the HCP's Covered Activities. NMFS recommends the district prepare a document which can serve as an appendix to the HCP with the specifications of each covered facility and the range of its operation. The appendix would include modeling results that present the monthly (or daily, if possible) operation of each facility under various water year types (wet, above normal, normal, below normal, and dry).

- (22) Chapter 3 Comment, Water Rights and Operations: For several facilities, the Instream Covered Activities section defines the district's water right and permitted season of diversion. For example, Masson Dam is described as a water diversion not to exceed 0.77 cfs from October 1 to May 1. However, the Masson Diversion has a larger capacity than 0.77 cfs and may operate year-round. Chapter 3 (or an appendix, see comment #21 above) needs to fully describe the operation of each diversion facility included as a Covered Activity.
- (23) Chapter 3 Comment, Ford Road Percolation Facility: Page 3-23 of Chapter 3 mentions four groundwater recharge systems in the Coyote Creek Watershed. Three of these are existing facilities (*i.e.*, Upper Penitencia, Overfelt, and Coyote percolation ponds) and are described in more detail later in the chapter. The fourth facility, Ford Road, is not an existing facility and is not describe further in Chapter 3. Is the future Ford Road percolation facility proposed for inclusion as a Covered Activity?
- (24) **Chapter 3 Comment, Water Right for Coyote Percolation Pond:** Page 3-25 refers to the district's water right appropriation for diversion of 5,000 acre-feet at the Coyote Percolation Pond system near Metcalf Creek from April 1 to December 15. Since this diversion season extends over the driest months of the year (*i.e.*, April to mid-December) and the location is downstream of Anderson Dam with no sizeable upstream tributary inputs, what is the source of the 5,000 acre-feet water appropriation at this site?
- (25) Conservation Program Framework: The lack of detail in this table and Chapters 1-3 regarding the HCP's conservation program make it difficult to provide comments on the conservation program framework presented in Submittal #1. There is a link between category of Covered Activities (i.e., reservoir operations, instream operations, etc.) and the framework's conservation measures, but overall the conservation strategy is unclear. Pursuant to the June 2000, addendum to the USFWS/NMFS HCP Handbook "5-Point" policy, the HCP must include clearly defined biological goals and objectives. Biological goals serve as broad, guiding principles for the Plan's conservation program. Biological objectives will serve as a target condition to be met or as a change to be achieved relative to the existing condition. Creeks HCP conservation measures should be based upon the HCP's biological goals and objectives; and the biological goals and objectives are the rationale behind the HCP's conservation strategy. It is critical that the District, in coordination with NMFS, develop explicit biological goals and objectives to clarify the purpose and direction of the operating conservation program. Based on the information provided in this framework, NMFS cannot determine if the HCP's conservation program will provide a high probability that aquatic habitat functions essential to the species' long-term survival will be achieved and maintained during the term of the permit while allowing for incidental take.

We look forward to continuing our work with the district on the Three Creeks HCP. Please contact Gary Stern of my staff at 707-575-6060 if you have questions regarding these comments and for further coordination on this project.

Dick Butler

North Central Coast Office Supervisor

Protected Resources Division

cc: Debra Caldon, SCVWD Craig Weightman, CDFW

### References

Santa Clara Valley Water District . (2000). Stream Habitat Inventory Summary Report for the Fisheries and Aquatic Habitat Collaborative Effort, Draft Report. Sacramento, CA: Entrix, Inc. (Project 552301). 74 pp.



August 26, 2013

Mr. Dick Butler
North Central Coast Office Supervisor
Protected Resources Division
National Marine Fisheries Service Southwest Region
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404-4731

Re: National Marine Fisheries Service (NMFS) Comment letter dated June 25, 2013, on Three Creeks Habitat Conservation Plan Submittal #1 (NMFS Reference: SWR/F/SWR4:GRS)

Dear Mr. Butler:

Thank you for providing comments on the first elements of the Three Creeks Habitat Conservation Plan (Three Creeks HCP) Submittal #1. This letter responds to the comments, questions and suggested revisions included in your letter of June 25, 2013.

The District is striving to produce a Three Creeks HCP that accurately captures District water supply operations and maintenance activities, their impacts to California Central Coast steelhead trout, and conservation measures commensurate with those impacts. These submittals will be different from the 2009 draft; terrestrial species and District water supply operations and maintenance activities that do not affect instream flows have been removed.

The District understands the importance of defining clear biological goals and objectives for the Three Creeks HCP to serve as the foundation of the conservation program. We invite your staff to advise the District team, including our fisheries consultants, on this aspect of the planning process so that biological goals and objectives commensurate with the proposed action can be incorporated into the conservation program.

The District also recognizes the significant commitment a 50-year incidental take permit and the considerable financial obligations represent a substantial investment that will be borne by Santa Clara County water rate payers to implement the Three Creeks conservation program. In light of this fact, the Three Creeks HCP must be vetted with, and fully supported by, the District Board of Directors (Board). Prior to each submittal of HCP elements for NMFS review, the submittal materials will be presented to the Board for review and public discussion. Should review comments received from NMFS necessitate substantive revisions to HCP elements, those revisions will similarly be vetted with the Board before submittal of the revised materials to NMFS for review.

Thank you again for your comments on Submittal #1. We look forward to working with you on the Three Creeks HCP and associated environmental review. If you have any questions, call me at 408-630-2736, or call my staff, Debra Caldon at 408-630-3057.

Mr. Dick Butler Page 2 August 26, 2013

Sincerely,

James M. Fiedler, P.E., D.WRE

Chief Operating Officer Water Utility Enterprise

Attachments: Attachment 1 – Santa Clara Valley Water District Responses to Comments by

National Marine Fisheries Service on Three Creeks Habitat Conservation Plan

Submittal #1

Attachment 2 – National Marine Fisheries Service Comment letter date June 25,

2013 on the Three Creeks Habitat Conservation Plan Submittal #1

cc: Gary Stern, Supervisor, San Francisco Bay Branch, National Marine Fisheries Service

Scott Wilson, Acting Regional Manager, Bay Delta Region, California Department of Fish and Wildlife

Craig Weightman, Environmental Program Manager, California Department of Fish and Wildlife

Brenda Blinn, Senior Environmental Scientist, California Department of Fish and Wildlife

Tami Schane, Environmental Scientist, California Department of Fish and Wildlife

Santa Clara Valley Water District Responses to Comments by National Marine Fisheries Service on Three Creeks Habitat Conservation Plan Submittal #1 – August 22, 2013

<u>DISTRICT GENERAL RESPONSE</u> to General Comment: These submittals will differ from the 2009 administrative draft; terrestrial species and District water supply operations and maintenance activities that do not affect instream flows have been removed.

<u>DISTRICT RESPONSE to Comments 2 through 10</u>: These comments on Chapter 1 request clarifications of content or revisions to address factual errors. The revised submittal will address these comments in strike out and delete. Wherever possible, the Three Creeks HCP will rely on the Santa Clara Valley Habitat Plan for definitions of terms (e.g., study area, permit area) and concepts, since these are already familiar to both regulatory personnel and District staff, and incorporate them into the Three Creeks HCP.

The Three Creeks HCP includes an overview of District water supply activities in the county to establish the context of the operations and maintenance activities that may both impact Central California Coast steelhead trout and occur within the study area, i.e., the covered activities. The document will clearly describe these covered activities in Chapter 3, along with the effects of those activities. The effects analysis is to be included in submittal #3, as mentioned in the Three Creeks HCP Milestone Schedule & Dashboard: FY2013-FY2015 (March 20, 2013).

The biological goals and objectives will be part of submittal #2. We look forward to working with your staff to develop biological goals and objectives commensurate with the scope of the covered activities. Our intent is to link the impacts of the activities and biological objectives to the conservation measures – which will also be part of submittal #2 – to ensure a practicable conservation program that is based on sound biological rationale.

As for the process regarding environmental review, it was our understanding that the draft NEPA and CEQA documents would be circulated simultaneously with the draft Three Creeks HCP. The reference to a timeframe in Chapter 1 is intended only to indicate the length of the public review period.

DISTRICT RESPONSE to Comments 11, 12 and 13: Submittal #3 will more fully outline biological analysis and the results of past data collection, based on agreement on the effects analysis, see response to comment 14. In addition to the studies mentioned, if NMFS has a list of District surveys or studies that are considered crucial to support the effects analysis approach, please provide that information so that it can be used to inform the effects analysis process.

<u>DISTRICT RESPONSE to Comment 14</u>: Submittal #3 will include the biological effects analysis, as noted above.

<u>DISTRICT RESPONSE to Comment 15</u>: The introductory portion of chapter 3 will be modified to clarify the portions of the discussion in Sections 3.1 and 3.2 that pertain to District-wide water operations. Covered activities will likewise be clarified.

<u>DISTRICT RESPONSE to Comment 16</u>: This version of the HCP focuses on District water supply operations and maintenance activities that affect instream flows. For the Pipeline Maintenance Program (PMP), the District is applying for coverage of pipeline dewatering releases that may affect stream flows in the Three Creeks HCP study area. The Dam Maintenance Program (DMP) includes reservoir dewatering for routine dam maintenance. The

Page 1 of 2

Santa Clara Valley Water District Responses to Comments by National Marine Fisheries Service on Three Creeks Habitat Conservation Plan Submittal #1 – August 22, 2013

District is applying for coverage of these dewatering releases that may affect stream flows downstream of the reservoirs in the Three Creeks HCP study area. As a result of recent permit negotiation, the latest iteration of the *Stream Maintenance Program* (SMP) no longer contains water utility facilities that may have impacts on instream flows. Chapter 3 will be revised to better explain the requested coverage.

<u>DISTRICT RESPONSE to Comment 17, 18, 19 and 20</u>: The proposed covered activities include three seismic safety retrofits – those at Guadalupe, Almaden and Calero Dams – focused on the changes in reservoir release associated with dewatering activities that could affect instream flows. Seismic retrofit activities are not anticipated on Stevens Creek, Lexington, or Coyote Dams; instead, periodic maintenance activities (e.g., inlet repair) may require dewatering at these dams. The Anderson Dam seismic retrofit project must meet Federal Energy Regulatory Commission (FERC) requirements and will require Army Corps of Engineers permits under the Clean Water Act, therefore an ESA, Section 7 consultation would be appropriate. With respect to Guadalupe, Almaden and Calero Dams, it is anticipated that the Three Creeks HCP will provide ESA coverage for steelhead for seismic safety retrofit dewatering. Chapter 3 will be clarified to reflect the locations where coverage for ISRs is requested.

<u>DISTRICT RESPONSE to Comments 21 and 22</u>: Chapter 3 will be augmented with tables that provide additional detail on facilities to be covered by the Three Creeks HCP including Masson Dam. The District concurs that that the addition of a technical appendix will be an appropriate vehicle to compile the considerable volume of existing modeling, scientific and technical work prepared for the Three Creeks HCP.

<u>DISTRICT RESPONSE to Comment 23</u>: Chapter 3 describes the recharge facilities in Coyote Creek for which ESA coverage is requested. Any new facilities that have conservation value will be described as a conservation measure.

<u>DISTRICT RESPONSE to Comment 24</u>: The source of the 5,000 acre-feet is the reservoir diversion under the existing water right or rediversion of federal water allocations from the Central Valley Project. This would vary from year to year depending on annual rainfall and other factors, such as the ISR as well as availability of federal water supplies.

<u>DISTRICT RESPONSE to Comment 25</u>: Details on the conservation program will be provided in Submittal #2, as discussed in the April 18 teleconference among the District, CDFW, and NMFS. The level of detail provided in Submittal #1 is intended to provide a general framework that could be used as a means for gaining concurrence on the overall direction of the Three Creeks HCP, as requested by NMFS and CDFW in the January 3, 2013, teleconference among our agencies.

Page 2 of 2



#### UNITED STATES DEPARTMENT OF COMMERCE

**National Oceanic and Atmospheric Administration** 

NATIONAL MARINE FISHERIES SERVICE Southwest Region 777 Sonoma Ave., Room 325 Santa Rosa, CA 95404-4731

June 25, 2013

In response, refer to: SWR/F/SWR4:GRS

Jim Fiedler Chief Operating Officer, Water Utility Enterprise Santa Clara Valley Water District 5700 Almaden Expressway San Jose, California 95118

Dear Mr. Fiedler:

Thank you for the opportunity to review Submittal #1 of the April 2013 draft of the Santa Clara Valley Water District's Three Creeks Habitat Conservation Plan (Three Creeks HCP). Submittal #1 contains drafts of the first three chapters of the Three Creeks HCP. NOAA's National Marine Fisheries Service (NMFS) has reviewed the document and we offer the following comments, questions, and suggested revisions for these chapters:

- (1) General Comment: The three chapters provided in Submittal #1 bear little resemblance to the first three chapters of the April 2009 draft Three Creeks. Although the new draft is well organized and clear, many of the details, tables, and photos presented in the first three chapters of April 2009 draft HCP were useful.
- (2) Chapter 1 Comment, HCP Conservation Goal: Chapter 1 presents a relatively modest goal for the Three Creeks HCP. The purpose of the Three Creeks HCP needs to be more than "... minimize and mitigate the effects of district water supply activities ...". The HCP's conservation program should preserve and protect Covered Species populations within the Study Area by achieving, during the term of the plan, the essential habitat functions required for their long-term survival while allowing for incidental take.
- (3) Chapter 1 Comment, Study Area: The document appears to use the terms "study area" and "planning area" interchangeably. The "planning" area (sometimes referred to as "study" area) typically includes the area in which covered activities would occur, impacts would be evaluated, and conservation activities would be implemented. "Permit" area is the geographic area specified on the permit where the authorized incidental take would occur and it includes specific land ownerships where the permittee has direct control. It is often a subset of the planning area.



- (4) **Chapter 1 Comment, Geographic Scope of Study Area:** Chapter 1, on page 1-4, defines the planning area for the Three Creeks HCP as stream reaches below district reservoirs. This is too narrow a geographic scope for this HCP, because several district reservoirs block steelhead from access to historical habitat. The impact of district dams on salmonid migration and current habitat availability needs to be included in the HCP's assessment.
- (5) **Chapter 1 Comment, County-Wide Overview:** Is the *Water Supply Operations Overview* presented in Chapter 1 for the HCP's permit area, study area, or for all of Santa Clara County?
- (6) **Chapter 1 Comment, ESA:** Portions of section 1.3.3 *Regulatory Context, Federal Endangered Species Act* are incorrect. Section 9 of the ESA prohibits the taking of any endangered <u>fish or</u> wildlife. It is the Protective Regulations provision in section 4(d) that allows for the prohibition of take of threatened species. In addition to incidental take permits, section 10 of the ESA provides for the issuance of permits for scientific purposes. The NMFS process for completing an internal section 7 is not accurately described in this section, and there may not be any consultation by USFWS for this HCP.
- (7) **Chapter 1 Comment, NEPA:** In the section regarding the *National Environmental Policy Act*, NMFS recommends this chapter only discuss the general process and not include specific dates and information regarding the NMFS NEPA document. The district will need to finalize the HCP prior to NMFS completion of the NEPA environmental review.
- (8) **Chapter 1 Comment, Covered Species:** The document does not clearly state the Covered Species. Are both CCC steelhead and fall-run Chinook salmon proposed for inclusion as Covered Species in the HCP?
- (9) **Chapter 1 Comment, Goals and Objectives:** Pursuant to the NMFS/USFWS Five Point Policy, HCPs must contain biological goals and objectives that clarify the purpose and direction of the conservation program and measures. Section 1.7 of Chapter 1 describes district institutional goals. The relationship of the district's goals to the HCP's biological goals/objectives for Covered Species is not clear.
- (10) **Chapter 1 Comment, HCP's Technical Foundation:** Chapter 1 should include a section which briefly describes the development of the HCP, including the parties involved and the technical foundation. There should be an overview of the data collected, scientific information compiled, and any technical reports that were generated during the formulation of the HCP's conservation strategy and measures.
- (11) **Chapter 2 Comment, Environmental Setting:** Chapter 2 provides a limited and unbalanced description of the physical and biological resources in the study area. For example, the *Hydrologic Setting* section of Chapter 2 consists of 14+ pages of text and figures, while the *Biological Setting* consists of 6 pages. The hydrologic information presented in the chapter focuses on channel conditions and intermittent flows in stream reaches downstream of existing dams, and the only discussion regarding perennial flows conditions in upper watershed areas occurs briefly in the section on the Coyote Creek Watershed. If the goal of this chapter is to "characterize the historic and current habitat conditions of the covered species to provide context

for proposed habitat conservation", it is important that there be discussion of the conditions in upper watershed reaches that historically supported the Covered Species.

(12) Chapter 2 Comment, Setting and Biological Resources: A significant problem with Chapter 2 relates to the selective presentation of hydrologic, physical, and biological information. Although there are major habitat problems in the HCP study area, the chapter presents a very negative view of conditions for salmonids and omits information regarding the positive habitat attributes within the watersheds. For example, pages 2-18 and 2-19 summarize conditions in the Guadalupe River Watershed and the closing paragraph states "Overall, the quality of the rearing habitat in the Guadalupe River is rated as poor. Thirty percent of the Guadalupe River was rated as having no rearing habitat and 52% was rated as having poor". This information, from the 2000 habitat inventory report prepared by Entrix, is correct for the Guadalupe River, but the same report also states that in Alamitos Creek "habitat conditions are favorable, and suitable rearing conditions are present based on physical habitat conditions" (SCVWD 2000). For Guadalupe Creek, SCVWD (2000) reports the stream contains approximately 3.8 miles of "good quality rearing habitat for juvenile salmonids".

Steelhead have developed a life history strategy that allows for migration from the ocean (*i.e.*, San Francisco Bay) through intermittent stream reaches during the winter months, and they utilize creeks in headwater areas with perennial flows for spawning and summer rearing. Prior to the development of the Santa Clara Valley, the mainstem Guadalupe River likely provided marginal hydrologic conditions in the summer/fall months and relatively poor quality rearing habitat for steelhead. Alamitos Creek, Guadalupe Creek and Los Gatos Creek in the Guadalupe Watershed were historically (and currently) the areas with the highest value freshwater steelhead habitat and the HCP's conservation program should embody this steelhead life history strategy. The selective presentation of information in Chapter 2 creates an incomplete view of the conditions and salmonid habitat potential in these watersheds. Chapter 2 should be revised to reflect the full range of conditions in the HCP's study area.

- (13) **Chapter 2 Comment, Steelhead in the Study Area:** The description of steelhead in *Study Area Species Summary* is lacking information regarding the district's fisheries sampling and research, as well as, the results of the biological investigations conducted for the FAHCE program. This section needs a more complete description of the status of steelhead in the study area.
- (14) **Chapter 3 Comment, Effects Analysis:** The chapter title included "effects analysis", but the chapter text is limited to an overview of the district's county-wide facilities and covered activities. NMFS suggests that "effects analysis" be removed from the chapter heading.
- (15) **Chapter 3 Comment, Scope of Covered Activities:** Portions of sections 3.1 and 3.2 describe county-wide facilities which are not part of the Three Creeks HCP. Inclusion of the district's county-wide facilities and operations may provide some context for the Covered Activities within the Three Creeks HCP, but it can also lead to some confusion. NMFS suggests that discussion of district facilities that are not Covered Activities be removed from the chapter, or text be added throughout sections 3.1 and 3.2 to clarify which facilities are not part of the HCP.

- (16) Chapter 3 Comment, Relationship to Other District Programs: Within Chapter 3, there are references to the district's Stream Maintenance Program, Pipeline Maintenance Program, and Dam Maintenance Program. The relationship between these on-going programs and proposed Covered Activities should be clarified.
- (17) Chapter 3 Comment, Seismic Safety Retrofit Projects: The chapter is not clear regarding the inclusion of seismic retrofit activities at district dams. On page 1-9 in Chapter 1, the document states "seismic safety retrofit activities" are included in the HCP. However, on page 3-6 in Chapter 3 the proposed covered activity appears to be limited to "... water supply operations during seismic safety retrofits of three of those dams...". Is the district proposing that the Three Creeks HCP only address water operations during three seismic safety retrofit projects (*i.e.*, Guadalupe Dam, Almaden Dam and Calero Dam) and not address the other components of these three retrofit projects. Tables in Chapter 3 also make references to "non-routine dam retrofit change to releases (dewatering releases)" at three additional dams: Stevens Creek Dam, Lexington Dam, and Coyote Dam. Do Covered Activities include seismic safety projects at these dams, too? For purposes of planning, analysis, and development of conservation measures, all aspects of the seismic retrofit projects need to be addressed by the district for Covered Species. If the district proposes to include water operations during seismic safety retrofit projects, the other aspects of the retrofit projects should also be included as Covered Activities in the HCP.
- (18) Chapter 3 Comment, Anderson Dam Retrofit Project: Chapter 3 identifies a fourth dam seismic safety retrofit project at Anderson Dam, but indicates this project is not included in the Three Creeks HCP because "that activity is being covered by an ESA Section 7 consultation." NMFS has not been contacted by any federal agency regarding consultation for the Anderson Dam seismic project. We recommend the district and the federal action agency initiate coordination with NMFS as soon as possible to identify potential conflicts with listed species and develop appropriate conservation measures. As discussed with the district at the December 14, 2011, meeting of partners to the Statements of Understanding Central California Coast Steelhead Recovery Program, draft recovery actions are proposed for steelhead at Anderson Dam and for Coyote Creek.
- (19) Chapter 3 Comment, Almaden Dam Retrofit Project: Chapter 3 indicates that the seismic safety retrofit project for Almaden Dam will be completed between 2015 and 2017. If Almaden Dam is scheduled to be completed prior to the Anderson Dam retrofit project (estimated to be completed between 2016-2018), shouldn't Almaden Dam also be addressed through an ESA Section 7 consultation?
- (20) **Chapter 3 Comment, Interim Storage Restrictions:** Regarding interim storage restrictions (ISR) established by the Division of Safety of Dams, Chapter 3 describes ISRs at four district facilities: Coyote Reservoir, Guadalupe Reservoir, Almaden Reservoir and Calero Reservoir. Are Covered Activities limited to these four existing ISRs?
- (21) **Chapter 3 Comment, Facilities Descriptions:** Chapter 3 presents an excellent overview of facilities and their general operations by watershed, but lacks the details required to assess

potential impacts and define the range of operations included under the HCP's Covered Activities. NMFS recommends the district prepare a document which can serve as an appendix to the HCP with the specifications of each covered facility and the range of its operation. The appendix would include modeling results that present the monthly (or daily, if possible) operation of each facility under various water year types (wet, above normal, normal, below normal, and dry).

- (22) Chapter 3 Comment, Water Rights and Operations: For several facilities, the Instream Covered Activities section defines the district's water right and permitted season of diversion. For example, Masson Dam is described as a water diversion not to exceed 0.77 cfs from October 1 to May 1. However, the Masson Diversion has a larger capacity than 0.77 cfs and may operate year-round. Chapter 3 (or an appendix, see comment #21 above) needs to fully describe the operation of each diversion facility included as a Covered Activity.
- (23) Chapter 3 Comment, Ford Road Percolation Facility: Page 3-23 of Chapter 3 mentions four groundwater recharge systems in the Coyote Creek Watershed. Three of these are existing facilities (i.e., Upper Penitencia, Overfelt, and Coyote percolation ponds) and are described in more detail later in the chapter. The fourth facility, Ford Road, is not an existing facility and is not describe further in Chapter 3. Is the future Ford Road percolation facility proposed for inclusion as a Covered Activity?
- (24) Chapter 3 Comment, Water Right for Coyote Percolation Pond: Page 3-25 refers to the district's water right appropriation for diversion of 5,000 acre-feet at the Coyote Percolation Pond system near Metcalf Creek from April 1 to December 15. Since this diversion season extends over the driest months of the year (*i.e.*, April to mid-December) and the location is downstream of Anderson Dam with no sizeable upstream tributary inputs, what is the source of the 5,000 acre-feet water appropriation at this site?
- (25) Conservation Program Framework: The lack of detail in this table and Chapters 1-3 regarding the HCP's conservation program make it difficult to provide comments on the conservation program framework presented in Submittal #1. There is a link between category of Covered Activities (i.e., reservoir operations, instream operations, etc.) and the framework's conservation measures, but overall the conservation strategy is unclear. Pursuant to the June 2000, addendum to the USFWS/NMFS HCP Handbook "5-Point" policy, the HCP must include clearly defined biological goals and objectives. Biological goals serve as broad, guiding principles for the Plan's conservation program. Biological objectives will serve as a target condition to be met or as a change to be achieved relative to the existing condition. Creeks HCP conservation measures should be based upon the HCP's biological goals and objectives; and the biological goals and objectives are the rationale behind the HCP's conservation strategy. It is critical that the District, in coordination with NMFS, develop explicit biological goals and objectives to clarify the purpose and direction of the operating conservation program. Based on the information provided in this framework, NMFS cannot determine if the HCP's conservation program will provide a high probability that aquatic habitat functions essential to the species' long-term survival will be achieved and maintained during the term of the permit while allowing for incidental take.

We look forward to continuing our work with the district on the Three Creeks HCP. Please contact Gary Stern of my staff at 707-575-6060 if you have questions regarding these comments and for further coordination on this project.

Dick Butler

North Central Coast Office Supervisor Protected Resources Division

cc: Debra Caldon, SCVWD Craig Weightman, CDFW

#### References

Santa Clara Valley Water District . (2000). Stream Habitat Inventory Summary Report for the Fisheries and Aquatic Habitat Collaborative Effort, Draft Report. Sacramento, CA: Entrix, Inc. (Project 552301). 74 pp.

# Three Creeks HCP Milestone Schedule & Dashboard: FY2013 – FY2015 July 15, 2013

Gauge	Milestone	WHO/Agency
В	<b>March 29</b> – Submittal #1 to NMFS and CDFW: Introduction, setting and covered activities of draft HCP; Preliminary Effects; Conservation Program Framework; milestone schedule and process for reviews and permit negotiations; draft interagency agreement; cover letter. <b>COMPLETED</b>	B. Dyer/D. Caldon – District
В	<b>April 30</b> – All parties concur on milestone schedule and process for agency reviews and permit negotiations <b>COMPLETED</b>	D. Butler/C. Yates – NMFS S. Wilson – CDFW J. Fiedler - District
R	May 31 – NMFS and CDFW provide comments on submittal #1 COMPLETED – CDFW on 5/30/13; NMFS on 6/25/13	G. Stern – NMFS T. Schane - CDFW
Y	August 31 – NMFS and District finalize interagency agreement (planning agreement and EIS/EIR roles and responsibilities, decision-making protocols) COMPLETED – CDFW on 5/30/13; Substantive NMFS comments rec'd 6/6/13	D. Butler/C. Yates – NMFS B. Goldie – District
G	October 1 – Submittal #2 to NMFS and CDFW: Effects analysis; compliance monitoring; operations-related adaptive management, conservation measures	B. Dyer/D. Caldon – District
G	<b>December 1</b> – NMFS and CDFW provide comments on submittal #2	G. Stern – NMFS T. Schane - CDFW
G	<b>January 31 (2014)</b> – Submittal #3 to NMFS and CDFW: Biological monitoring; biological adaptive management; quantification of take; plan implementation.	B. Dyer/D. Caldon – District
G	March 31 (2014) – NMFS and CDFW provide comments on submittal #3	G. Stern – NMFS T. Schane - CDFW
G	July 31 (2014) – Admin Draft NEPA and CEQA documents completed	B. Dyer/D. Caldon – District S. Mendez - NMFS
G	October 31 (2014) – Public Draft HCP, NEPA and CEQA documents circulated for comment	B. Dyer/D. Caldon – District G. Stern/S. Mendez – NMFS
G	April 30 (2015) – Responses to Comments	B. Dyer/D. Caldon – District G. Stern/S. Mendez – NMFS
G	December 31 (2015) - Final HCP, NEPA and CEQA documents	B. Dyer/D. Caldon – District G. Stern/S. Mendez – NMFS

#### KEY:

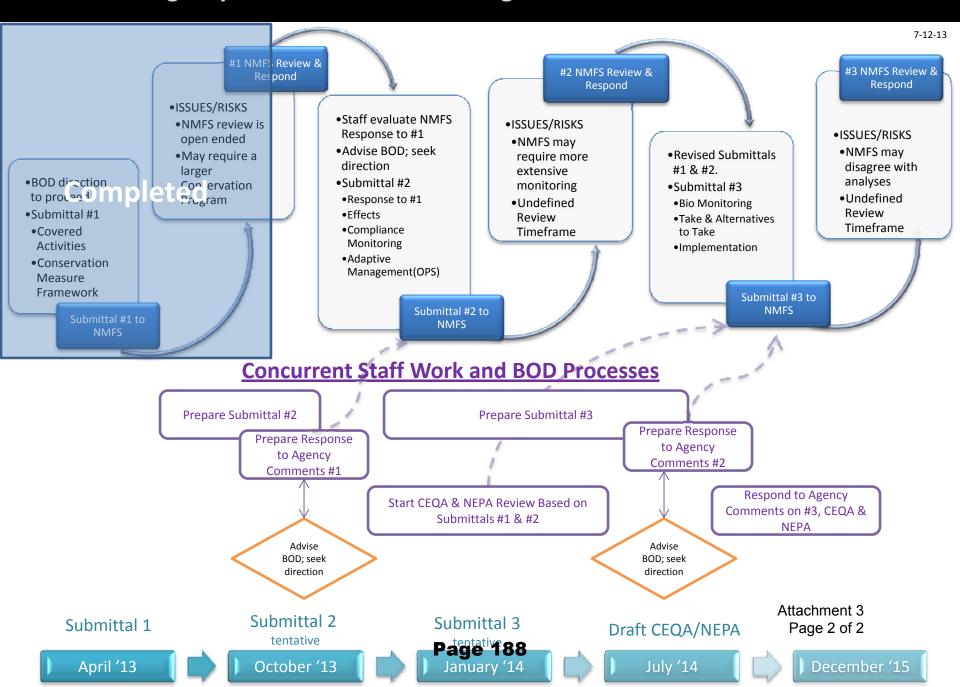
- = Item is on track to be completed in a timely manner, per latest schedule
- = Item may be in jeopardy of meeting schedule (e.g., task started late, guidance needed, personnel changes)
- = Item will (or has already) missed scheduled date for completion
- = Item has already been completed

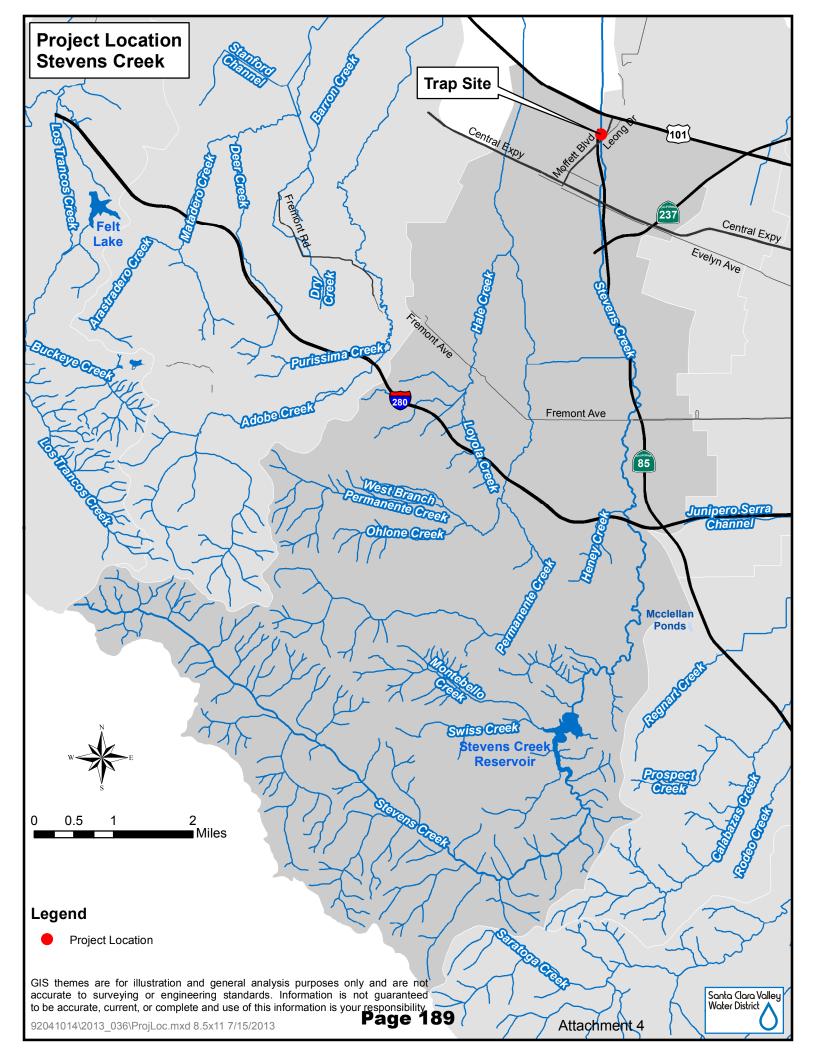
NOTE: All dates are dependent on 1) timely agreement on schedule and process (2<sup>nd</sup> milestone) by <u>all parties</u>; and 2) timely completion of all preceding tasks.

Revision #: 3

LAST REVISED: July 15, 2013

# Overview of Agency Review and Iterative Negotiation Process for Three Creeks HCP





# This Page Intentionally Left Blank



Meeting Date: 10/21/13

Agenda Item No.: 5.2

Staff: Michele King

E-mail: mking@valleywater.org

Committee: Environmental

#### **ADVISORY COMMITTEE AGENDA MEMO**

**SUBJECT:** Presentation of the Advisory Committee Ad Hoc Committee's Draft Phase II Improvement

Recommendation Report

#### **RECOMMENDED ACTION:**

Receive information on the Draft Phase II Improvement Recommendation Report and provide comment to the Advisory Committee Ad Hoc Committee, as necessary.

#### **POLICY RATIONALE:**

#### **Governance Process Policy-8:**

The District Act provides for the creation of advisory boards, committees, or commissions by resolution to serve at the pleasure of the Board.

Accordingly, the Board has established Advisory Committees, which bring respective expertise and community interest, to advise the Board, when requested, in a capacity as defined: prepare Board policy alternatives and provide comment on activities in the implementation of the District's mission for Board consideration. In keeping with the Board's broader focus, Advisory Committees will not direct the implementation of District programs and projects, other than to receive information and provide comment.

Further, in accordance with Governance Process Policy-3, when requested by the Board, the Advisory Committees may help the Board produce the link between the District and the public through information sharing to the communities they represent.

The Board may also establish Ad-hoc Committees to serve in a capacity as defined by the Board and will be used sparingly.

	Policy Review
$\boxtimes$	Policy Implementation

#### **SUMMARY:**

Advisory Committee Ad Hoc Committee members will provide a report on the progress the Committee is making on the review of the Board Advisory Committee functions, purpose and structure. The Ad Hoc Committee will present the draft Phase II Report for information and feedback.

#### ATTACHMENT(S):

Attachment 1: Draft Phase II Improvement Recommendation Report

# This Page Intentionally Left Blank



# **ADVISORY COMMITTEE AD HOC COMMITTEE**

Phase II Improvement Recommendation Report
September 12, 2013

#### ADVISORY COMMITTEE AD HOC COMMITTEE

#### **Phase II Improvement Recommendation Report**

#### I. <u>INTRODUCTION</u>

See better, Lear; and let me still remain
The true blank of thine eye.
- King Lear, William Shakespeare

For Santa Clara Valley Water District (District), avoiding outcomes like the tragedy that struck King Lear means avoiding his crucial mistake – a failure to seek out and listen to good advice. The District Board of Directors (Board) has a governance policy and process for using Board Advisory Committees (Advisory Committees) to seek meaningful policy-level advice from the community and to serve as a link to help the broader community learn about and participate in the District's goals. However, it has been clearly communicated to this Board Advisory Committee Ad Hoc Committee (Ad Hoc Committee) that the Advisory Committees have lacked opportunity to provide meaningful input on substantive issues up for consideration by the Board.

In February 2013, the Ad Hoc Committee was formed by the Board to address this issue. Working together with Advisory Committees, the Ad Hoc Committee identified key problems to "providing meaningful input" and documented the problems in its Phase I Report.

This Phase II Report recommends changes and/or improvements to strengthen the Advisory Committees' ability to provide meaningful policy-level advice to the Board and to serve as a link to the broad community, therefore addressing the feedback received from the Advisory Committees. Additionally, given the substantial costs of staff supporting the Advisory Committees, the total cost of the Advisory Committee system after changes should not increase.

#### II. APPROACH

The Ad Hoc Committee organized the problems identified in the Phase I Report into two categories: organizational problems and procedural problems (Table 1), and developed improvement recommendations for each category independently.

Identified organizational problems are categorized based on the concerns received relating to the committees' purpose, duties, and organization. The identified procedure problems are categorized based on meeting effectiveness, process, and staff support costs.

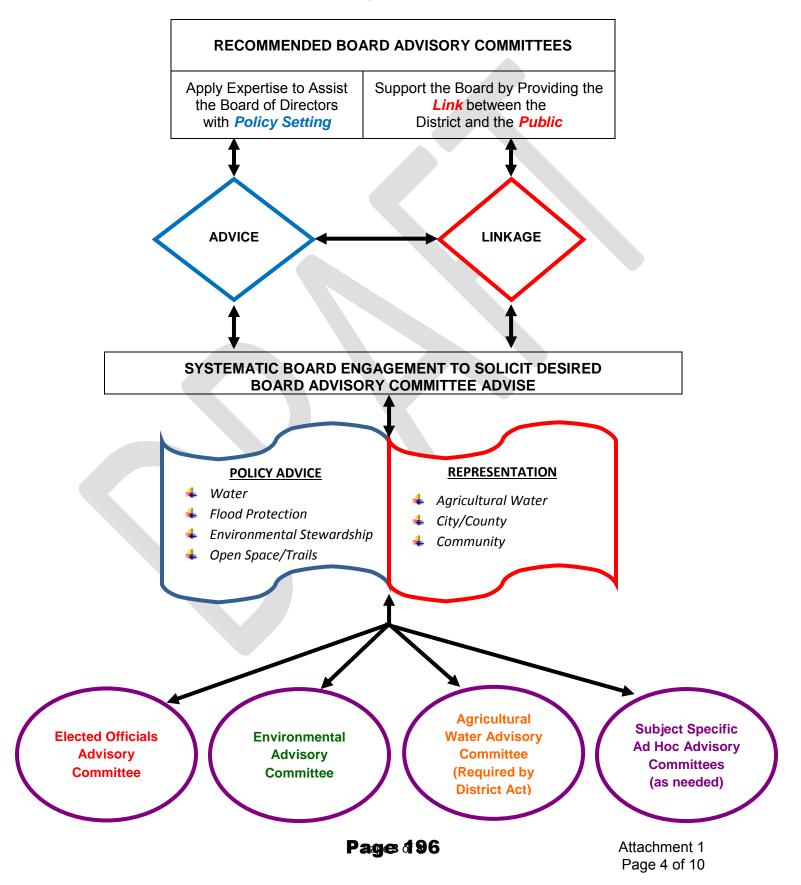
TABLE 1

CATEGORIZATION OF PROBLEMS IDENTIFIED IN PHASE 1 REPORT

Themes	Problems (see Phase 1 Report for Details)	ORGANIZATIONAL PROBLEM	Procedure Problem
Not clearly communicated to committee members			<b>✓</b>
Purpose of	Board is not clear about the purpose	✓	<b>✓</b>
Committee	Changed over time	✓	
	No orientation		✓
	Limited opportunity to provide meaningful advice	✓	
	One-way (receiving) communication	✓	
Duties of Committee	Allowed to provide advice on Ends Policy only	✓	
	Expertise of committee members	✓	
	Unclear representation of committee members	✓	
	Members appointed by city governments on multiple advisory committees	✓	
	No appointments from County to FPWACs for 2 years	✓	
Organization of Committee	Roles of Committee Chair, supporting staff, and Board members attending Advisory Committee meetings		<b>~</b>
	Communication with Board members		<b>✓</b>
	Inflexible and limited meeting schedules		✓
	Brown Act restrictions		<b>→</b>
Effectiveness of Committee	Utilization of subcommittees		<b>√</b>
	Extended lead time resulted from agenda process		<b>√</b>
Costs of Committee	Value gained from annual investment of approximately \$562,000 to support committee operation		<b>√</b>

#### III. ORGANIZATIONAL IMPROVEMENTS

Summarized in the following chart are the organizational improvements recommended by the Ad Hoc Committee. This recommendation is based on analyses documented in Sections III.A, III.B, III.C, and III.D.



#### A. Flood Protection and Watershed Advisory Committees and Water Commission

#### Alternatives A and D are the recommended alternatives

The Ad Hoc Committee, in recommending improvements, evaluated the five Flood Protection and Watershed Advisory Committees (FPWAC) and the Water Commission together because: 1) Majority of the organizational problems shown in Table 1 were raised by these committees, and 2) Many members of these committees currently serve on multiple committees.

The FPWACs and Water Commission are standing committees with purposes that are either too wide (not focused on a particular well-defined topic that would benefit most from the committees' expertise) or too narrow (not encompassing the entire county or involving a subject matter that has insufficient new developments to require regular meetings). Advisory Committees that worked well in the past have become outdated. These Advisory Committees need to be evaluated and reconsidered for current needs of the District and its Board. Then, it will be the responsibility of the Board, with the assistance of the Advisory Committees, to ensure that the Advisory Committees are asked to provide advice relevant to their purposes and expertise and to serve as the link between the District and the community they represent.

Summarized in Table 2 are the four improvement alternatives developed and evaluated by the Ad Hoc Committee in consultation with District staff, Chairs and members of the committees.



TABLE 2
IMPROVEMENT ALTERNATIVES

	Alternative	Structure	Membership	Expertise And Representation	Committee Responsibility	Evaluation	
A - One Standing Committee	Elected Official Advisory Committee	dvisory Commission and appointed by		Local governments and their communities	Advises the Board on policies requiring intergovernmental efforts  Example: Land use near creek corridor, water charges, recycled water public education	Addresses most problems	
g Committees	B1. FPWAC	Combine the 5 FPWACs	Representatives appointed by Cities, County and at-large members appointed by board members	Local governments and their communities	Advises the Board on flood protection policies requiring intergovernmental efforts. Example: Land use near creek corridor	Not efficient; the same	
B - Two Standing	B2. Water Commission	Maintain the Water Commission	Representatives appointed by Cities/County	Local governments and their communities	Advises the Board on water supply policies requiring intergovernmental efforts.  Example: Water charges, recycled water public education	appointed members likely will be on both committees	
Two Standing Committees	C1. Elected Official Advisory Committee	See Alternative A above	See Alternative A above	Local governments and their communities	See Alternative A above	Not effective as expertise and representation of atlarge members are	
C - Two Comn	C2. Citizen Advisory Committee	New committee	At-large members appointed by board members	Community at-large	Same as C1 above	difficult to identify, additionally it may duplicate the existing EAC responsibility	
D - Ad Hoc Advisory Committees	Committees as needed developed developed, and generally at-la appointments.		Per Procedures to be developed, and generally at-large appointments.	Directly related to the specific policy	Advises the Board on specific policies as needed.  Examples:  Homeless Encampments  Shoreline Protection/ Restoration  Bay Delta Fish Barrier Removal  Water Conservation	A flexible structure that is more equipped to work on specific and time sensitive issues and to complement standing committees	

#### **B.** Landscape Advisory Committee

#### Alternative A is the recommended alternative.

The Landscape Advisory Committee is a standing committee with a purpose that is technical in nature. Committee members' expertise is more directly connected with staff's work. The Committee will be more effective if it is changed to become a staff-level advisory committee.

Summarized in Table 3 are the two improvement alternatives developed and evaluated by the Ad Hoc committee in consultation with Water district staff, Chairs and members of the Landscape Advisory committee.

TABLE 3
IMPROVEMENT ALTERNATIVES

		Expertise And Representation	Committee Responsibility	Evaluation		
A – One Staff Advisory Committee	Staff Level Advisory Committee	Refer to staff and current committee	Refer to staff and current committee	Refer to staff and current committee	Refer to staff and current committee	Addresses problem of the existing structure and would fully utilize industry expertise
B - One Standing Board Committee	Water Conservation Advisory Committee	Expand the purpose of LAC to become a water conservation advisory committee				Does not address the identified problem, and may even worsen the problem. In the event when the Board needs advice on water conservation issues, either the Elected Official Advisory Committee or an Ad Hoc Advisory Committee (formed for the specific issue) will be a more effective body to perform the responsibility than a standing water conservation advisory committee.

#### C. Environmental Advisory Committee

#### No organizational change to the EAC is recommended.

The Environmental Advisory Committee is a standing committee with a purpose of providing advice to the Board on policies related to environmental restoration and enhancements. The committee did not raise any organizational issues during the problem definition phase; instead it raised many procedural issues.

#### D. Agricultural Advisory Committee

The Agricultural Advisory Committee is a standing committee and is mandated by the District Act. It is not included in the scope of this project. The Ad Hoc Committee noted that the membership of Agricultural Advisory Committee cannot be expanded to include urban agriculture representation, unless the District amends the District Act.

#### IV. PROCEDURAL IMPROVEMENTS

A number of procedural issues also hinder the committee's effectiveness. Some issues may be resolvable; others may be inherent to the governmental advisory process. This is an ongoing process and will be subject to refinement and ongoing improvement.

The Ad Hoc Committee recommends the following procedural improvements to make the committees more effective.

- Orientation
  - 1. For committee members
  - 2. For chairs/vice chairs

#### Meeting Process

- 1. Committee chairs have authorities to add items to the agenda, to invite speakers for any agendized item, and controls time limits of speakers, subject to District and Brown Act restrictions and reasonable notification time for Clerk's office. Staff support may not be available for items and speakers added by the chairs.
- 2. No formal subcommittees will be recognized, but committee members will be encouraged to work together informally outside of meetings, subject to Brown Act restrictions against serial meetings.
- 3. Any meeting in which all items on agenda are informational only will be cancelled.
- 4. Include a "draft agenda for next meeting" standing item on the agenda for the committee to better determine whether it wants to make changes or get clearer direction from the Board as to what recommendations are needed.
- 5. All committee recommendations will be reported out as information item (not for action) at the Board meeting immediately following the committee meeting.

#### Meeting Frequency

1. For each committee, meeting frequency should be determined by the committee's purpose and Board requested advice (annual work plan) with a minimum of one meeting per year.

- Committee Member Attendance
  - 1. Orientation will include understanding of the need to attend scheduled meetings.
- Support Committee Members to Link District Goals, Objectives and Activities to Their Represented communities
  - 1. Provide written summary of meetings material to committee members
  - 2. Encourage committee members to report on their own activities or the agency/organization they represent that pertain to the committee's purpose

#### V. <u>CONCLUSION</u>

Get thee glass eyes;
And like a scurvy Politician, seem
To see the things thou dost not.
- King Lear

Scurvy politicians may look for things that are not there, but good politicians ask for good advice on what they need to see and do. This Phase II Report seeks solutions to help us get that advice. We recognize that as with previous efforts, this will not solve all problems, but we hope these solutions will be a basis for good advice and link to the public that supports the happy, vibrant, and sustainable communities that are the goals of the Santa Clara Valley Water District.

# This Page Intentionally Left Blank



Meeting Date: 10/21/13

Agenda Item No.: 5.3

Staff: Rick Callender

E-mail: rcallender@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

SUBJECT: Discuss California Environmental Quality Act (CEQA)

#### **RECOMMENDED ACTION:**

Conduct a policy review and prepare policy alternatives for Board consideration.

#### **POLICY RATIONALE:**

	Policy Review
$\boxtimes$	Policy Implementation

This item is based on Board Policy EL-7.8, which states: "A BAO shall obtain the concurrence of the Chair of the Board of Directors, or the Chair's designee, prior to communicating a position on legislation." and "A BAO shall inform the Board regarding positions on legislation communicated on behalf of the District no later than the next regularly scheduled Board of Directors meeting."

#### **SUMMARY:**

Each year, the District's Board reviews and adopts legislative policy proposals and legislative guiding principles, which form the foundation for advocacy efforts at the local, regional, state, and federal levels. Based on these Board-adopted proposals and guiding principles, the Office of Government Relations (OGR) ensures that the District plays an active role in influencing the outcome of numerous legislative and budgetary items of interest to and/or that affect the District, using the guiding principles as the driver for those efforts.

Last year, in an acknowledgement that the State legislature might soon undertake an effort to modify the California Environmental Quality Act (CEQA), the Board adopted a new guiding principle under the category of "Enhance the quality of life through the protection and enhancement of watersheds, streams, and natural resources," that states: "Support CEQA reform." This action follows on staff's engagement on the issue through the American Planning Association and the Association of Environmental Professionals, who formed the Enhanced CEQA Action Team (ECAT).

Subsequently, OGR staff polled District staff to determine what, if any, CEQA reforms should be pursued and/or supported at the state level that would benefit the District. Staff from throughout the District in all three divisions responded to the poll, including biologists, environmental planners, unit managers, District Counsel staff, and staff from facilities, water treatment plants, and vegetation management. The poll revealed broad support for retaining CEQA's baseline authority and purpose of describing the impacts associated with a project, and for the framework to provide mitigation measures for identified impacts. However, those polled also identified the following challenges with the current law in conducting the District's business:

- 1. Thresholds for identifying impacts are overly complex, uncertain, and variable, which results in inconsistent and unnecessarily time-consuming impact analyses.
- 2. Timelines for environmental analyses are long and highly variable.

- 3. Categorical, statutory, and ministerial exemptions are too few and too narrowly interpreted, and should be expanded to cover more minor, routine activities.
- 4. CEQA is rife with litigation issues, most notably in terms of identification of impact issues very late in the process. Furthermore, Mitigated Negative Declarations (MNDs) don't typically stand up to the fair argument test, commonly leading agencies to pursue a costlier, more time-consuming Environmental Impact Report (EIR) for reasons more linked to risk aversion than to CEQA's intended purpose.
- 5. CEQA does not facilitate creative mitigation for regional impacts such as greenhouse gas emissions or climate change.

After analysis of both the ECAT team's "Summary of Concepts Recommended for Updating and Enhancing CEQA," published in January, and staff's suggested solutions submitted through the District-wide poll, staff believes that specific improvements could be made to CEQA that could minimize and/or eliminate the identified challenges:

- To address the threshold issue, external benchmarks could be established that could be applied to
  projects by CEQA practitioners, thereby minimizing the variability and inconsistency in environmental
  analyses. These benchmarks could serve a dual purpose of simplifying thresholds, which could also
  shorten processing timelines for preparation of the appropriate environmental analysis as it would
  minimize interpretation and uncertainty in weighing impacts against previously mercurial thresholds.
- 2. Timelines for preparation of CEQA analyses could be shortened through a) streamlining of the overall preparation process, b) establishing time limits within which discovery and litigation can occur under CEQA, c) establishing a "fast-track" for certain types of projects, and/or d) expanding the list of projects that could qualify for CEQA exemptions.
- 3. As mentioned in #2, the list of projects that qualify for CEQA exemptions could be expanded to include minor, routine activities.
- 4. The substantial evidence test could be used in place of the fair argument test for MNDs (which are much stronger documents now than when CEQA was first introduced), which could prevent the unnecessary preparation of an EIR when an MND suffices.
- 5. CEQA could be modified to expressly encourage agencies to exercise creativity in addressing regional impacts, perhaps through the implementation of a set of guidelines established by a team of CEQA practitioners and other stakeholders.

As CEQA is a state law, any modification thereof requires an act of the State Legislature. Typically, the District pursues one of two routes for such a modification: 1) the District can seek an author and sponsor its own legislation, or 2) the District can support amendment efforts either planned or already underway in the Legislature.

As the EAC may already be aware, the Legislature ended the last legislative session with a last-minute push to reform CEQA that failed. The reform effort was then taken up by Senator Rubio, who shepherded a bill through until he resigned from the Legislature, at which point that effort, along with most of the remaining CEQA bills, ceased to exist. One exception is Senate Bill 731 (Steinberg), which provides minimal reform to CEQA and mostly addresses the proposed Sacramento Kings arena project. It is rumored, however, that CEQA reform will be taken up in later in the legislative session.

Because CEQA reform is a sensitive, critical, statewide issue that is likely to garner both support and opposition by a wide variety of stakeholders depending on what is proposed, staff recommends that the District continue to monitor any CEQA reform efforts proposed by the Legislature, and recommend that the Board take positions of support (or opposition) on CEQA reform bills based on whether they accomplish the reforms identified above while preserving CEQA's original authority and intent, as they are introduced and make their way through both houses of the Legislature.

#### ATTACHMENT(S):

Attachment 1: 2013 Legislative Guiding Principles





### Enhance the quality of life through the protection and enhancement of watersheds, streams, and natural resources

In order to protect and enhance the environment and improve the health of our watersheds, the District advocates for legislation which accomplishes the following:

- Support legislation that facilitates the cleanup of illegal encampments.
- Support CEQA reform.
- Support legislative efforts to eliminate or reduce the waste stream entering our waterways.
- Support legislation and policies that address mercury contamination in local waterways.
- Support protection of funding for improving the integrity of Delta levee systems.
- Support legislation that protects the environment through conservation and the preservation of natural resources, habitat, and improving the health of local watersheds.
- Support funding to address climate change impacts on water supply and flood management facilities and infrastructure needs.
- Support legislative efforts to prohibit/prevent abandonment or derelict operation of vessels in navigable waterways.
- Support exempting public agencies from requirements to establish escrow or endowment accounts to fund maintenance of mitigation sites.
- Promote a regulatory environment that allows and encourages special districts and municipalities to achieve local, state, and national water conservation and environmental goals.

# Encourage opportunities for job creation, and the protection and stability of the District's workforce

Responding to the economic downturn, the District has reduced our workforce and continues to reduce costs. Supporting the creation of local jobs, ensuring a well trained workforce to carry out the District's mission while containing costs continue to be priorities. In order to support opportunities for job creation, and the protection and stability of the District's workforce, we will advocate for legislation which accomplishes the following:

- Oppose legislation that reduces the authority and/or ability of local government to determine how best and most effectively to operate local programs, secure facilities, and provide services.
- Support transparency and accountability for local government.
- Support workforce training, job creation, and research and development efforts.
- Promote policies that provide a more sustainable and cost-effective delivery of workers compensation benefits for injured District employees.
- Protect and support legislative efforts that curb and/or control the escalating cost of employer-provided healthcare.
- Oppose legislation that interferes with the employer/employee relationship or places employees at risk while performing their duties.



The District protects and enhances the environment and improves the health of our watersheds.





Serving 1.8 million people living and working in Silicon Valley, the Santa Clara Valley Water District is the primary water resources agency for Santa Clara County, California.

The District acts not only as the county's water wholesaler, but also as its flood protection agency and the steward for its watersheds, streams and creeks, underground aquifers and District-built reservoirs. As the county's water wholesaler, the District makes sure there is enough clean, safe water for the county's residents. As the agency responsible for local flood protection, the District works diligently to protect Santa Clara Valley homes, schools, roadways, and businesses from the devastating effects of flooding. Our watershed and stream stewardship responsibilities include protection and restoration of habitats, and protection of endangered species in connection with carrying out the purposes of the District Act.

To support our efforts in managing critical water issues, the District advocates for legislation that advances our key guiding principles:

- Protect revenues, enhance revenues, and contain costs
- Ensure a reliable supply of healthy, clean drinking water
- Reduce the potential for flood damages
- Enhance the quality of life through the protection and enhancement of watersheds, streams and natural resources
- Encourage opportunities for job creation, and the protection and stability of the District's workforce



In managing critical water issues, the District advocates for legislation that advances our key guiding principles.





PAGE 4 • LEGISLATIVE GUIDING PRINCIPLES 2013

Page 205

Page 205



### Protect revenues, enhance revenues, and contain costs

The District's multiple responsibilities are supported by a diverse array of funding sources. As we continue to trim our operational budget while meeting the infrastructure needs of our complex water system, the District will advocate for legislation that accomplishes the following:

- Oppose efforts to eliminate local agencies' ability to issue tax-exempt bonds and Certificates of Participation.
- Support reducing the voting requirement for special taxes.
- Oppose efforts to reallocate property taxes among state and local agencies.
- Support the California Water Commission engaging Congress and the federal government in supporting the completion of projects in Santa Clara County.
- Support state and federal funding for key infrastructure efforts, including funding for local projects and a Bay-Delta solution.
- Protect local government revenues by maintaining local authority over the collection of fees and generation of revenues.
- Oppose the imposition of unfunded mandates.
- Support the voluntary realignment of services.
- Clarify groundwater charges and language.
- Support exemptions for stormwater and flood protection fees.

# Ensure a reliable supply of healthy, clean drinking water

Water is a finite resource that must be protected. As the water wholesaler for our county, our ability to deliver a reliable, clean water supply for one of the country's most important technology communities continues to be challenged by a multitude of factors. The District will advocate for legislation impacting our water supply that accomplishes the following:

- Support efforts that encourage the use of recycled water for indirect/direct potable use.
- Support strengthening local agencies' ability to manage and protect groundwater supplies.
- Support efforts to streamline the permitting of water recycling projects, taking into account the need to protect high-quality groundwater basins.
- Support efforts to address all Delta stressors, including toxics, invasive species, and in-Delta and upstream diversions.
- Oppose measures that reduce the reliability or quality of the District's imported water supplies.
- Support funding for boating inspections and other measures to prevent the spread of invasive mussels.
- Support legislative efforts that better integrate water resources in the land use and decision-making process. (continued)



Our ability
to deliver a
reliable, clean
water supply
continues to be
challenged by a
multitude of factors.







# Drinking water (continued)

- Support increasing water use efficiency throughout the state, while taking into account previous water use efficiency investments.
- Support legislation that provides for the reliability of operations of state and federal water projects.
- Support funding for planning and environmental review of new Delta conveyance facilities.
- Support funding to ensure sustainable long term water supplies, including recycled water projects.
- Oppose weakening the State Water Resource Control Board's anti-degradation policy.
- Support efforts to amend the Clean Water Act consistent with our mission.
- Support efforts to establish a Dry Cleaner Fund to prevent groundwater contamination.

## Reduce the potential for flood damages

Silicon Valley's waterways pass through areas populated by homes, schools, and businesses. When our roadways flood, the ensuing loss in productivity easily runs into millions of dollars; this is in addition to the physical infrastructure damage. Additionally, our shoreline area, which is vulnerable to tidal flooding, requires investments in levee maintenance and repair, and houses a number of Silicon Valley Fortune 500 businesses.

To maintain and expand the flood protection infrastructure necessary to prevent flooding and resulting damages, the District advocates for legislation which accomplishes the following:

- Support funding and staffing for the State Flood Control Subventions Program.
- Support funding for the implementation of a statewide flood protection needs assessment.
- Support streamlining of permitting.
- Support funding for FEMA to update tidal and fluvial flood risk maps.
- Support efforts to modify the U.S. Army Corps of Engineers' levee policy regarding vegetation near levees.
- Support WRDA authorization for the Upper Llagas Creek, San Francisquito Creek, and South San Francisco Bay Shoreline Flood Protection Projects.
- Support funding for infrastructure, construction, and repair of flood protection systems.
- Support authorization for District projects at the federal level.
- Support reimbursement of local funds used for the Upper Llagas Creek Flood Protection Project.











Meeting Date: 10/21/13

Agenda Item No.: 5.4

Staff: Glenna Brambill

E-mail: gbrambill@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

SUBJECT: Review Agenda and Advisory Committee Work Plan: Review of Recent Updates and Board

Action

#### **RECOMMENDED ACTION:**

Review the Board-approved Committee work plan to guide the committee's discussions regarding policy alternatives and implications for Board deliberation.

#### **POLICY RATIONALE:**

#### **Governance Process Policy-8:**

The District Act provides for the creation of advisory boards, committees, or commissions by resolution to serve at the pleasure of the Board.

Accordingly, the Board has established Advisory Committees, which bring respective expertise and community interest, to advise the Board, when requested, in a capacity as defined: prepare Board policy alternatives and provide comment on activities in the implementation of the District's mission for Board consideration. In keeping with the Board's broader focus, Advisory Committees will not direct the implementation of District programs and projects, other than to receive information and provide comment.

Further, in accordance with Governance Process Policy-3, when requested by the Board, the Advisory Committees may help the Board produce the link between the District and the public through information sharing to the communities they represent.

The Board may also establish Ad-hoc Committees to serve in a capacity as defined by the Board and will be used sparingly.

	Policy Review
$\boxtimes$	Policy Implementation

#### **SUMMARY:**

The attached Work Plan outlines the Board-approved topics for discussion to be able to prepare policy alternatives and implications for Board deliberation. The work plan is agendized at each meeting as accomplishments are updated and to review additional work plan assignments by the Board.

### ATTACHMENT(S):

Attachment 1: 2013 Environmental Advisory Committee Work Plan

#### 2013 Work Plan: Environmental Advisory Committee

GP8. Accordingly, the Board has established Advisory Committees, which bring respective expertise and community interest, to advise the Board, when requested, in a capacity as defined: prepare Board policy alternatives and provide comment on activities in the implementation of the District's mission for Board consideration. In keeping with the Board's broader focus, Advisory Committees will not direct the implementation of District programs and projects, other than to receive information and provide comment.

The annual work plan establishes a framework for committee discussion and action during the annual meeting schedule. The committee work plan is a dynamic document, subject to change as external and internal issues impacting the District occur and are recommended for committee discussion. Subsequently, an annual committee accomplishments report is developed based on the work plan and presented to the District Board of Directors.

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
1	Annual Accomplishments Report (Governance Process-8:Policy Implementation)	January 28	Review and approve 2012     Accomplishments Report for presentation to the Board.	Accomplished January 28, 2013:  The Committee reviewed and approved 2012 Accomplishments Report for presentation to the Board.  The Board received the Committee's Accomplishment Report at its April 9, 2013. meeting.
2	Review Agenda and Advisory Committee Work Plan: Review of Recent Updates and Board Action (Governance Process-8: Policy Implementation)	January 28	<ul> <li>Receive and review the 2013         Board-approved Committee         work plan.</li> <li>Submit requests to the Board,         as appropriate.</li> </ul>	Accomplished January 28, 2013:  The Committee received and reviewed the 2013 Board-approved Committee work plan and the committee made the following requests:  Committee Requests:  1. The Committee requests that EAC Chair Levy contact Board of Director Chair Hsueh, to request working with staff in inviting parties with alternative perspectives to participate at the committee's April 15, 2013, meeting regarding agenda item covering the Three

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 1 of 9

Creeks Conservation Habitat Plan.  Committee Chair Levy sent an email Board of Directors' Chair Hsueh on March 4, 2013.  2. The Committee requests adding to plan the following issues to discuss allocation of Measure B fu	il to the
Clean Water Program),  Lake Almaden Issue, and  Measure B Grant Criteria f Selections (Safe, Clean W Program)  The Board approved the Committee's April 9, 2013, meeting.  3. The Committee requests adding to agenda discussion on, improveme committee process, alternative per for committee's consideration, and agenda have one main topic for ar discussion.  The Board approved the Committee's April 9, 2013, meeting.  4. The Committee requests adding plan an agenda item for discuss the work plan review and its effecti  The Board approved the Committee's April 9, 2013, meeting.	o its work is: unds (Safe,  for Grant Vater  request at its  o a future ents to the rspectives d that the n in-depth  request at its  g to its work sion to cover tiveness.

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 2 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
				Director Schmidt attended the Committee's April 15, 2013, meeting and discussed board advisory committees' roles and responsibilities and received feedback from the committee.  Accomplished July 15, 2013:  The Committee made the following requests:  Committee Request 1: The Environmental Advisory Committee request for Board consideration, is to have a standing Environmental Advisory Committee Meeting in the June, solely to discuss policies.  Committee Request 2: The Environmental Advisory Committee requested for Board consideration, to begin policy discussions at their January meeting.
3	Presentation of the Third Annual Stewardship Report (Ends 4: Policy Implementation)	January 28	<ul> <li>Receive a presentation of the Third Annual Stewardship Report</li> <li>Provide comments to the Board, as necessary.</li> </ul>	Accomplished January 28, 2013:  The Committee received a presentation of the Third Annual Stewardship Report.
4	Informational Report on the Status of Safe, Clean Water and Natural Flood Protection Plan (Ends 1-4; Policy Implementation)	January 28	<ul> <li>Receive an update on the Safe, Clean Water and Natural Flood Protection Plan.</li> <li>Provide comments to the</li> </ul>	Accomplished January 28, 2013:  The Committee received an informational report on the status of Safe, Clean Water and Natural Flood Protection Program.

Yellow = Update Since Last Meeting
Blue = Action taken by the Board of Directors

Attachment 1 Page 3 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)  ACCOMPLISHMENT DATE AND OUTCOME
			Board, as necessary.
5	Discussion and Comment to the Board regarding the Bay Delta Conversation Plan Discussions the decisions the Board will be making, if any, regarding the Bay Delta Conservation Plan, the component parts of those decisions, if any, includir identification of the components of the schedule, and when the Board will make that decision. (Ends-2.1:Policy Implementation)	January 28	<ul> <li>Receive updated information of Bay Delta Planning and Imported Water with Respect to Board Ends Policy 2.1: Reliable Water Supply</li> <li>Provide comments to the Board, as necessary</li> </ul> Accomplished January 28, 2013: The Committee received and discussed information on the Bay Delta Conversation Plan.
6	Discuss and Develop Recommendations on Specified Policies from the 2012 Board Policy Work Study Sessions. (Governance Policies 1.6/1.7: Policy Review)	April 15	<ul> <li>Discussion and Development of Specified Policies from 2012 Board Policy Work Study Sessions.</li> <li>Provide comments to the Board, as necessary,</li> </ul> <ul> <li>Accomplished April 15, 2013:</li> <li>The Committee discussed recommendations on specificed policies from the 2012 Board Policy and made the following policy recommendations, requests and comment.</li> </ul>

#### **Committee Policy Recommendations:**

- 1. The Environmental Advisory Committee does not support including the phrase "open space consistent with the District Act" as it pertains to Governance Process Policy 1.7.
- 2. The Environmental Advisory Committee recommends that the Board consider that a broad, extensive, and well-established connection between watershed health, water supply and flood protection be part of the master plans developed for each watershed per CEO Interpretation Strategy 3.2: Natural Flood Protection.

At its June 11, 2013, meeting, the Board received the Committee's Policy recommendations and will discuss during the Board's Policy Workshops in July 2013,

#### **Committee Requests:**

1. The Environmental Advisory Committee recommends the Board consider requesting District Counsel to prepare a supplemental analysis based on assumption that Section 4 (c) 7 changed the context of beneficial uses to include stream habitat and stream function beneficial uses, independent of Water Supply and Flood Protection.

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 4 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
------	---	---------	---------------------	---------------------------------

At its June 11, 2013, meeting, the Board directed District Counsel to conduct additional analysis and to plan submitting any information at the June 25, 2013, Board meeting.

2. The Environmental Advisory Committee requests that the Board consider authorizing the Committee Chair the ability to invite guest speakers to their meetings to speak on any item on the agenda.

At its June 11, 2013, meeting, the Board directed Board Chair Hsueh to communicate with the Committee's Chair regarding their decision of the Committee's request.

The Environmental Advisory Committee requests that the Board consider adding to the Committee's work plan an agenda item for their October meeting, discussion and give input on CEQA for board consideration.

At its June 11, 2013, meeting, the Board directed Board Chair Hsueh to communicate with the Committee Chair regarding their decision of the Committee's request.

#### **Committee Comment:**

The Environmental Advisory Committee reviewed the Board's questions regarding April 15, 2013, Agenda Item 4.1's recommendation; 1A and 1B. The Committee considered the history of the District Act and believes that the context of the term "beneficial uses" was significantly broadened in 2001 by the addition of Section 4(c) 7 which included the additional power to restore streams. The power to restore streams is the power to restore stream habitats and stream functions which implies a focus on environmental beneficial uses such as "warm and cold water habitat" and "fish migration and fish spawning" and requests the District use the beneficial uses as defined by the San Francisco Bay Regional Water Quality Control Board. Secondly, hence the purposes of the District Act as stated in Section 4(a) "to authorize the District to provide comprehensive water management for all beneficial uses" includes, after 2001, those environmental beneficial uses cited above. The Committee believes that the District is authorized to do stream restoration to achieve the beneficial uses of warm and cold water habitat and fish migration and fish spawning, not only water supply beneficial uses and not necessarily in connection with water supply and flood protection.

At its June 11, 2013, meeting, the Board received the Committee's comment and will consider it with the Committee's Policy Recommendations during the Board's Policy Workshops in July 2013.

L						
	7	Update on the Three Creeks	April 15	•	Receive an update on the	Accomplished April 15, 2013:
	′	Conservation Habitat Plan (Ends-2.1.2	October 21		Three Creeks Conservation	

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
	El-7.8: Policy Implementation)		Habitat Plan.     Provide comments to the Board, as necessary.	The Committee received an update on the Three Creeks Conservation Habitat Plan.
8	Provide Input on Advisory Committee Operations and Effectiveness (Governance Process Policy 8.1:Policy Implementation)	April 15	<ul> <li>Discussion and input on Advisory Committee Operations and Effectiveness</li> <li>Provide comments to the Board, as necessary.</li> </ul>	Accomplished April 15, 2013:  The Committee provided input on Advisory Committee Operations and Effectiveness.
9	Update on Bay Delta Planning and Imported Water with Respect to Board Ends Policy 2.1: Reliable Water (Ends Policy 2.1:Policy Implementation)	July 15	Receive updated information of Bay Delta Planning and Imported Water with Respect to Board Ends Policy 2.1: Reliable Water Supply.  Provide comments to the	Accomplished July 15, 2013:  The Committee received an update on Bay Delta Planning.
10	Presentation on the Silicon Valley Advanced Water Purification Center (Ends-2.1.5: Policy Implementation)	July 15	Board, as necessary.     Increase Advisory Committee understanding of where the District is headed related to implementing the Board Policy on Recycled Water.      Receive information and provide comments to the Board, as necessary.	Accomplished July 15, 2013:  The Committee received an update on the Silicon Valley Advanced Water Purification Center

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 6 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTE	ENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
11	Discuss Allocation of Measure B funds (Safe, Clean Water Program) (Ends 1-4; Policy Implementation)	July 15	B fur Prog	uss Allocation of Measure ands (Safe, Clean Water ram).  ide comments to the d, as necessary.	Accomplished July 15, 2013:  The Committee received an update on the Allocation of Measure B funds (Safe, Clean Water Program).
12	Discuss Measure B Grant Criteria for Grant Selections (Safe, Clean Water Program) (Ends 1-4; Policy Implementation)	July 15	Crite (Safe	uss Measure B Grant ria for Grant Selections e, Clean Water Program). ide comments to the d, as necessary.	Accomplished July 15, 2013:  The Committee discussed Measure B Grant Criteria for Grant Selections (Safe, Clean Water Program), and made the following request:  Committee Request: The Environmental Advisory Committee requested for Board consideration, that the Grant Criteria for D3 have higher priority on projects with an ecosystem, watershed-scale impact.
13	Discuss Open Space Credit Policy Executive Limitation 7.4:Policy Review)  Review and comment to the Board on staff recommendations related to the Open Space Credit Policy and associated practices (Executive Limitation 7.4:Policy Review)	July 15 October 21	• Prov	uss Open Space Credit y. ide comments to the d, as necessary.	Accomplished July 15, 2013:  The Committee discussed the Open Space Credit Policy.
14	Invitation to Participate in the Flood Protection and Watershed Advisory Committees' Joint Tours of Flood Protection and Watershed Project Sites to Review Ends Board Policy E- 3.1: Natural Flood Protection for	September 5 September 6	Com Flood Wate Com	equested by the mittee, to participate in the d Protection and ershed Advisory mittees' Joint Tours of tal and Maintenance	Accomplished September 5, 2013 and September 6, 2012:  2 EAC member participated in the tours.

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 7 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
	Residents, Businesses, and Visitors (Ends 3.1: Policy Implementation)		Project Sites, was approved by the Board.  Provide comments to the Board, as necessary.	
15	Information on the Mercury Issues at Almaden Lake (Ends 4.2.1:Policy Implementation)	October 21	<ul> <li>Receive Information on the Mercury Issues at Almaden Lake.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	
16	Update on the Santa Clara Valley Habitat Conservation Plan (Ends 1: Policy Implementation)	October 21	<ul> <li>Receive an update on the Valley Habitat Conservation Plan.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	
17	Presentation of the Advisory Committee Ad Hoc Committee's Draft Phase II Improvement Recommendation Report (Governance Process-8:Policy Implementation)	October 21	<ul> <li>Receive a presentation the Advisory Committee Ad Hoc's Phase 2 Report.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	
18	Discuss California Environmental Quality Act [CEQA] (Executive Limitations 7.8: Policy Implementation)	October 21	<ul> <li>Discuss California Environmental Quality Act [CEQA].</li> <li>Provide comments to the Board, as necessary.</li> </ul>	

Yellow = Update Since Last Meeting

Blue = Action taken by the Board of Directors

Attachment 1 Page 8 of 9

ITEM	WORK PLAN ITEM, BOARD POLICY, & POLICY CATEGORY	MEETING	INTENDED OUTCOME(S)	ACCOMPLISHMENT DATE AND OUTCOME
19	Discuss Climate Divestment Investment Restriction (Executive Limitation Policy, EL-4.9.3: Policy Implementation	October 21	<ul> <li>Discuss Climate Divestment Investment Restriction.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	
20	Discussion on, improvements to the committee process, alternative perspectives for Board consideration, and that the agenda have one main topic for an in-depth discussion. (Governance Process-8:Policy Implementation)	TBD	<ul> <li>Discuss improvements to the committee process, with alternative perspectives for Board consideration and have one main agenda item for an in-depth discussion.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	
21	Discussion to cover the work plan review and its effectiveness. (Governance Process-8:Policy Implementation)	TBD	<ul> <li>Discuss Work Plan review and its effectiveness.</li> <li>Provide comments to the Board, as necessary.</li> </ul>	

# This Page Intentionally Left Blank



Meeting Date: 10/21/13

Agenda Item No.: 6.1

Staff: Debra Caldon

E-mail: dcaldon@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

**SUBJECT:** Update on the Santa Clara Valley Habitat Conservation Plan

#### **RECOMMENDED ACTION:**

Receive Information on the status of the Santa Clara Valley Habitat Conservation Plan

#### **POLICY RATIONALE:**

This project is linked to Board Ends Policy E-1 – The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner for current and future generations.

	Policy Review
$\boxtimes$	Policy Implementation

#### **SUMMARY:**

In January 2013, the City of San Jose joined with the District and the cities of Morgan Hill and Gilroy; Santa Clara County, and the Valley Transportation Authority (VTA) to approve the final Santa Clara Valley Habitat Plan (Plan) which will, once approved by the US Fish and Wildlife Service and California Department of Fish and Wildlife, allow the issuance of permits to meet state and federal Endangered Species Act (ESA) requirements for public infrastructure and private development projects.

The Habitat Plan supports the issuance of 50-year ESA permits to the Local Partners who become copermittees. The co-permittees enter into an Implementing Agreement, and a Joint Powers Agreement (JPA). The JPA enables the imposition of Habitat Plan fees to be paid by private parties and public agencies commensurate with species impacts from permitted projects. The funds are used to acquire and manage preserve areas. Lands that are acquired for preservation provide compensatory mitigation for public and private development projects, including certain large scale District projects, such as seismic retrofits for dams.

#### The Santa Clara Valley Habitat Agency was formed in May 2013

The JPA establishes the Santa Clara Valley Habitat Agency to be responsible for collecting the fees and carrying out Plan requirements. The Local Partners determined that it was appropriate to establish a joint powers agency to implement the Plan to have the authority to set mitigation fees for permitted development projects, pursuant to the Mitigation Fee Act (Government Code § 66000 et seq.). Because only certain of the Local Partners (the County, San Jose, Morgan Hill and Gilroy) have clear authority to adopt and assess developer mitigation fees, the Local Partners determined that the parties to the JPA would be limited to the County, San Jose, Morgan Hill and Gilroy, while the District and VTA are not signatory parties to the JPA, the IA and the permit provide that all Local Partners are responsible for ensuring that the Habitat Plan is fully implemented.

To this end the JPA governance structure calls for a Governing and Implementation Boards to serve as the Agency's implementing body. The Governing Board consists of two representatives each from the County, San Jose, Gilroy, Morgan Hill and the Implementation Board the consists of two representatives each from the County, San Jose, Gilroy, Morgan Hill, the Water District, and one representative from VTA. At least one representative from the County, San Jose, Gilroy, Morgan Hill and the District must be an official elected to that agency's governing body, and the alternates for those elected representatives must also be officials elected to their respective agency's governing body. The VHA have been meeting on the third Thursday of the month at the Morgan Hill Community Center; agendas and information about their meetings are on the website.

#### Fees and permitting are expected to take effect in October 2013

The Valley Habitat Agency has begun the fee setting process. The draft fee study distributed with the final Habitat Plan in August 2012 was was updated and issued by the Governing Board at its meeting in June (June 20, 2013). Approval of the fee schedule includes both a Fee Ordinance and a Fee Resolution. Both were discussed and issued by the Governing Board during a public hearing on this item at its July 15, 2013 meeting. The Governing Board adopted the Ordinance and Resolution at its August 15, 2013 special meeting. Based on this action the ordinance will take effect 60 days from this date of final adoption barring any challenge this is anticipated to be October 14, 2013.

Both the US Fish and Wildlife Service and the State Department of Fish and Wildlife have completed their Habitat Plan approval process and signed their respective Permits. The remaining step to allow the Habitat Agency to issue incidental take permits is for the Fees to become effective.

To celebrate this accomplishment Local Partner and Wildlife Agency staff have begun organizing a Permit Signing Ceremony. The proposed date for this ceremony is October 3<sup>rd</sup>, 2013; updated information will be provided on the Habitat Agency website: www.scv-habitatplan.org.

ATTACHMENT(S):	Α	TT	A	Cŀ	H۷	ΙE	NT	(S	):
----------------	---	----	---	----	----	----	----	----	----

None.



Meeting Date: 10/21/13

Agenda Item No.: 6.2

Staff: Rechelle Blank

E-mail: rblank@valleywater.org

Committee: Environmental

#### ADVISORY COMMITTEE AGENDA MEMO

**SUBJECT:** Lake Almaden Mercury Removal Issue

#### **RECOMMENDED ACTION:**

Provide comment to the Board in the implementation of the District's mission as it applies to Mercury Issues at Almaden Lake.

#### **POLICY RATIONALE:**

As part of the District's commitment to the Guadalupe Watershed, a study is being conducted at Almaden Lake to address the water quality issues related to mercury and anadromous fish. The objectives of the study are:

- 1. Reduce mercury concentration in target fish to meet applicable water quality objectives consistent with Board Policy No. E-4.2.1;
- 2. Reduce thermal barrier to migration of anadromous fish consistent with Board Policy Nos. E-4.1.2 & E-4.1.3;
- 3. Remove entrainment and impacts from predatory species to anadromous fish consistent with Board Policy Nos. E-4.1.2 & E-4.1.3; and
- 4. Minimize impacts to recreational features consistent with Board Policy No. E-4.3.1.

	Policy Review
$\boxtimes$	Policy Implementation

#### **SUMMARY:**

This item is coming to the Environmental Advisory Committee to determine if Safe Clean Water (SCW) Measure B Funds can be allocated to the Almaden Lake Project. The Almaden Lake Project is incorporated as Project D4 (Fish Habitat and Passage Improvement) of the SCW Measure. The California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) derived site-specific mercury water quality objectives for Almaden Lake in the 2008 Basin Plan Amendment.

Sediment and water in Almaden Lake and other waterways in the Guadalupe Watershed contain mercury from historic mercury mining activities. Under certain conditions, inorganic mercury in water can be converted to methylmercury which is a bioaccumulative toxin. Methylmercury can move through the food chain and affect terrestrial wildlife and human health. Methylmercury is being produced and released from Almaden Lake into the Guadalupe Watershed resulting in its designation as an impaired water body.

The City of San Jose (City), the agency that's responsible for recreation activities at Almaden Lake Park, also has to comply with water quality (bacteria and blue green) regulations at the lake for swimming. Since August

of 2010, the City has closed the lake to swimming partly because high concentrations of fecal coliform, total coliform, and blue-green algae have exceeded the applicable criteria. Not all the lake's closures to swimming were because of water quality related issues, the City has also closed the lake because of insufficient funds to operate this activity.

Almaden Lake also acts as a thermal barrier along the Guadalupe River and Alamitos Creek corridor which is known to be utilized by anadromous fish. The anadromous fish may avoid passing through the lake since the lake's warm water poses both harmful and unfavorable conditions for them. Additionally, the lake's expansive size does not allow for a current for anadromous fish to follow through the lake, resulting in the fish losing their way and becoming entrained in the lake. The lake's warm water creates conditions where non-native fish thrive and these fish out-compete native fish for resources. Also the lake's warm water temperature provides favorable conditions to a large number of non-native warm-water fish species that prey on the anadromous fish. The non-native species can prey on the juvenile anadromous fish when they out-migrate to the ocean. This may impact the overall existence of anadromous fish in the Guadalupe Watershed since fewer anadromous fish may reach the ocean which results in fewer returning to spawn in subsequent years.

Planning efforts for the Almaden Lake Project began in July 2011. Since then, staff has been coordinating with the City, regulatory agencies, and engaging regularly with the community. To date, four feasible alternatives have been identified. The study team anticipates having a staff recommended project by February 2014 and an environmental consultant on board by March 2014 to prepare the environmental document. Public review of the draft Environmental Impact Report (EIR) is scheduled for August 2014 with certification of a Final EIR in November 2014. Should a project be approved by the Board, design efforts would begin after November 2014 and last a period of 2 years.

#### ATTACHMENT(S):

Attachment 1: Almaden Lake Fact Sheet
Attachment 2: Feasible Alternative 1
Attachment 3: Feasible Alternative 2
Attachment 4: Feasible Alternative 4
Attachment 5: Feasible Alternative 5

Attachment 6: Mercury in the Guadalupe Watershed Shell Attachment 7: Mercury in the Guadalupe Watershed Insert D

### August 2013 Fact Sheet

### Almaden Lake



#### About the lake

The 32-acre man-made water body was once a privately owned gravel quarry within the city of San José's 65-acre Almaden Lake Park. The city owns the land associated with the park and recreational improvements surrounding the lake. The water district owns the water body and land beneath it. Walking trails, playgrounds, picnic areas, bocce ball courts, swimming, fishing and boating are under city responsibility.

Almaden Lake has minimal recharge value since the quarry operation removed all the good gravel material. Water surface at the lake is influenced by the Alamitos Flashboard Dam operating north of the lake. When in place, the dam impounds water into the lake, increasing its water surface by four- to five-feet.



The lake's bottom is not a typical bowl shape. It's compartmentalized with separate areas of varying depths that doesn't allow good water circulation. Elemental mercury also deposits in the lake as it washes down from



- Elemental mercury methylating into the toxic form known as methylmercury.
- High bacteria and algae counts rendering the lake unusable for recreational swimming
- Ecological damage from the lake's warm water, causing impacts to cold-water fisheries.

#### Why we must do something

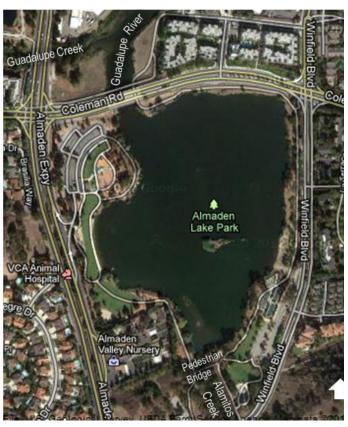
The San Francisco Bay Regional Water Quality Control Board has derived site-specific mercury water quality objectives in the 2008 Basin Plan Amendment.

#### Water quality objectives for mercury in fish tissue at Almaden Lake:

Freshwater water quality objectives for the protection of aquatic organisms and wildlife and also humans who consume fish	0.05 mg methylmercury per kg fish (3 fish, 5- to 15- cm in length)
	0.1 mg methylmercury per kg fish (3 fish greater than 15-35 cm in length)

#### Total Maximum Daily Load of mercury in water at Almaden Lake:

TMDL water quality objective expressed as	1.5 ng total methylmercury per liter water
methylmercury mercury concentration in water	(seasonal maximum, hypolimnion)



#### Current actions at the lake

Solar powered water circulators known as SolarBees, are in the lake to reduce methylmercury concentrations. However, they cannot reduce the concentrations to below the mercury water quality objectives set by the Regional Water Board. Lake monitoring in 2011 and 2012 indicates the average methylmercury concentration in fish tissue and water is about 10 and seven times, respectively, the targeted water quality objectives.

#### Results from 2011 and 2012 monitoring:

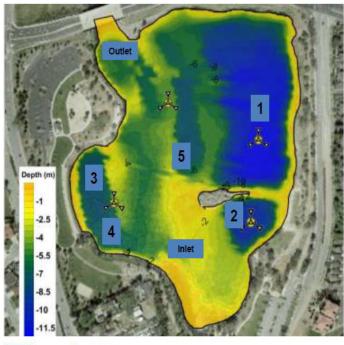
December 2011	15.4 ng methylmercury per liter water
November 2012	0.382 mg methylmercury per kg fish

#### Project objectives

Reduce mercury in fish and production of methylmercury to meet water quality objectives; Reduce thermal barrier to cold-water fish migration; Remove entrainment - incidental trapping of fish - and impacts from predatory species to cold-water fish and minimize impacts to recreational features. Project boundaries are within the park from Almaden Expressway to Winfield Boulevard and Coleman Road to the pedestrian bridge at the park's southern end.

#### Project schedule

Planning phase: 2011 -2014
Design phase: 2014 - 2016
Construction phase: 2016 - 2018



= Sampling/Monitoring Location

= Solar-powered Circulator Location

Above: Almaden Lake bathymetry and monitoring locations.

#### Steps for project approval

Water district staff will identify a recommended project and prepare a document that analyzes the environmental impacts of the project as required by the California Environmental Quality Act (CEQA). The team will then present the recommended project and CEQA document to the water district's board of directors for their consideration and approval.

#### Stay informed

The project web site: www.valleywater.org/Mercury/AlmadenLake.aspx

Facebook: www.facebook.com/SCVWD

Project blog: almadenlakeproject.wordpress.com

Neighborhood Liaison: Tony Mercado at 408-630-2342 or tmercado@valleywater.org

Confact us

For more information on the project, contact

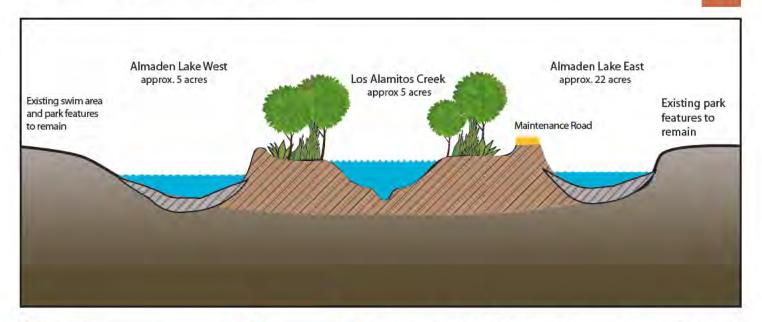
Rechelle Blank at (408) 630-2615, or
visit our website at
www.valleywater.org and use our

Access Valley Water customer request
and information system. With three easy
steps, you can use this service to find out
the latest information on the project or to
submit questions, complaints or compliments
directly to a district staff person.



#### Almaden Lake Plan View





#### Benefits

- Restored creek is separated from the lake.
- Methlymercury production in the lake is eliminated by capping existing mercury sediment with clean fill and reducing lake depth to 10-feet.
- Separated lakes eliminate entrapment and predatory environment problems for cold-water fish.
- Sediment catchment area will allow for removal of mercury-laden sediments.
- Lakes allow for swimming in the west lake, boating in the east lake.
- Existing trails will remain with potential for additional trails along both sides of the creek.

#### Disadvantages

- West lake requires water treatment and SolarBee use for swimming.
- Requires large amount of clean fill to cap lake bottom.
- Sedimetricatchment area will require routine sediment removal and disposal.
- Algae and bacteria may still be an issue in east lake if left untreated.

This scenario calls for a 100-foot wide restored creek section with a 5-acre lake to its west and a 22-acre lake to its east.

The retored creek would have riparian vegetation planted along both creek banks, providing shading and lower water temperatures for cold-water fish. A sediment catchment area at the upstream end of the creek, where sediment is allowed to deposit, will slow the stream flow and promote sediment deposition, the laying down of sediment carried by water in the form of pebbles, sand and mud to allow for removal of potential mercury-laden sediment.

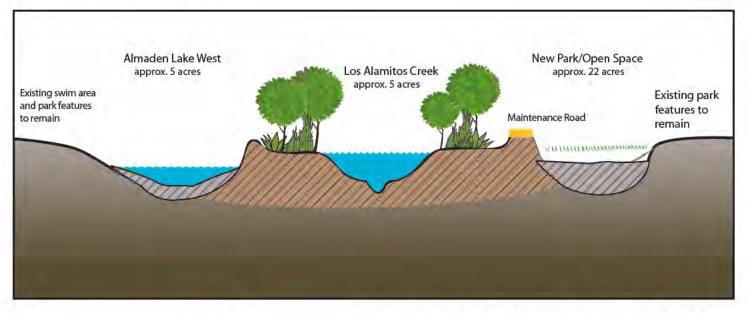
The creek section may be full seasonally when the Alamitos flashboard dam is in place. Otherwise, it will have low flows similar to what occurs naturally upstream. There will be no reduction to the existing flood conveyance capacity.

Water supply for the lakes will be from a non-creek water source not associated with the Guadalupe Watershed. The bottom of the lake will be raised to make the new lakes about 10-feet deep to cover the existing mercury laden sediment with clean fill. Swimming will remain in the west lake, which will require SolarBee circulators, devices that circulate water to increase oxygen levels at all depths to eliminate algae and bacteria production. Boating will move to the east lake. The required water treatment for swimming will eliminate fish and other aquatic life in the west lake. However, fishing may continue in the untreated east lake. There will be no impacts to existing trails.

A maintenance road along the east bank will provide crews creek access and has potential for trail use.

#### Almaden Lake Plan View





#### Benefits

- Separated restored creek improves conditions for coldwater fish and elimninates mercury-laden sediments.
- Eliminates methylmercury production by capping mercury sediment with clean fill and reducing lake to 10-feet deep.
- Separated lake eliminates entrapment and predatory environment for cold-water fish.
- Sediment catchment area allows for mercury-laden sediment removal.
- West lake accommodates swimming and boating.
- Existing trails remain with potential for additional trails along both creek sides.
- East open space may be dedicated to city for potential recreational development.

#### Disadvantages

- West lake requires water treatment and use of SolarBees for swimming.
- Lake size for boating reduced.
- Fishing eliminated due to water treatment for swimming.
- · Requires large amount of clean fill to cap lake bottom.
- Routine sediment removal in catchment area.
- East open space will require routine grass care.

This scenario calls for a 100-foot wide restored creek with a five-acre lake to its west and a 22-acre open space area to its east.

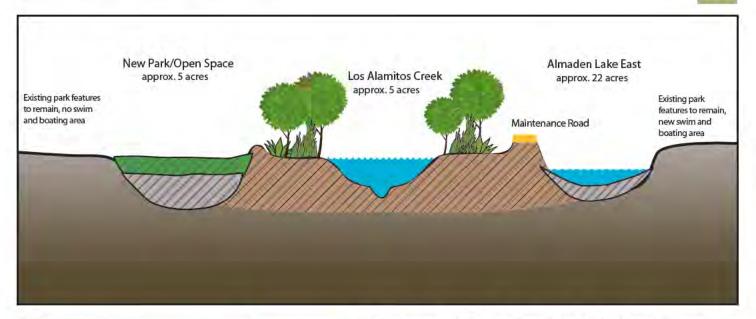
The creek will have riparian vegetation planted along both banks to provide shading and lower water temperatures for cold-water fish. Sediment catchment areas located at the upstream end of the creek would slow the stream flow and promote sediment deposition, the laying down of sediment carried by water in the form of pebbles, sand and mud. This would allow for the removal of potential mercury-laden sediment. The restored creek may be full seasonally when the Alamitos flashboard dam is in place. Otherwise, it will have low flows similar to what occurs naturally upstream. There will be no reduction in flood conveyance capacity.

Water supply for the west lake will be from a non-creek water source not associated with the Guadalupe Watershed. The lake bottom would be raised with clean fill to make it 10-feet deep to cover the existing mercury laden sediment. Swimming will remain in the west lake, which will require water treatment and SolarBee circulators to increase oxygen levels at all depths, improve water quality and eliminate algae and bacteria production. Boating will remain in the west lake. The east open space will be planted with grass and trees and could be dedicated to the city of San Jose for recreational development. There will be no impact to existing trails.

A maintenance road along the top of the east bank has potential for trail use. Creek maintenance could include bank erosion inspection and repair and trash, debris, vegetation and sediment removal. Lake maintenance could include monitoring and treatment of water for swimming and maintenance of SolarBees. Open space maintenance would include routine grass care.

#### Almaden Lake Plan View





#### Benefits

- Restored creek separated from east lake to improve conditions for cold-water fish and eliminate mercury-laden sediments
- Methylmercury production eliminated by capping existing mercury sediment with clean fill and reducing lake depth to 10-feet
- Separated lake will eliminate entrapment and predatory environment for cold-water fish
- Sediment catchment area allows for removal of mercuryladen sediment
- East lake accommodates swimming and boating; west open space allows potential recreational development
- Existing trails remain with potential for more along both creek sides

#### Disadvantages

- East lake will require water treatment and SolarBee use
- Swimming and boating areas would have to be relocated
- Fishing eliminated due to water treatment for swimming
- Requires large amount of clean fill to cap existing lake bottom
- Sediment catchment area requires routine sediment removal and disposal
- West open space will require routine grass care

This scenario calls for an approximate 100-foot wide restored creek section with a 22-acre lake to its east and 5-acre open space area to its west.

The creek will have riparian vegetation along both creek banks to provide shading and lower water temperatures for cold-water fish.

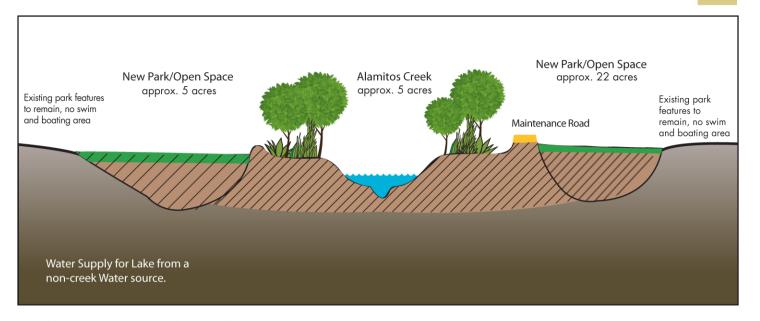
Sediment catchment area at the upstream end of the creek would slow stream flow and promote sediment deposition. The creek may be full seasonally when the Alamitos flashboard dam is in place. Otherwise, the creek will have low flows similar to what occurs naturally upstream. There will be no reduction to existing flood conveyance capacity.

Water supply for the east lake will be from a non-creek water source not associated with the Guadalupe Watershed. The bottom of the lake will be raised to make the lake about 10-feet deep, covering the existing mercury-laden sediment with clean fill. Swimming will relocate to the east lake, which will require water treatment and SolarBees to circulate water to increase oxygen levels at all depths and eliminate algae and bacteria production. Boating will relocate to the east lake. The required water treatment for swimming will eliminate fish and and other aquatic life in the lake. The west open space will be planted with trees and grass. The new open space may be dedicated to the city of San Jose for potential recreational use. There will be no trail impacts.

A maintenance road along the east bank will provide maintenance access, which also has potential for trail use. Typical maintenance activities include erosion inspection of levees and embankments, maintenance of SolarBees, monitoring and testing of the lake's water quality, removal of trash and debris and vegetation

#### Almaden Lake Plan View





#### Benefits

- Restored creek will improve conditions for cold-water fish by eliminating the entrapment and predatory environment problems.
- Sediment catchment area allows for removal of mercuryladen sediments.
- Existing trails will remain with potential for additional trails along both sides of the creek.
- Filling the lakes will eliminate the methylmercury production.
- New open spaces may be dedicated to city of San Jose for potential recreational development.

#### Disadvantages

- Eliminates swimming and boating activities.
- Sediment catchment areas will require routine removal and disposal.
- Requires routine grass care of new open space.
- Requires a large amount of clean fill to fill the lake.

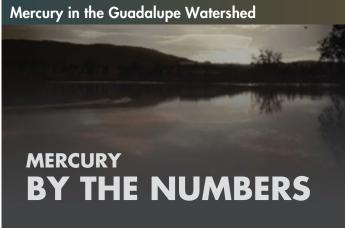
This scenario proposes a new 100-foot wide restored creek with a 5-acre open space to its west and a 22-acre open space to its east.

The restored creek will have riparian vegetation planted along both creek banks to provide shading and lower water temperatures for cold-water fish. Sediment catchment areas at the upstream end of the creek will slow the stream flow and promote sediment deposition - the laying down of sediment carried by water in the form of pebbles, sand and mud - to allow for removal of potential mercuryladen sediment.

Full seasonally when the Alamitos flashboard dam downstream is in place, the restored creek will have low flows similar to what occurs naturally upstream. There will be no reduction to the flood conveyance capacity.

The remaining bottom of the lake will raised to ground level with clean fill, covering the existing mercury-laden sediment. About 27 acres of new open space will be created, resulting in the elimination of swimming, boating and fishing. There will be no impacts to existing trails. Thew new open space areas will be planted with grass and trees and may be dedicated to the city of San Josefor potential recreational development.

A maintenance road along the east creek embankment will provide maintenance access to the creek. This road has potential use as a trail. Typical creek maintenance will include inspection of the banks for erosion, removal of trash and debris, overgrown vegetation and sediment. Maintenance of the new open space will consist of routine grass care.



### 202 lbs

The California Regional Water Quality Control Board estimates that 92 kilograms, or 202 pounds of mercury enters the San Francisco Bay from the watershed each year.

### 84 million lbs

During the mining era, the seven New Almaden mines produced nearly 84 million pounds of quicksilver, according to Santa Clara County Parks.

### 6,260 cubic yards

The water district has removed 6,260 cubic yards of mercury from Alamitos Creek.

## 12,000 cubic yards

The water district has removed 12,000 cubic yards of mercury from Jacques Gulch.

### 120 years

The estimated time it will take to completely allow the bay to recover from mercury contamination.

### 20 years

The estimated time it will take to fix the Guadalupe Watershed from mercury contamination after the current sources are eliminated.

### Mercury in the ecosystem

Mercury in aquatic environments takes on a vicious life of its own. Bacteria converts the metal into the more toxic methylmercury, which can be taken up by insects, the fish that eat the invertebrates and humans who eat the fish. Mercury's concentration increases at each level up the food chain in a process known as biological magnification.

Exposure to mercury can be particularly hazardous for pregnant women and small children. During the first several years of life, a child's brain is developing and rapidly absorbing nutrients.

In adults, mercury poisoning can adversely affect fertility and blood pressure regulation and can cause memory loss, tremors, vision loss and numbness of the fingers and toes. A growing body of evidence suggests that exposure to mercury may also lead to heart disease.



## We need you

People working together drive results to even the most challenging issues. When it comes to mercury containment, collaboration with the people in the Almaden Valley will be invaluable as the water district begins to take a closer look at one of the last vestiges of the mercury problem: Almaden Lake.

The water district understands the importance of the lake to the community. Many visitors come to enjoy all this site has to offer.

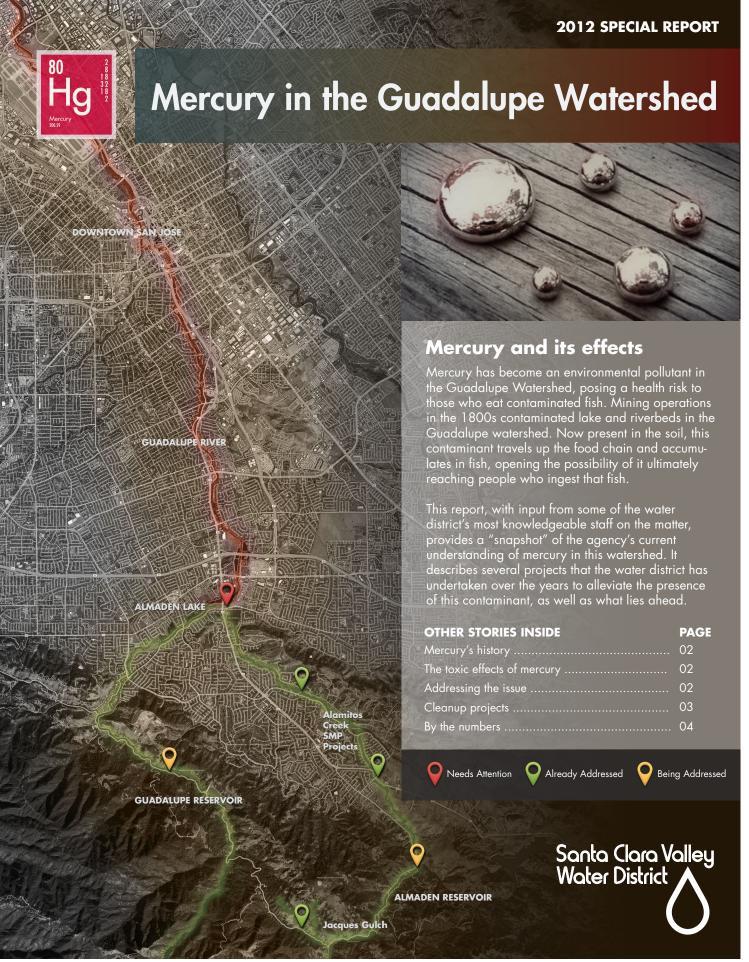
That's why it is committed to engaging you in a solution that addresses the contamination. It will listen to your input as the water district determines the direction of this endeavor, an effort that will also take voices from partners in the city of San Jose.

In the coming months, the water district will hold meetings to present findings and encourage community feedback.

#### **ACCESS VALLEY WATER**

For more information, visit our website at www.valleywater.org and use our Access Valley Water customer request and information system. With three easy steps, you can use this service to submit questions, complaints or compliments directly to a district staff person. If you have questions or concerns about this report, please contact: Ngoc Nguyen at (408) 265-2607, ext. 2632.





# Mercury's history in the Guadalupe Watershed

The 170-square mile Guadalupe River watershed has six reservoirs, more than 80 miles of streams and rivers and is one of the area's biggest sources of mercury contamination.

Mercury in the Guadalupe Watershed can trace its roots to the Gold Rush of the 1800s. Mercury was essential to the process of separating gold from ore and plenty of it could be found in the hills above San Jose.

The New Almaden Mines would become the largest mercury mine in North America and work there would ultimately seep – according to the State Water Resources Control Board – an estimated 6,500 tons of mercury into the local systems of creeks and rivers between 1850 and 1920.



### What is mercury?

Mercury is the most toxic of all natural metals and the only one that is liquid at room temperature. Named for the solar system's fastest moving planet, and the winged sandaled messenger in Roman mythology because of its highly mobile elemental form, mercury readily cycles through the environment once released.

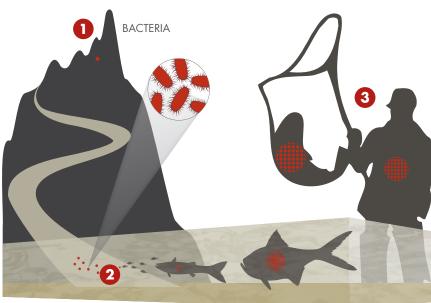
### Toxic effects of mercury contamination

Mercury's toxic effects vary depending on the chemical form it takes and the way a person or animal gets exposed to it. The most dangerous form is methylmercury, also called organic mercury. While mercury is not present in the drinking water supply, it's of great concern to the Santa Clara Valley Water District. Methylmercury tends to increase up the food chain, particularly in lakes.

- The mud at the bottom of a lake may have 100 or 1000 times the amount of mercury than is in the water.
- Worms and insects in the mud extract and concentrate the organic mercury.
- Small fish that eat these critters further concentrate the mercury in their bodies.
- The chain continues as larger fish eat smaller fish until the top predator fish may have mercury levels up to 1,000,000 times the mercury level in the water.

The heavy metal sinks to the bottom in harmless inorganic or elemental form until bacteria turns it into methylmercury, a harmful form of mercury that can be absorbed by animal tissue. Small bottom feeders absorb traces of the toxic and as prey move up the food chain, the mercury is concentrated.

The top predators in the lake, such as steelhead, can end up with concentrations of mercury that can trigger health advisories to limit human consumption.



Eating contaminated fish and other organisms at the top of the aquatic food chain is the most common way that people become exposed to methylmercury. It can cause problems with the immune system and damage a person's nervous system, creating issues with coordination and the senses of touch, taste and sight. Because it's readily absorbed when ingested and excreted very slowly, most of it stays in a person's system. Pregnant women and young children are the most susceptible to mercury poisoning.

### What we've done about mercury to date

In Santa Clara County, it's the Santa Clara Valley Water District that carries the responsibility to provide stream stewardship, wholesale water supply and flood protection to the residents. The water district encompasses all the county's 1,300 square miles and serves the area's 15 cities, 1.7 million residents and more than 200,000 commuters. As the responsible stream steward, the water district is taking action to remediate the problem.

The water district has intensely monitored the mercury situation – given that less than a teaspoon of methylmercury can poison thousands of fish – with the goal to remove the mercury before it affects people and wildlife.

The areas of most concern in the watershed are those where Guadalupe River has flowed from the old Almaden Quicksilver mines down the hill and north toward downtown San Jose. Water bodies of particular concern are where these flows slowed and released mercury deposits.

The water district has undertaken seven projects so far to remove the mercury. The work will take place over 20 years, with ecosystem recovery projected in about 120 years. If that sounds like a long time, remember the majority of mercury is the legacy of mining dating back 150 years.

As the amount of mercury in sediment decreases, concentrations in fish will also decline, reducing risk to people and wildlife.

# Drinking water supply not threatened

It's important to note that mercury is not in the drinking water supply. In the Guadalupe Watershed, the water district does not utilize the Guadalupe or Almaden reservoirs to store drinking water and none of the district's reservoirs that do provide sources for potable water have mercury contamination issues.

## About the projects

The water district has removed mercury calcine deposits along portions of Alamitos Creek, Jacques Gulch and one of its tributaries, stabilized the streambanks and re-established native riparian vegetation. It began using solar powered circulators – often called Solar Bees – at Almaden Lake and Almaden and Guadalupe reservoirs. These floating circulators gently aerate water bodies to accelerate the normal purification process. In 2012, the water district will pursue more aggressive treatment with oxygenation systems at Calero and Almaden reservoirs and will begin planning for removal of methylmercury at Almaden Lake.



Page 234 Attachment 6



#### **About Almaden Lake**

Once a privately owned gravel quarry, the 32-acre man-made water body provides groundwater recharge benefits to the water district. Quarry excavation started at the center of Los Alamitos Creek and moved outward, transforming a meadow where cows grazed into a area that's offered many recreational activities since the city of San José and water district opened it for public use in the early 1980s. This body of water, however, is one of the most polluted in California, according to a two-year screening by the state Water Resources Control Board on contaminants in fish from the state's lakes and reservoirs. It lists Almaden as having 2.15 parts per million methyl mercury for large-mouth bass, a reading that's the highest among lakes with mercury above .044 parts per million. The lake is closed to swimmers indefinitely due to water quality issues, according to the city's Department of Parks and Recreation.

### Today

The water district has eliminated sites along Alamitos Creek where it has title and easement as sources of mercury to the lake. But other upstream sources continue to discharge mercury to Almaden. Solar powered water circulation machines – solar bees – have reduced some of the harmful buildup of methylmercury in this water body, but not enough to reduce the levels in fish. The influx of seagulls increases the nutrient problem which results in oxygen consumption and algae blooms. It's clear it is beyond treatment alternatives as the only "fixing" method.

continued on the back »

# Outlook and the public's role moving forward

Almaden Lake has been a treasured part of this area for decades. It has been the site for many recreational activities and a gathering spot for families eager to take advantage of its sandy beach and waters. But as mercury has slowly contaminated the waters, it's clear that not only have times changed, but that action is now required.

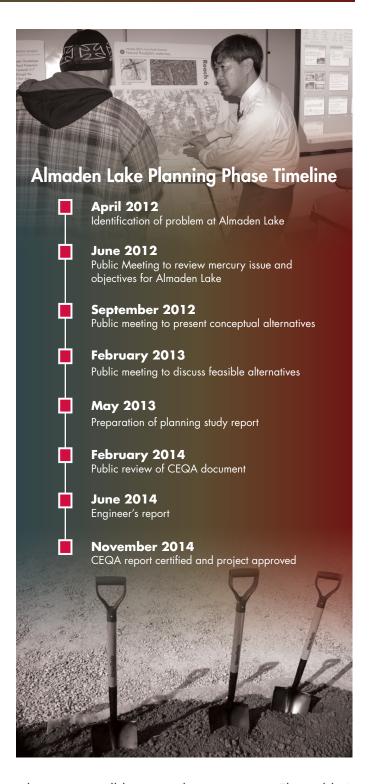
The water district recognizes that something must be done to address what has happened to the lake. It must be done soon and it must be done while also weighing the sentiments of the neighboring community. This is not a process the district will take alone.

It will need and solicit the input of the nearby community on the path to take in deciding what is best for Almaden Lake. The water district has not decided on the best manner to alleviate the situation there. Getting to the point of discussing alternatives will take time. And it will take additional voices, not just from the community, but also from our partners in the city of San Jose. The water district will not attempt to solve this problem alone.

At this time, the water district is beginning to take a closer look at just what issues exist within Almaden Lake. This is the first step in what it believes will be an extensive study. In June 2012, the water district will hold its first public meeting to brief the community on Almaden Lake and the overall mercury issue. The district intends to hold even more meetings in the coming months to present findings and encourage community feedback.

That input will be critical toward a course of action. Working together is pivotal towards addressing the mercury issues at Almaden Lake.

The importance of that input can't be understated, given the general public's vested interest in Almaden Lake. The input the water district receives will provide the critical insight into the effects any potential



alternatives will have on the community. The public's comments often present the "real world" concerns on many issues, in this case, the use of the lake.



# This Page Intentionally Left Blank

#### **Proposal to the EAC**

#### A Steelhead Fishery Recovery Policy

Co-Sponsors: Nancy Smith and Richard McMurtry

In order to support the District's evolving approach to environmental stewardship and stream ecological restoration, we propose that the EAC recommend that the SCVWD Board consider adoption of a "Steelhead Fishery Recovery Policy" for the following reasons.

During the past 10 to 20 years, the Santa Clara Valley Water District has developed, evolved and refined its approach to environmental stewardship, in general, and stream restoration in particular. As a result of the recent legal opinion of District Counsel, the District now accepts that its enabling legislation (the District Act) empowers the District to restore streams for the purpose of achieving environmental beneficial uses such as fish spawning and rearing, cold and warm water habitat.

The next logical step in the evolution of the District's approach to streams is to make explicit what is implicit in its policies and programs, by making specific commitments to restore the ecological health of our streams as a goal in itself and to take steps towards improving integration of all its programs to achieve those goals, to wit:

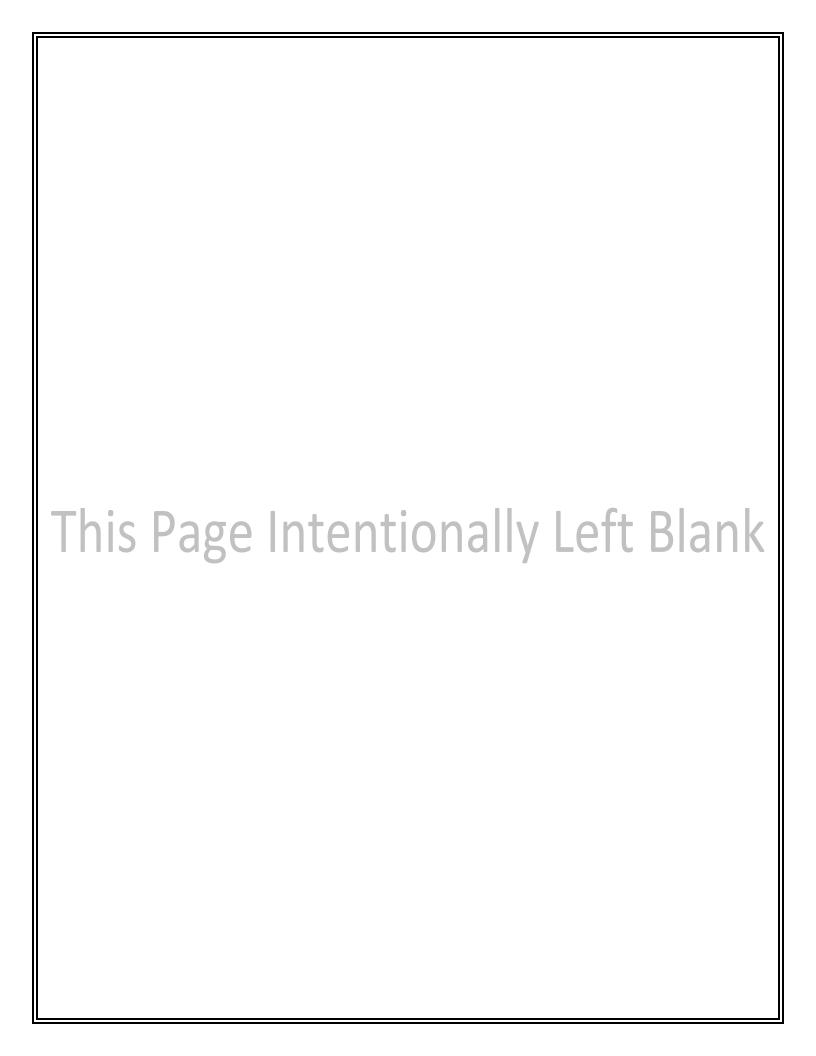
#### The Steelhead Fishery Recovery Policy

The SCVWD District is committed to leading a community effort to restore the steelhead trout fishery on identified steelhead streams within fifteen years of policy adoption by creating suitable spawning and rearing habitats downstream of major dams, provided such creation is feasible, within funding resources obtainable by the District, and consistent with authorities of the District Act and with the District's fiduciary responsibilities.

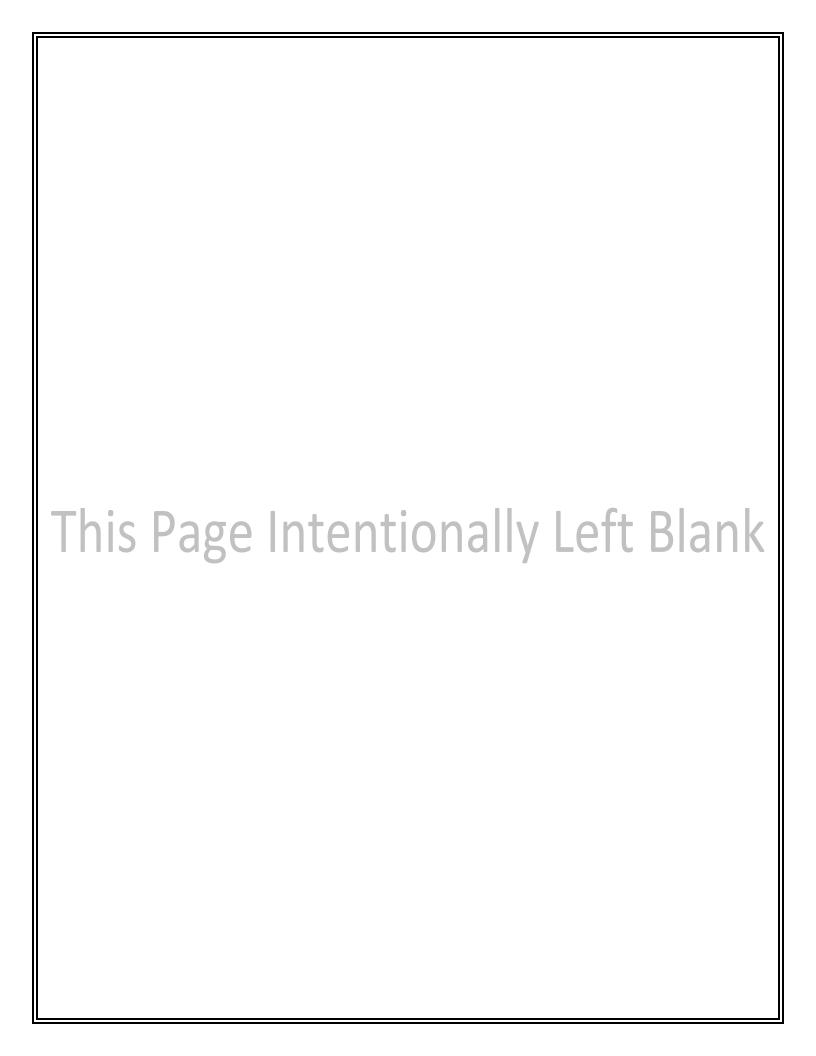
The intent of this policy is to repair and restore the steelhead fishery downstream of the dams in a manner calculated to also compensate for the habitat upstream of the dams that was lost to construction and maintenance of the dams without fish passage

By February 2014, the District will prepare a report listing conceptual changes to the implementation of District programs - including the Clean Safe Water special tax, the Three Creeks Habitat Conservation Plan, FAHCE Settlement Agreement and various District mitigation programs - needed to successfully implement this policy and achieve its goal.

(Proposed Board Adopted Policy Strategy for Ends Policy E-4.1 – Protect and restore creek, bay and other aquatic ecosystems.)









# **NOAA FISHERIES**

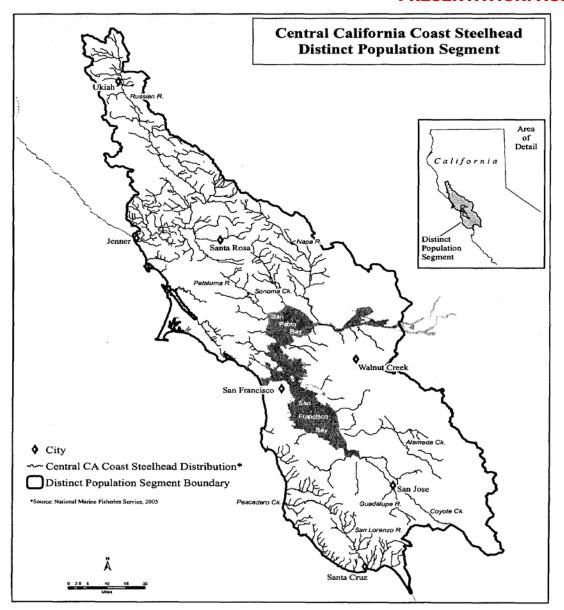
West Coast Region

# Northern Santa Clara County Steelhead and Three Creeks HCP

October 21, 2013

Gary Stern
San Francisco Bay Branch Supervisor
Central California Coastal Area Office

#### **PRESENTATION: AGENDA ITEM 5.1**







# Steelhead Recovery – Viable Populations

Recovery is the process by which "... listed species and their ecosystems are restored and their future safeguarded to the point that protections under the ESA are no longer needed ..." (NMFS 2006).

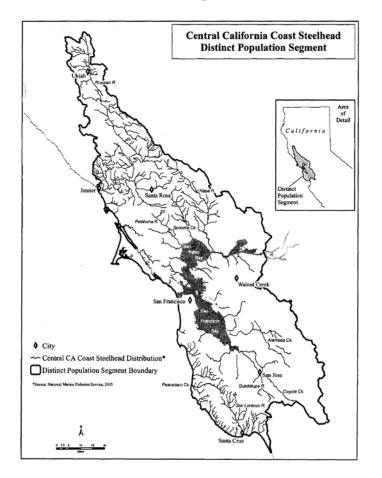
Four parameters for

## "viable salmonid population"

(McElhany et al. 2000)

- 1. abundance
- 2. population growth rate
- 3. spatial structure
- diversity

# Viability = abundance, growth rate, spatial structure, diversity







# Estimating Status of Steelhead Runs (units are total juvenile steelhead per 100 linear feet of stream)

Lagunitas Creek (MMWD 1980-2009) – 26 to 111 SH

- San Geronimo Creek 8 to 135 SH
- Devil's Gulch 11 to 97 SH

San Francisquito Creek (San Mateo and Santa Clara Co.)

- West Union Creek (NPS 1996) 9 to 163 SH
- San Francisquito Creek (Alley 2004) -12 to 17 SH
- San Francisquito Creek (Stanford 2009) 8 SH
- San Francisquito Creek (PG&E 2012) 6 SH
- Bear Creek (CH2M Hill 2007) 12 SH
- Los Trancos Creek (Stanford 2009) 14 SH
- Los Trancos Creek (Stanford 2011) 18 SH





# Status of Steelhead Runs in Three Creeks Study Area (units are total juvenile steelhead per 100 linear feet of stream)

## Stevens Creek

- S. Li (2000) 64 SH
- Blackberry Farms Restoration (2008) 65 SH
- CDFG/Smith (2010) 1 to 51 SH
- Blackberry Farms Restoration (2013) 24 SH

## Guadalupe River

- Guadalupe River (Flood Project 2004-2012)- 0.1 to 5 SH
- Lower Guadalupe Ck (Flood Project 2004-2012) 0.5 to 6 SH
- Upper Guadalupe Ck (S. Li 2000) 28 SH





# Status of Steelhead Runs in Three Creeks Study Area (Continued)

(units are total juvenile steelhead per 100 linear feet of stream)

## Coyote Creek

- Mid-Coyote Flood Baseline (2007) 1.0 SH
- Mid-Coyote Flood Baseline (2008) 0.7 SH
- S. Li (2000) 0.9 SH

## Upper Penitencia Creek

- Mid-Coyote Flood Baseline (2007) 15 SH
- Mid-Coyote Flood Baseline (2008) 4 SH
- S. Li (2000) 6 SH
- Stillwater (2005) 8 SH
- CDFG/Smith (2008-2012) 2 to 11 SH





## Summary of No. Santa Clara County Steelhead Streams

- Very low abundance of steelhead in Coyote Creek and Guadalupe River watersheds
- Populations isolated from other CCC steelhead streams (low potential for straying adults to re-populate area)
- Habitat significantly altered by flood control and water development
- Area represents unique and significant portion of CCC steelhead range
- Improvements on Stevens Creek, Guadalupe River and Coyote Creek are needed to de-list CCC steelhead

# ESA Section 10(a)(1)(B) - permit authority

- The Secretary may permit, under such terms and conditions as he shall prescribe –
  - any taking otherwise prohibited by section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

# Section 10(a)(2)(A) – conservation plan

- The applicant must submit a conservation plan (i.e., Habitat Conservation Plan) that specifies:
  - The impact which will likely result from the taking;
  - The steps the applicant will take to minimize and mitigate the impacts, and the funding available to implement the steps;
  - Alternative actions to the taking the applicant considered and the reasons why they are not being utilized;
  - Other measures NMFS may require as being necessary or appropriate for purposes of the plan.



# Section 10(a)(2)(B) - findings for issuance

- NMFS must make the following findings:
  - The taking will be incidental;
  - The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking;
  - The applicant will ensure that adequate funding for the plan will be provided;
  - The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;
  - The other measures, if any, required by NMFS will be met; and
  - Any other assurances as NMFS may require that the plan will be implemented.





# ITP Permit Findings

"The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild"

# FAHCE draft Settlement Agreement

Section 6.2.2: "Overall Management Objectives: Implementation of the Agreement will restore and maintain healthy steelhead trout and salmon populations as appropriate to each of the Three Creeks, by providing (A) suitable spawning and rearing habitat within each watershed, and (B) adequate passage for adult steelhead trout and salmon to reach suitable spawning and rearing habitat and for outmigration of juveniles."





# Certainty for Fish, Certainty for SCVWD

Challenging task to meet requirements of ITP:

- "maximum extent practicable, minimize and mitigate the impacts of the taking"
- "not appreciably reduce the likelihood of the survival and recovery of the species in the wild"

## "No Surprises" Rule – 1998 (63 FR 8859)

Permittees, who are properly implementing their HCP, will not be required to provide additional conservation and mitigation measures involving the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources without their consent.





# HCP Conservation Strategy and Biological Goals and Objectives

- Development Steps:
- Identify planning unit(s)
- 2. Identify conservation needs
- 3. Deconstruct known activities
- 4. Identify threats/stressors/responses
- 5. Determine conservation measures



# Three Creeks HCP Steelhead Conservation Strategy Questions

- How large of a population can be supported with the habitat available below existing dams?
- Can these steelhead populations become sustainable and resilient over the long-term with only the habitat available below existing dams?
- How much habitat is available above currently impassable dams and how much benefit would that habitat provide to population viability?





# Biological Goals and Objectives

- Defines the expected biological outcome for each species, ecosystem or habitat
- Provides concepts of what HCP is trying to accomplish and guides development of the HCP
- Must be consistent with recovery
- Promotes effective monitoring
- Increase effectiveness of conservation



## **Questions?**

# **NOAA FISHERIES**

Southwest Region



- Gary Stern NMFS
- 707-575-6060
- Gary.Stern@noaa.gov

