SANTA CRUZ COUNTY

FLOOD CONTROL AND WATER CONSERVATION DISTRICT

GOVERNMENTAL CENTER

701 OCEAN STREET, ROOM 400, SANTA CRUZ, CALIFORNIA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123

January 5, 1999

Agenda: January 26, 1999

Board of Directors
Flood Control and Water Conservation District
701 Ocean Street
Santa Cruz, California 95060

Report On Siting Artificial Recharge Locations Discussed at the Santa Margarita Groundwater Basin Advisory Committee

Dear Members of the Board:

The Santa Margarita Groundwater Basin Advisory Committee (Committee) has been meeting since Fall 1995. At their January 1998 meeting, Supervisor Almquist was elected chair and initiated discussion to focus the Committee on two parallel paths. One path would look at the present authority of the Committee for regional decision making as examined through the enabling MOU. The second path involved the consideration for updating the Basin Management Plan emphasizing regional water supply planning. Support for this process was discussed in a staff report to your Board dated March 17, 1998. The process was not supported at the March 25, 1998 meeting of the Committee but unanimous support was expressed to pursue some form of groundwater recharge project.

At the October 28, 1998 Committee meeting, the County's staff to the Committee brought forward a proposal from the Monterey Bay Area Shared Information Consortium (BASIC) for siting Artificial Recharge Locations by Integrated GIS and Remote Sensing. BASIC is a public purpose, non-profit organization. An overview of the BASIC presentation is included as Attachment 1. The different member agencies are expected to report back to the regional Committee of their willingness to support this effort at the January 27, 1999 meeting.

Supervisor Almquist and the County Hydrologist have included the County's Planning Director and GIS Coordinator in informal discussions with members from BASIC on November 24, 1998. BASIC has agreed to support a pilot project study focused in the Santa Margarita Groundwater Basin in conjunction with their NASA Earth Science Information Partners Program. The goal of the effort would be to locate artificial recharge locations which could benefit multiple stakeholders and to identify select land worthy of protection for its groundwater recharge capability.

The level of County support necessary for this effort only involves a commitment of staff time from the County Hydrologist and GIS staff. The County will also

provide available GIS information for this project and help in developing additional GIS information. This level of staff support would require only minimal changes to existing work programs. This report serves to apprise your Board of the pilot project study and the minor work program adjustments necessary to support the effort.

Staff believes that the effort to locate artificial recharge sites will be supported by all member agencies to the Committee. If approved, it is anticipated that the County will develop a Memorandum of Understanding with BASIC for their services and that other member agencies and major stakeholders will comprise a technical advisory committee to oversee the effort. The issue of scope of services and project tasks continues to be discussed by all involved parties. This brief report presents information to your Board for a NASA grant funded process (through BASIC) for Siting Artificial Recharge Locations by Integrated GIS and Remote Sensing. The report also solicits your Board approval for staff support and ultimately your direction to staff on how to proceed on this matter.

It is therefore RECOMMENDED that your Board:

1) Accept and file this report, and

2) Direct staff to report back to the Santa Margarita Groundwater Basin Advisory Committee the County's support for this process of Siting Artificial Recharge Locations and Identifying lands worthy of protection for their groundwater recharge capabilities; and

3) Direct staff to work with BASIC and the Santa Margarita Groundwater Basin Advisory Committee to develop an appropriate scope of work and identify the level of County staff support necessary to complete this planning process.

Sincerely,

Alvin D. James
Planning Director

RECOMMENDED:

for SUSAN A. MAURIELLO
County Administrative Officer

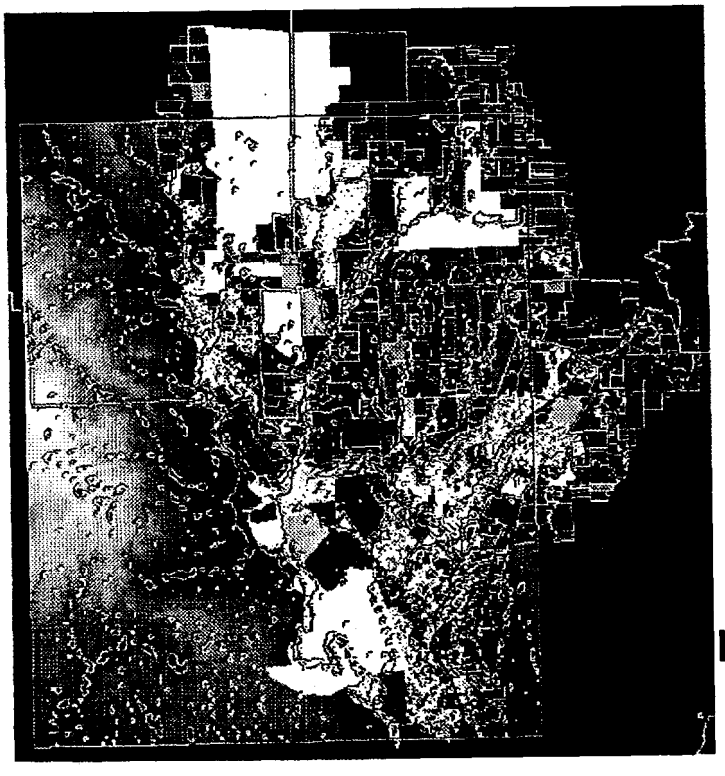
BLC/TsmBMP23

Attachment

Santa Margarita Groundwater Basin Advisory Committee

October 28, 1998

Santa Margarita Groundwater Recharge Possibilities: An Overview



Presented by:

U Win, Ph.D.

Bay Area Shared Information Consortium (Monterey Bay Region)

Santa Margarita Groundwater Basin
Advisory Committee
October 28, 1996

Santa Margarita Groundwater Recharge Possibilities:

An Overview

Presented by:
U Win, Ph.D.
Bay Area Shared Information Consortium (Monterey Bay Region)

Presentation Objectives

- To explore suitability of recharge concept for Santa Margarita Groundwater Basin
- To introduce **BASIC's** Community Assistance Program Under **NASA-**ESIP
- A Preliminary Overview of Santa Margarita Groundwater Basin

Santa Margarita Groundwater Basin

Suitability of Artificial Recharge Concept

Santa Margarita Groundwater Basin

- Santa **Margarita** and Lompico **Aquifers**
- Supplies the **City** of **Scotts** Valley and parts of San **Lorenzo** Valley
- Santa Margarita Aquifer (including Lompico **formation)** is federally designated aquifer, the sole **source** of drinkiig water for **this** region

Santa Margarita Groundwater Basin (Tsm) Hydrologic Concerns

- Depletion of the Santa Margarita Aquifer
  - ➡ **Groundwater levels declined 150'** (in the Pasatiempo Unit, Camp Evers and other parts of Santa Margarita Basin)
  - ➡ **Baseflow** lowered (in Bean Creek, Carbonera Creak and San Lorenzo R)
  - ➡ Available **water supplies reduced** (for San Lorenzo Water District, Scotts Valley, Mt. Hermon and the City of Santa Cruz)
- Extraction from deeper Lompico formation
  - ➡ The last known developable aquifer
  - ➡ Lies under **Pasatiempo, Camp Evers,** El Pueblo and **North Scotts Valley**

0 Possible overdrafting of Lompico Formation

- ➡ **Demand** is higher than estimated safe yield (4,200 af)

Santa Margarita Groundwater Basin (Tsm) Hydrologic Concerns (Cont'd)

- Reduction of primary recharge areas
  - ➡ An estimate of **30%** or more of recharge areas caused by the coverage with **impervious surfaces**

0 Reduction of Stream Baseflows

- ➡ An estimate of at least **25%** stream baseflows cased by **direct stream diversion**

- ➡ **Contamination of groundwater** caused by:
  - ➡ Toxic **compounds** from groundwater storage tanks and other sources in Camp Evers and El Pueblo areas
- Deteriorating Water Qualities caused by:
  - ➡ **Nitrate** (levels S-7 times higher)
  - ➡ Bacteria (levels 20-50 time5 increased)
  - ➡ **Chemical wastes**

County of Santa Cruz

Recommendations:

Applicable to Santa Margarita and Lompico Aquifers

- ➡ Idenffition of diversion points on the streams and estimating amount of diversion
- ➡ Baseflow measurements and investigations on Newell, Zayante, Bean and Carbonera Creeks
- ● Groundwater monitoring
- ➡ Soil erosion and sedimentation monitoring
- ➡ Water supply management
- ➡ Monitoring nitrate and bacteria in surface and groundwater
- ➡ Urban runoff/stormwater monitoring and planning
- ● Planning for sewage collection system
- ● Improving agricultural runoff
- ➡ Development of water resources GIS

1997-98 Scotts Valley Water District

Recommendations:

AB 3030 Groundwater Management Plan

- ● Expand and refine the understanding of hydrogeology of the Santa Margarita Basin for further gmundwater exploration
- ● Continue with water supply monitoring program
- ● Reevaluate water balance
- ● Complete Urban Water Management Plan
- ● Reclaim wastewater
- ● Protect water quality
  - ➡ TDS, Iron and Manganese, VOCS
  - ➡ Septic tank investigation
  - ➡ Updating well database
  - ● monitor recycled water use
- ● Develop Drinking Water Source Assessment Plan

Groundwater Recharge in California – Examples

Fresno Metropolitan Area Artificial Recharge Sites and Water Conveyance Systems

Groundwater Recharge in California – Examples (Cont'd.)

Orange County Water District Groundwater Research Program

- Recharge started since 1949
- Extensive recharge system
- Acquired 1240 acres of land adjacent to or near the Santa Ana River
- In-stream recharge (dikes/pits)
- Spreading ponds
- Water Factory 21 – recharges reclaimed wastewater to hold off seawater intrusion

Groundwater Recharge in California – Examples (Cont'd.)

The Niles Cone Alameda County

Used in-stream facilities for groundwater recharge
- earth dikes
- Inflatable rubber dams
- flashboard dams

Why Artificial Recharge Should be Considered?

In Santa Margarita Basin,
- Need to replenish declining and depleting aquifers
- Need assurance of a constant and long-term potable water
- Need dilution of fresh water inb nitrate contaminated aquifers
- Recharge facilities will also serve as runoff retention and detention facilities in the upstream area reducing soil erosion and flooding in the downstream area
- Recycled regional wastewater can be used for recharge
- Water available From various sources -- precipitation, urban runoff, river and stream runoff, reclaimed water

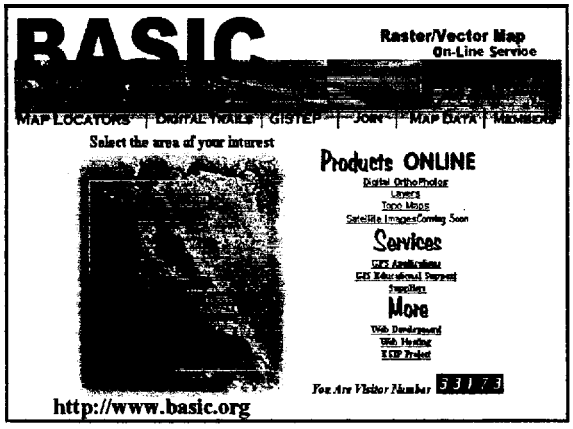
Spreading ponds

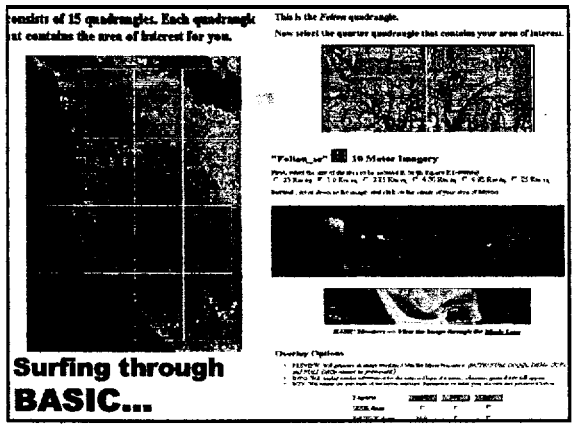
Introduction:

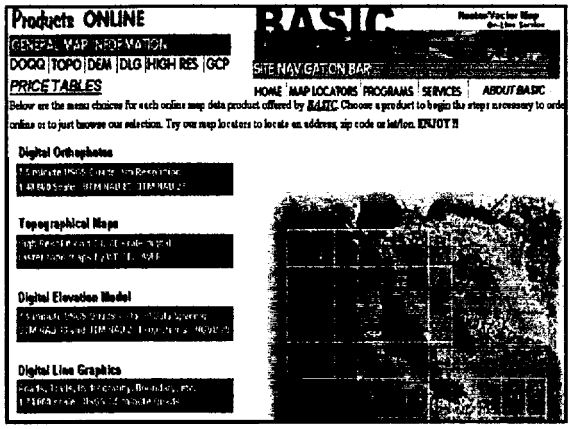
BASIC

Community Assistance Program under

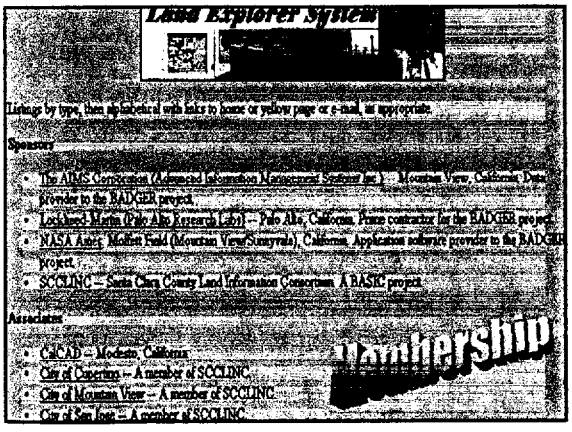
NASA-ESIP

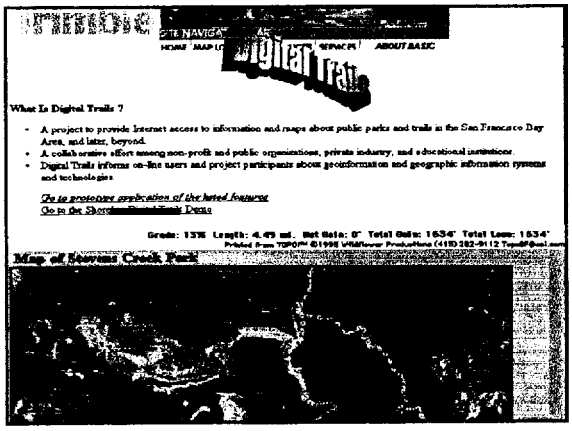


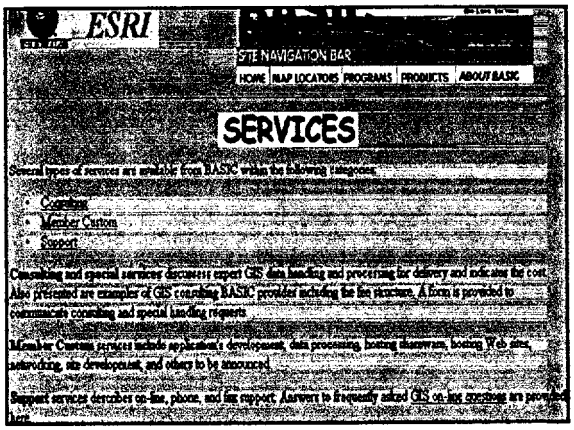


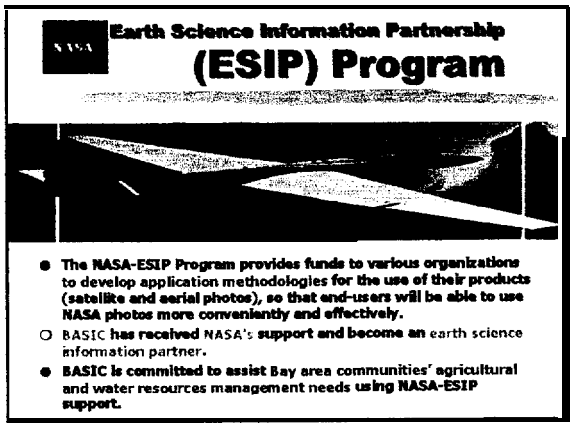


- On-line sharing info with other sntiiies committed to the same goals of resources management
- 4 Preserving and managing natural resources including water
- Managing and servicing your organizational properties and facilities
- 4 Permitting systems (eg. building and other property related permits)
- Real estate business (eg. Flood, Rre, earth-quake zone analysis)
- Hazardous material storage compliance
- Transportation laws compliance
- Transportation planning
- Providing roadway info
- Internet distance teaming
- 4 Communication with customers, the public




Digital Trails
What Is Digital Trails ?
Map of Sherman Creek Park


ESRI
SITE NAVIGATION BAR
HOME
MAP LOCATORS
PROGRAMS
PRODUCTS
ABOUT BASIC
SERVICES


Earth Science Information Partnership
(ESIP) Program
● The NASA-ESIP Program provides funds to various organizations to develop application methodologies for the use of their products (satellite and aerial photos), so that end-users will be able to use NASA photos more conveniently and effectively.
○ BASIC has received NASA's support and become an earth science information partner.
● BASIC is committed to assist Bay area communities' agricultural and water resources management needs using NASA-ESIP support.

What BASIC can do to assist the Santa Margarita Groundwater Basin communities?

- Providing assistance under the NASA-ESIP Program
- Conducting a Reconnaissance Study for Groundwater Exploration and Identification of Recharge Sites in Santa Cruz County: A Pilot Study of the Santa Margarita Groundwater Basin
  - ➡ Remote Sensing Analysis
  - ➡ GPS/GIS Analysis
- Establishing Internet and/or Intranct on-line services for the communities who will sham/exchange info
  - ➡ Define membership
  - Specify, establish and maintain hardware, server, application software and data
- Providing training on on-line Internet/Intranet, GIS uses to the members

Cooperation and Collaboration Needed from the Communities

- Providing available geodata and related data to the groundwater recharge study
- Commitment and cooperation in digital data collection
- Establishment of digital on-line services
- Commitment to trainings

The BASIC Team

Remote Sensing

Jack Paris, Ph.D., Director
SIVA Resources Center
Cal State University-Monterey Bay
(831) 582-4221
e-mail: Jack_Paris@monterey.edu

Meeting Services

Don Wimberly, P.E.
BASIC (Monterey Bay Region)
269 Main St., Ste. 400
Salinas, CA 93901
pgr: 231-8692
e-mail: sfbasic@aol.com

Groundwater Resources Analysis

U Win, Ph.D.
Winner's Circle Consulting
317 W. Curtis St.
Salinas, CA 93906
(831) 449-1182
e-mail: monmonwin@aol.com

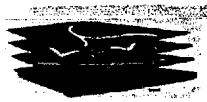
Coordinator

David Etter, Ed.D., President
BASIC
1931 Old Middlefield Way, Ste. H
Montainview, CA 94043
(650) 528-4099
e-mail: detter@basic.org

Priliminary:

An **Overview** of Santa Margarita Groundwater Basin

strategy for Exploration of Groundwater Recharge Possibilities



- ➡ Utilization of **water resources analysis and planning tools** -- Geographic Information System and/or Remote Sensing
- ➡ **Information sharing among interested parties** through Internet and Intranet communication

- ➡ **Geo-data** collection and mapping
- ➡ Identification and mapping of **constraints to groundwater recharge**
- ➡ Identify potential **sources** of water for recharge
- ➡ Locate potential **recharge sites**

Integrated Remote Sensing and GIS for Groundwater Exploration and Identification of Recharge Sites

- **Utilization of GEOSAR** or **relevant photos**
- **Collect and develop** GIS (digital) data
  - ➡ **Geology**
  - ➡ **Geomorphology**
  - ➡ **Land Use**
  - ➡ **Vegetation Cover**
  - ➡ **Soils**
  - ➡ **Digital Elevation Model (DEM)**
  - ➡ **USGS 7.5' Topo maps**
  - ➡ **Water Levels**
  - ➡ **Digital Orthophoto Quads**
  - ➡ **Well Locations (GPS)**
  - ➡ **Stream Diversion Points**
- **Generation of** GIS base map and GIS database
- **Digital image processing**
- Analysis
  - ➡ **General watershed analysis**
  - ➡ **Identification of catchment area**
  - ➡ **Soil erosion**
  - ➡ **Defining recharge zone(s)**
  - ➡ **Contamination zones**
  - ➡ **Sources of water for recharge**
  - ➡ **Selection of recharge sites**