Photo Monitoring and Reporting Protocol
Established by the Executive Officer

Exhibit 26

_____
***for* Kenneth Harris, Jr., Interim Acting Executive Officer**
Revised August 15, 2012

Requirement for Photo Monitoring and Reporting

The Agricultural Order, No. R3-2012-0011 (Part E, ¶ 69, Page 28), and the associated Monitoring and Reporting Program (MRP), Orders No. R3-2012-0011-02 (Part 4A, ¶ 1- 2, Page 14) and R3-2012-0011-03 (Part 4A, ¶ 1-2, Page 14 and Part 7A, ¶ 1-2, Page 20-21), require dischargers to conduct Photo Monitoring and Reporting. The requirement to conduct Photo Monitoring and Reporting applies to Tier 2 and Tier 3 dischargers whose properties contain or are adjacent to a waterbody identified on the 2010 Clean Water Act section 303(d) List of Impaired Waterbodies for temperature, turbidity or sediment.

The Order requires Tier 2 and Tier 3 dischargers to 1) document the condition of perennial, intermittent, or ephemeral streams and riparian wetland area habitat, 2) conduct Photo Monitoring consistent with these protocols established by the Executive Officer, and 3) demonstrate how practices in the photos meet the Basin Plan requirements for Erosion and Sedimentation (Chapter 5, p. V-13, Section V.G.4), including relevant management practices and/or treatment and control measures implemented to prevent conditions, erosion, or sediment discharges that may or do cause or contribute to impairments for temperature, turbidity, or sediment. The Executive Officer may request additional photographs if needed.

The Order requires Tier 2 dischargers to conduct Photo Monitoring and Reporting every four years, at the same photo monitoring point locations, and to submit the photos and associated reports in a format specified by the Executive Officer.

The Order further requires Tier 3 dischargers to implement the same requirements as Tier 2. The MRP Order R3-2012-0011-03 (Part 7A, ¶ 1-2, Page 20-21) further requires Tier 3 dischargers to conduct Photo Monitoring and Reporting annually to document progress on their Water Quality Buffer Plan which is due 2016 (Agricultural Order R3-2012-0011, Part F, ¶ 80-81, Page 30-31).

This protocol describes how to conduct Photo Monitoring and Reporting to meet these requirements.

Methodology for Photo Monitoring

1. Establish Photo Monitoring Points

Place a permanent marker in view of the photo monitoring point if a natural marker (i.e. fencepost or large tree) does not exist. A permanent marker is necessary for a) property owners to ensure that the same location is used for the photo point every four years and b) Water Board Staff to compare the view in subsequent photos taken from the same location.

2. Document Monitoring Points.

Label each photo monitoring point with a unique site code (Global ID # & Photo Point #). Identify the exact location of each photo monitoring point on a ranch map, identified with the unique site code. See additional detailed description below in **Methodology for Documentation and Reporting**.

3. Establish In-stream Condition Photo Monitoring Points

Establish photo monitoring points to document in-stream riparian condition at the upstream and downstream boundaries of the stream, wetland or other waterbody. Include banks of the stream, wetland or waterbody that are adjacent to the ranch property (Diagram 1). If one photo point is not visible from the other (due to a significant bend in the waterbody) or there is more than ½ mile of stream length between photo points, additional photo points must be established (Diagram 2).

In-stream photo monitoring point 001

Establish a permanent photo monitoring point at the downstream most edge of the waterbody on the ranch property. Mark the location with a permanent marker that will be visible in the photo if one does not already exist (such as a large tree or fence post). Position the monitoring point on the top of the bank of the waterbody. Take a minimum of one photo from this monitoring point looking upstream. In this photo, the following should be visible: permanent marker, center of riparian area, waterbody bank, top of bank and vegetation on adjacent non-cropped areas such as a road (Figure 1). Multiple photos may be taken so that they can be overlaid and show all of the above from photo point 001. If multiple photos must be taken at a given photo monitoring point, they shall be labeled with the site point number and letters a-z (i.e.001a, 001b, 001c etc).

In-stream photo monitoring point 002

Establish a permanent photo monitoring point at the upstream most edge of the waterbody on the ranch property. This monitoring location should also be marked with a permanent marker. Position the monitoring point on the top of the bank of the waterbody. Take a minimum of one photo from this monitoring point, looking downstream. Again the following should be visible in the photo: permanent marker, center of riparian area, waterbody bank, top of bank and vegetation on non-cropped areas such as unpaved roads (Figure 1).

Figure 1. Example of in-stream photo 001. This photo shows the permanent marker (orange post), center of waterway, waterbody bank, top of bank and vegetation on non-cropped areas.

Diagram 1. Location of In-stream Condition Photo Monitoring Points.

If there is a significant bend in the waterbody or the ranch has more than ½ mile of stream length, additional photo monitoring points must be established (as shown in Diagram 2). From each of the points, two photos must be taken. The first photo must be taken facing upstream and the second facing downstream. Again, the following should be visible in each photo: center of riparian area, waterbody bank, top of bank and vegetation on non-cropped areas such as unpaved roads. For a ranch like the one shown in Diagram 2, five in-stream photo monitoring points must be established to adequately document the conditions and riparian habitat on the stream banks and in the stream.

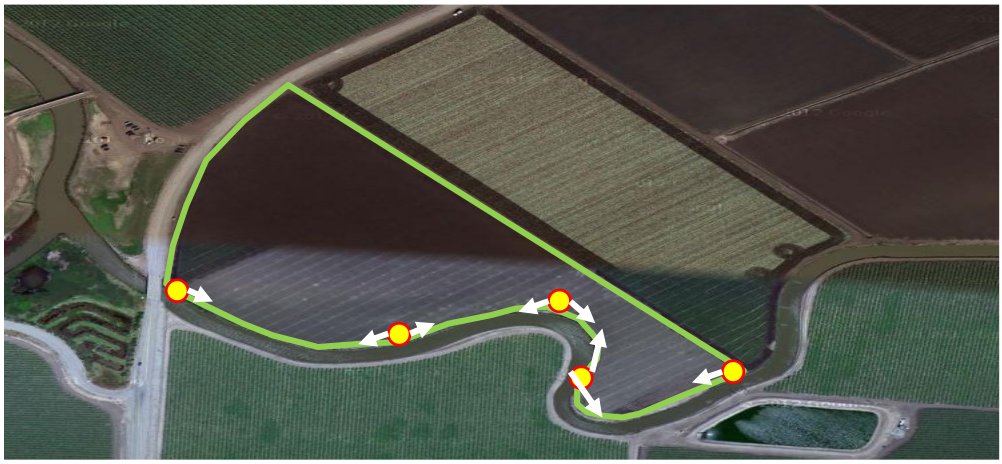


Diagram 2. Additional in-stream condition monitoring points (if needed).

4. Riparian Vegetation Condition Photo Monitoring Points

Establish photo monitoring points to document riparian vegetation condition at a minimum of three locations on the ranch property, positioned 100 feet back from the riparian vegetation edge (and into the fields). Establish the first photo monitoring point at the downstream edge of the waterbody and ranch property. Establish the second point mid-ranch (mid-way between the up and downstream edges). Establish the final photo monitoring point at the upstream most edge of the ranch property. If one edge of the ranch is not visible from the other edge (due to a significant bend in the waterbody), or the ranch has more than ½ mile of stream length, additional photo points must be established.

Riparian vegetation condition photo monitoring point 003 (NOTE: start numbering with three if only two photo points were established for in-stream condition as shown in Diagram 1; otherwise, start numbering consecutively from last in-stream condition photo monitoring point number.)
Establish the photo monitoring point at the upstream edge of the ranch/waterbody and 100 feet away from the top of the waterbody bank (into the field). Face downstream but at a 45-degree angle to the riparian area and take one picture. In this photo, the following should be visible: the upstream edge of the property/waterbody, midpoint of the property/waterbody, the ground adjacent to the riparian vegetation and the riparian vegetation looking downstream. Diagram 3 illustrates the photos needed for each riparian vegetation photo monitoring point.

Riparian vegetation condition photo monitoring point 004 (See NOTE above re: number)
Establish the photo monitoring point at a midpoint between the upstream and downstream edges of the ranch/waterbody. Again, this photo monitoring point must be on the field and 100 feet away from the top of the waterbody bank. From this point take three photos: 1) facing downstream, at a 45-degree angle (photo 004dn), 2) facing directly toward the riparian vegetation (photo 004), and 3) facing upstream, at a 45 degree angle (photo 004up). If there is a significant bend in the waterbody and the edge of the ranch is not visible from this point, establish additional photo points moving downstream and repeat this procedure (Diagram 4). Establish the monitoring points so that the view in one picture slightly overlaps with the next point.

Riparian vegetation condition photo monitoring point 005 (See NOTE above re number) Establish the photo monitoring point at the downstream edge of the ranch/waterbody and on the field, 100 feet away from the top of the waterbody bank. Face upstream but at a 45 degree angle to the riparian area and take one picture. In this photo, the following should be visible: downstream edge of the property/waterbody, midpoint of the property/waterbody, ground adjacent to the riparian vegetation and riparian vegetation looking upstream.

Diagram 3. Top of diagram is upstream from bottom of diagram. Photographer is positioned 100 feet back from the water's edge, standing in the field.

Diagram 4. Additional riparian vegetation condition monitoring points (if needed).

5. Photos Documenting Management Practices

Additional photos must be submitted to document any management practices and/or treatment and control measures used to prevent conditions, erosion or sediment discharges that may or do cause or contribute to impairments for temperature, turbidity, or sediment. There is no specific photo monitoring protocol for photos documenting additional management practices or measures that are not located at established photo monitoring points. However, any photos taken to document management practices or measures must be reported with a brief form to identify the location and type of practice or measure. Label photos documenting additional management as described below in the Methodology and Documentation for Reporting section.

Methodology for Documentation and Reporting

Dischargers will maintain photo monitoring point data, including a map showing exact locations of each photo monitoring point, photos and completed photo reporting forms, in their Farm Plan. Discharges will submit photo monitoring point data upon request of the Executive Officer. Dischargers must maintain the following information in the format specified below.

1. Ranch map showing exact location of each photo monitoring point and including:
   - Points showing the location of each photo monitoring point
   - Labels for each photo monitoring point (unique site code)
   - Map scale
   - North marker
   - Landmarks such as labeled road crossings and waterways.

2. Photos- Labeling, Mapping and Describing
   - In-stream and riparian vegetation condition photos must be labeled to include the following information:
     - Unique site code (Global ID # & Photo Point #)
       - Note, Global ID appears on the ranch information page as follows: "Global ID: AGL##########"
     - Photo Date (Formatted: DayMonthYear or 05May2012)
   - Each in-stream or riparian condition photo must be labeled with this format: Global ID #_Site#_Date.jpg. For example, a photo taken at site 003 on Global ID # 1234 on May 5th 2012 would have the following label: AGL1234_003_5May2012.jpg
   - Additional management practice photos must be labeled as follows: Global ID #_MP_###_Date.jpg. For example, If two practices are documented with photos, on Global ID # 1234 taken on May 5th 2012, Photos must have the following labels: AGL1234_MP001_5May2012.jpg and AGL1234_MP002_5May2012.jpg
   - All photos must be one of the following formats (JPEG, GIF, TIFF or BMP)
   - If possible, use a camera with a GPS feature (such as smart phones or tablets) so that the coordinates of the photo locations are automatically associated with the picture file.

3. Photo Documentation Reporting Forms
   - Each photo must be delivered with a photo documentation form (Attachment 1, available in word format at:

http://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/index.shtml, See link under "Grower Workshops and Resources."). Each form records the following data and information about a single photo: Photo monitoring point data including AGL#, waterbody name, purpose of the photo, photo monitoring point #, coordinates and date.

- Explanations and descriptions of the management practices demonstrated in the photos (if applicable)
- Estimated widths of buffer and riparian areas from top of bank (top edge of water holding capacity for the waterbody) to the edge of either cropped area or non-cropped areas like roads, whichever is closer. This should be an estimate of the average width for the view in the photo.

4. Reporting:
   - Dischargers are NOT required to submit the map, photos or photo documentation forms to the Central Coast Water Board.
   - All photos and photo documentation forms must be *maintained in the farm plan* as of October 1, 2012.
   - Dischargers must conduct the same photo monitoring procedures and documentation, and add the items in 1-3 above to the farm plan again in four years, by October 1, 2016.
   - Photo monitoring documentation must be submitted to the Water Board upon request of the Executive Officer.
   - Dischargers must indicate on the Annual Compliance Form Section K, if and when they have completed the documentation required as in 1-3 above and added it to the farm plan as required.

Definitions

Riparian vegetation or vegetated cover- the naturally occurring vegetation found along creek channels, typically willows and other trees, shrubs, and grasses.

Width of vegetated cover- the width measured or estimated for each bank from top of bank to edge of vegetation.

Right bank- bank on the right while the observer is facing downstream.

Left bank- bank on the left while the observer is facing downstream.

References

Hall. F.C. March 2002. Photo Point Monitoring Handbook: Part A-Field Procedures. U.S. Department of Agriculture, Forest Service. Portland, OR.

Photo Monitoring and Reporting Protocol

ATTACHMENT 1

Photo Documentation Reporting Form
(Use one form for each photo taken.)

This Form is available in word format at:
http://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/index.shtml,
See link under "Grower Workshops and Resources."

Global ID (AGL) #: _____ Photo Monitoring Point #:_____

Photo Point Coordinates (NAD 83): Latitude:_____Longitude:_____

Waterbody Name: _____ Photo Date: _____

Description of the photo monitoring point purpose and view in each photo (Choose one)

In-stream condition(photo on bank)
Riparian vegetation condition (photo 100 ft back from bank)

1. Identify Management Practice(s) Demonstrated in Photo (Choose One or more of the following).

Maintain vegetative cover (Herbaceous plants)
Maintain vegetative cover (small woody plants, < 15 ft tall)
Maintain vegetative cover (large woody plants , >15 ft tall)
Plant vegetative cover, filter or buffer strip (Herbaceous plants)
Plant vegetative cover, filter or buffer strip (small woody plants, < 15 ft tall)
Plant vegetative cover, filter or buffer strip (large woody plants , >15 ft tall)
Vegetative treatment system
Seeding (hydro seed or hydraulic planting)
Rolled Erosion Control Products (Biodegradable netting, mats or blankets)
Biodegradable mulches (straw or fiber), netting or mats
Gravel or rock to stabilize soil
Impervious covers (plastic or woven sheeting)
Sediment control basin or traps
Silt fences
Tracking Control (rumbles strips or rock)
Other _____
None

2. Identify the dominate type of cover on the right bank (Choose one of the following).

   Trees
   Shrubs
   Grasses
   Bare Soil
   Other
   Not applicable, not my property

3. Estimate average width of riparian vegetated cover on the right bank (top of bank to edge of farm or non-cropped areas such as a road). Choose one of the following:

   Not applicable, not my property
   0 ft (bare soil)
   1-5 ft
   6-10 ft
   11-15 ft
   15-20 ft
   21-25 ft
   26-30 ft
   > 30 ft

4. Identify the dominate type of cover on the left bank (Choose one of the following).

   Trees
   Shrubs
   Grasses
   Bare Soil
   Other
   Not applicable, not my property

5. Estimate average width of riparian vegetated cover on the left bank (top of bank to edge of farm or non-cropped areas such as a road). Choose one of the following:

   Not applicable, not my property
   0 ft (bare soil)
   1-5 ft
   6-10 ft
   11-15 ft
   15-20 ft
   21-25 ft
   26-30 ft
   > 30 ft

Exhibit 27

United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

General Technical
Report
PNW-GTR-526
March 2002

Photo Point Monitoring Handbook:

Part A–Field Procedures

Frederick C. Hall

Author

Frederick C. Hall was senior plant ecologist (now retired), U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, Natural Resources, P.O. Box 3623, Portland, OR 97208-3623. This paper is published by the Pacific Northwest Research Station in cooperation with the Pacific Northwest Region.

The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

Photo Point Monitoring Handbook:

Part A–Field Procedures

Frederick C. Hall

Part A contains pages 1–48

Published By:
U.S. Department of Agriculture
Forest Service
Pacific Northwest Research Station
Portland, OR
General Technical Report PNW-GTR-526
March 2002

Abstract

Hall, Frederick C. 2001. Photo point monitoring handbook: part A—field procedures. Gen. Tech. Rep. PNW-GTR-526. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p. 2 parts.

This handbook describes quick, effective methods for documenting change in vegetation and soil through repeat photography. It is published in two parts: field procedures in part A and concepts and office analysis in part B. Topics may be effects of logging, change in wildlife habitat, livestock grazing impacts, or stream channel reaction to land management. Land managers, foresters, ranchers, wildlife biologists, and land owners may find this monitoring system useful. Part A discusses three critical elements: (1) maps to find the sampling location and maps of the photo monitoring layout; (2) documentation of the monitoring system to include purpose, camera and film, weather, season, sampling system, and equipment; and (3) precise replication in the repeat photography.

Keywords: Monitoring, photography.

Preface

This handbook is a synopsis of repeat photography principles and photo point sampling from the publication *Ground Based Photographic Monitoring*, PNW-GTR-503, which is based on 45 years of experience in repeat photography by the author. During those years, many nuances were discovered that bear discussion and emphasis so that new users can avoid the pitfalls I ran into. The terms *should*, *must*, *do not*, and *will* are used to help users avoid problems and are not meant as rules.

Contents

1 **Introduction**
1 **Basics**
1 Photo Monitoring Objectives
7 Selecting an Area
8 Locating the Monitoring System
12 Relocating Photo Points
15 When to Photograph
18 Photograph Identification
18 Describing the Topic
18 **General Photography**
20 Concept
21 Equipment
23 Technique
24 **Topic Photography**
24 Concept
26 Equipment
26 Technique
33 Analysis of Change
33 Topic Description
34 **Shrub Profile Photo Monitoring**
34 Concept
34 Guidelines
35 Procedures
41 Equipment
41 Technique
43 **Tree Cover Sampling**
45 Concept
45 Equipment
46 Technique
49 **Literature Cited**

Introduction

Anyone interested in quick and effective documentation of change in vegetation or soil through repeat photography will find this handbook useful. Illustrations cover such topics as streamside changes, riparian willow response to beavers, logging, livestock use, and mountain pine beetle (*Dendroctonus ponderosa*) kill of lodgepole pine (*Pinus contorta* var. *latifolia* Englm.). People, such as foresters, ranchers, wildlife biologists, and nature enthusiasts, interested in natural resources can establish photo point monitoring (discussed here) to appraise changes (see part B) in natural resources. No special skill or training is required other than some knowledge of cameras.

There is one essential criteria if repeat photography is used to document change. Distance from camera to photo point **must** remain the same (part B). For this reason, both the camera location and photo point require permanent markers. The system recommended is use of cheap fenceposts or steel stakes, usually ½ inch (1.2 cm) diameter concrete reinforcing bar.

This field procedure handbook is divided into several parts: basic foundations for photo monitoring, with discussions on objectives, selecting an area, techniques for general photography, procedures for specific topic pictures, shrub profile monitoring, and tree cover sampling. Use of forms in part B are illustrated.

Basics

The primary consideration in photo monitoring is an objective. Ask yourself several questions: What is the topic of this photograph? Why do I want to take this picture? What am I trying to show? What appeals to me? What will the picture demonstrate? (Hedgecoe 1994, Johnson 1991).

Photo Monitoring Objectives

Consider the five basic questions for any inquiry: why, where, what, when, and how (Borman 1995, Nader and others 1995).

Why—"Why" to monitor reveals the question or questions needing to be answered. Implementation monitoring asks **if** we did what we said, effectiveness asks if it **did** what we wanted, and validation asks if it **is** meeting the objectives. The "why" question

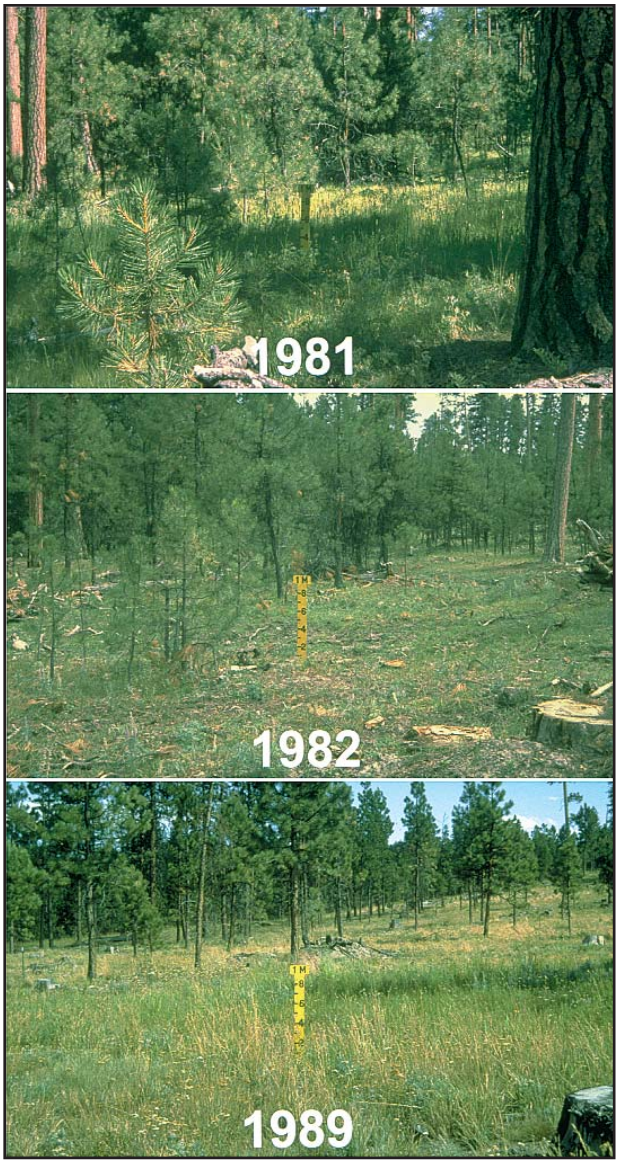
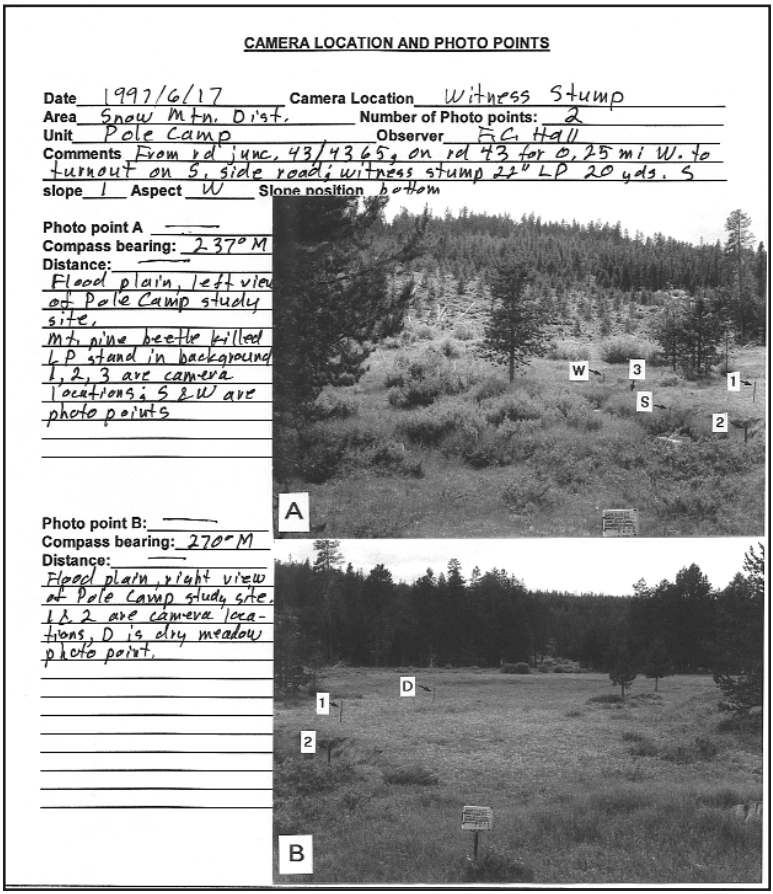


Figure 1—A ponderosa pine stand with pinegrass ground vegetation showing effects of logging: undisturbed in 1981, 1982 after the first selection cut, and in 1989 after the second selection cut and precommercial thinning. These views, with their dramatic differences, emphasize the need for permanent marking of both camera locations and photo points. Exact picture reorientation uses the "1M" of the meter board as the photographic center (also see fig. 18) and for focusing the camera for best depth of field at the meter board.



CAMERA LOCATION AND PHOTO POINTS

Date 1997/6/17 Camera Location Witness Stump
Area Snow Mtn. Dist. Number of Photo points: 2
Unit Pole Camp Observer E.C. Hall
Comments From rd junc, 43/4365, on rd 43 for 0.25 mi W. to turnout on S. side road; witness stump 22" LP 20 yds. S
slope 1 Aspect W Slope position bottom

Photo point A
Compass bearing: 237° M
Distance:
Flood plain, left view of Pole Camp study site, Mt. pine beetle killed LP stand in background 1, 2, 3 are camera locations; S & W are photo points

Photo point B:
Compass bearing: 270° M
Distance:
Flood plain, right view of Pole Camp study site. 1 & 2 are camera locations, D is dry meadow photo point.

Figure 2—Filing system form “Camera Location and Photo Points” showing general photographs of Pole Camp taken from the witness stump: (**A**) the left landscape, and (**B**) the right landscape diagramed in figure 6. Note repeat of fenceposts 1 and 2 in both pictures. Fenceposts identify camera locations 1, 2 and 3 and photo points “D” for the dry meadow, “W” for the wet meadow, and “S” for the streambank. Photo identification cards similar to figure 10, a form from part B, appendix A, are at the bottom of each picture. The purpose of these photographs is twofold: to illustrate the general sampling area and to show location of the photo monitoring layout. Used in conjunction with the map in figure 6, someone other than the original sampling crew could find and rephotograph this site.

sets the stage for all other discussion. Is a proposed treatment to be monitored (fig. 1)? Is animal distribution to be appraised? Are things changing as a result of management decisions (Borman 1995, Nader and others 1995)?

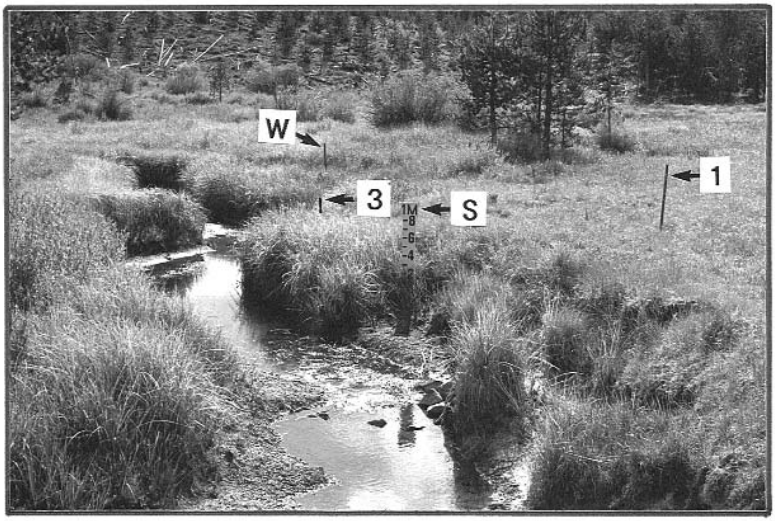


Figure 3—A general photograph taken in 1997 at Pole Camp; the topic is streambank stability. This streambank photo point is taken upstream from camera location 2 (shown in fig. 2 and on the map in fig. 6). Fencepost 1 is camera location 1, fencepost 3 is camera location 3 looking downstream at photo point "S," "S" is the photo point for the streambank, and fencepost "W" is the photo point for the wet meadow.

Where—"Where" to monitor depends on the "why." How does one select representative tracts, animal activity areas, treatment sites, or particular kinds of treatments? How are number, size, and location of activities, such as fire, logging, revegetation, livestock grazing or flood, selected? Ask yourself, "Where is the best location that will answer my questions (fig. 2; Borman 1995, Nader and others 1995)?" Critical documents are a map to locate the site and a site map to document all camera locations and photo points.

What—"What" to monitor means selecting specific items (topics) on the tract to support the "why" questions: vegetation, soil, streambanks (fig. 3), or animals. Ask yourself, "What are the critical few items that must be documented? What is expected to change? What will the picture demonstrate (Borman 1995, Johnson 1991, Nader and others 1995)?" The "what" dictates the sampling layout.

Figure 4—Pole Camp "W" (wet meadow) photo point showing three dates of the same year. June 15 is before scheduled grazing, August 1 is at change in rotation pastures, and October 1 is after grazing. This pasture was rested from June 15 to August 1. October 1 illustrates the degree of livestock use on Kentucky bluegrass at the meter board, on aquatic sedge behind the board, and on willows.

When—“When” to monitor supports the “why” and “what” questions. Does it encompass a year or years? one or more times a year (fig. 4)? specific dates? specific time(s) of day (Borman 1995, Nader and others 1995)? All are important with both animal and site monitoring. Scheduling when to photograph deals with before and after treatment and how often thereafter. Unplanned disturbances, such as fire or flood, pose special problems. A monitoring protocol may have to be developed on the spot during an event to establish photo points and define a followup schedule.

How—“How” to monitor is determined by “what” as influenced by “why” and “when.” It may encompass detailed protocols for photographic procedures, which may be to obtain either qualitative data (estimates) or quantitative data (measured in the field or measured from photographs).

A simple question might deal with effects of livestock grazing on a riparian area: (1) Are streambanks being broken down? (2) Are riparian shrubs able to grow in both height and crown spread? (3) Is there enough herbage remaining after grazing to trap sediments from flooding? (4) Is herbaceous vegetation stable, improving, or deteriorating?

These questions require selection of a sampling location, placement of enough photo points to answer each of the four questions, and establishment of camera locations to adequately photograph each photo point. Try to select camera locations that will photograph more than one photo point. Next, time or times of year to do the photography must be specified, such as just prior to animal use of the area, just after they leave, or fall vegetation conditions. Will a riparian site be monitored for high spring runoff? late season low flows? or during floods? Monitoring of stream flows vs. animal use probably will require different scheduling.

Recommendation—Write down the specific objectives and protocols for each photo monitoring project. Write them so that someone other than the installer can understand the purpose, can follow the protocols, and can become enthusiastic about the project.

Selecting an Area

Selection of a monitoring area requires a great deal of professional expertise liberally mixed with artistic finesse. The **purpose** for photographic monitoring is the most critical factor in considering where to monitor (Borman 1995, Nader and others 1995): Where in the landscape is my topic of concern, and once at the area, what kind of change do I want to document? In some cases, "where" is straight forward; for example, documentation of logging impacts requires an area being logged (fig. 1), and effects of beavers on a stream requires beaver dams. On the other hand, documentation of impacts from livestock grazing requires understanding livestock distribution plus knowing the location of areas sensitive to grazing and the most critical season of use.

Once in an area, the real decisions must be made. Determine specifically what to monitor for change. Figure 2 shows two general views of Pole Camp in northeast Oregon where some examples of photo monitoring are located. The purpose was to document effects on a riparian area from livestock grazing. Pole Camp was selected because it was preferred by livestock. Specific objectives were to evaluate grazing effects on streambanks (fig. 3); willow (*Salix* spp.) shrub utilization (fig. 3); differences in use between Kentucky bluegrass (*Poa pratensis* L.) by the fencepost on the right (1) and aquatic sedge (*Carex aquatilis* Wahlenb.) at the fencepost in the left background (W). The topic in figure 3 is streambank stability.

Figure 1 is a different situation. The purpose for photo sampling was to document effects of a two-stage overstory removal and subsequent precommercial thinning on stand structure and ground vegetation. The sale area determined the site. Stand conditions of open ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.) and clumped reproduction across an opening were chosen for the photo point. The opening was selected to avoid tree crown encroachment between the camera location and photo point and to appraise logging effects on livestock forage. It was photographed before and after each entry to log.

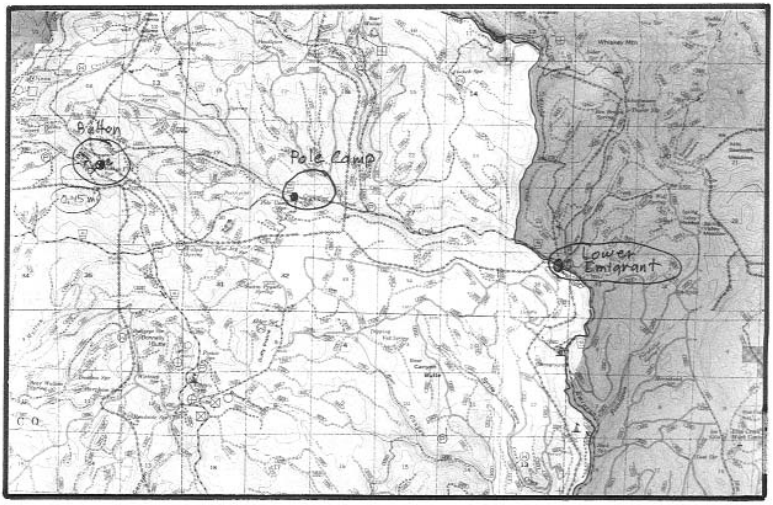


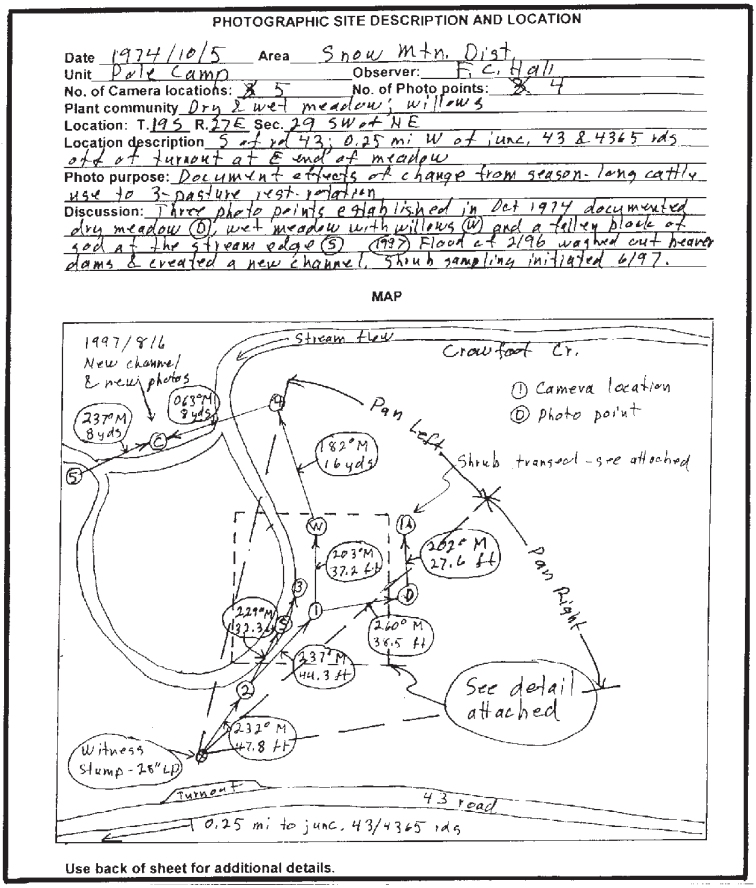
Figure 5—USDA Forest Service ranger district map showing location of the Button Meadow, Pole Camp, and Lower Emigrant riparian study sites. Road numbers, mileage from road junctions, and directions to the witness sites are given on the filing system form “Photographic Site Description and Location” (fig. 6).

After appraising the area, establish the photo monitoring system as discussed below in “General Photography” and “Topic Photography.” The sampling layout must be mapped as described next.

Locating the Monitoring System

Assume that the person installing the monitoring program will **not** be the one to find and rephotograph the area. Provide maps and instructions accordingly. A local map showing roads and the site locates Pole Camp, one of three locations for the Emigrant Creek riparian study (fig. 5).

After laying out the photography system, select a witness site to mark the area. Identify it with a permanent marker, such as an orange aluminum tag, and determine direction and measured distance to camera locations, photo points, or both. Inscribe these on the identification tag. Next map the camera locations and photo points with directions and measured distances on the filing system form “Photographic Site Description and Location” (fig. 6), found in part B, appendix A. Note whether the direction



PHOTOGRAPHIC SITE DESCRIPTION AND LOCATION

Date 1974/10/5 Area Snow Mtn. Dist.
Unit Pole Camp Observer: E. C. Hall
No. of Camera locations: ~~3~~ 5 No. of Photo points: ~~3~~ 4
Plant community Dry & wet meadow; willows
Location: T. 19S R. 27E Sec. 29 SW of NE
Location description 5 of rd 43; 0.25 mi W of junc. 43 & 4365 rds off of turnout at E end of meadow
Photo purpose: Document effects of change from season-long cattle use to 3-pasture rest-rotation
Discussion: Three photo points established in Oct 1974 documented dry meadow (D), wet meadow with willows (W) and a telley block of sod at the stream edge (S). (1997) Flood of 2/96 washed out beaver dams & created a new channel. Shrub sampling initiated 6/97.

MAP

Use back of sheet for additional details.

Figure 6—Filing system form "Photographic Site Description and Location" showing the monitoring layout for Pole Camp. In the lower left corner is a reference to the junction of roads 43 and 4365 at 0.25 mile (0.4 km). Immediately opposite the road turnout is a lodgepole pine witness stump 28 inches (71 cm) in diameter. An aluminum tag, orange for visibility, is attached to the stump with directions and distances to camera locations. An additional map, noted by the square labeled "See detail attached," is shown in figure 17. It documents triangulation of the streambank photo point "S." Another note, "Shrub transect - see attached," refers to an installation in 1997, which is shown in figures 22, 23, and 25 dealing with shrub profile photo monitoring.

is taken in magnetic or true degrees by indicating either "M" or "T." A 21-degree deviation in the Pacific Northwest must be accounted for. Measure distances between the witness site, camera locations, and photo points on the ground. Do not attempt conversion to horizontal distance.

Fenceposts or stakes—Monitoring, by definition, means repeated observation; therefore, all camera locations and photo points must be permanently marked. The recommended method is stamped metal fenceposts shown in figures 2 and 3. In 2000, these cost about $2.75 each for a 5-foot (1.5-m) post. Stamped metal has several advantages over strong T-bar posts: they are flimsy and will bend if driven over by a vehicle or run into by an animal; they will bend flat and remain in the ground to mark the spot; they resist theft because they are just as difficult to pull out as a good fencepost but are not worth the trouble; and they are easy to carry and pound. The primary advantage of flimsy fenceposts is their visibility, as seen in figures 2 and 3. If visibility is not desired, steel rebar stakes are a choice but require a metal detector for relocation (White's Electronics, Inc. 1996).

Steel stakes, preferably concrete reenforcing bar (rebar) have been used and may be required for shallow soils, areas that will be disturbed, or locations where fenceposts may be obtrusive. If disturbance or shallow soils prevents the use of fenceposts, stakes should be driven flush with the ground. If left a few inches above the ground, stakes will damage tires, hooves, or feet. They are always difficult to find. When driven flush with the ground, they require a metal detector for relocation (White's Electronics, Inc. 1996), but even then, the stakes must be of some mass for detection with a simple, $250 machine. Angle iron should be 1 inch (2.5 cm) on the angle and at least 12 inches (30 cm) long. Cement reenforcing bar should be at least ⅜ inch (1 cm) in diameter and at least 12 inches (30 cm) long. Shorter lengths may be needed for shallow soils.

Distance from camera to photo point—One overriding consideration in photo monitoring is to use the same distance between the camera location and photo point for all subsequent photography of that sample. Any analysis of change depicted in the photographs can be made **only** when the distance remains the same (part B). Therefore, always **measure** the distance from camera location to photo point and mark with steel fenceposts or stakes.

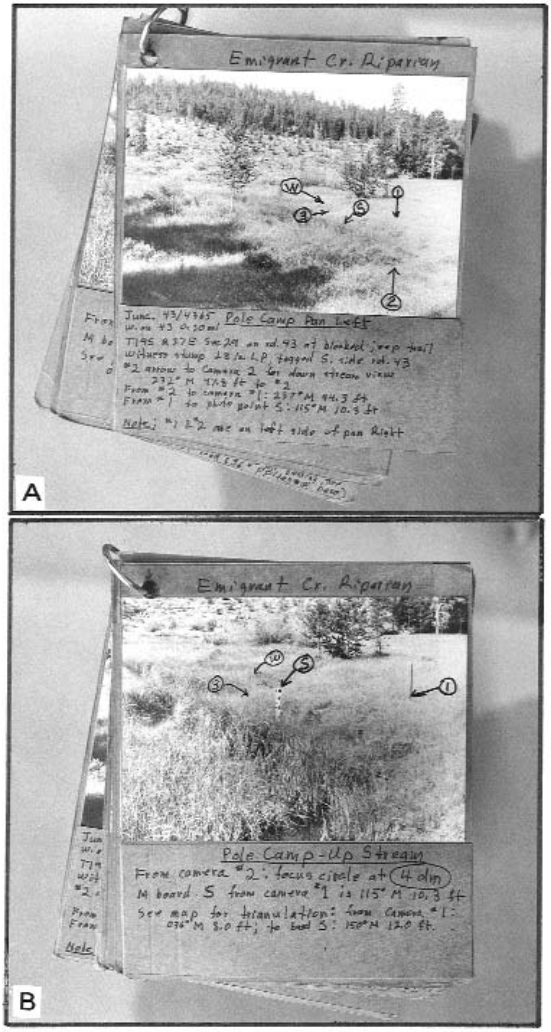


Figure 7—A site locator fieldbook is my system for finding camera locations and photo points. It is a pocket-sized set of photographs and directions mounted on cardboard (file separator thickness). (**A**) The left landscape view of the sampling area at Pole Camp shown in figure 2. (**A**) also locates camera locations 1, 2, and 3. Camera location 1 has two photo points: “D” is Pole Camp dry meadow and “W” is Pole Camp wet meadow (figs. 2 and 6). (**B**) The upstream photo point taken from camera location (2) to “S” (illustrated in fig. 3). A map of this area is shown in figure 6.

A fixed distance for all photo monitoring is not required. It may differ from one photo point to another. Camera format also may change, such as first pictures with a 50mm lens and next pictures with a 35mm lens, but distance must remain the same. It can remain the same in repeat photography only if permanently marked.

Site locator fieldbook—A photo monitoring fieldbook is recommended for carrying the original photos and some intervening photographs into the field (fig. 7). If previous photographs were done by different people, you may discover some disorientation of subsequent views. For that reason, a copy of the original photograph is very important. Rephotograph from the original and not from any misoriented intervening views.

My system for Pole Camp is depicted in figure 7. Figure 7A is a landscape view of the Pole Camp flood plain from the witness site that identifies camera locations and some photo points. It locates the left of two flood-plain scenes, both shown in figure 2 (and mapped in fig. 6). Figure 7B is a view from camera location 2 to photo point “S” on the streambank, the scene in figure 3.

The pocket-size booklet has a picture from each witness site to each camera location and photo point and includes directions from the witness site to camera location and orientation of the photo point.

Once at the area, review the photographs for changes in vegetation. Next, note the number of years since the last photograph, particularly if it was taken more than 3 years previous. The purpose is to evaluate change in the vegetation that might make previous photographs difficult to interpret (fig.1).

Relocating Photo Points

If camera locations and photo points were not marked, they may be approximated by the following triangulation procedure. Align items in the original photograph as shown in figure 8A. Start in the center of the photograph to orient the direction of the picture and draw line 1 on the photo, the photo point direction. Then, for

Text continues on page 15.

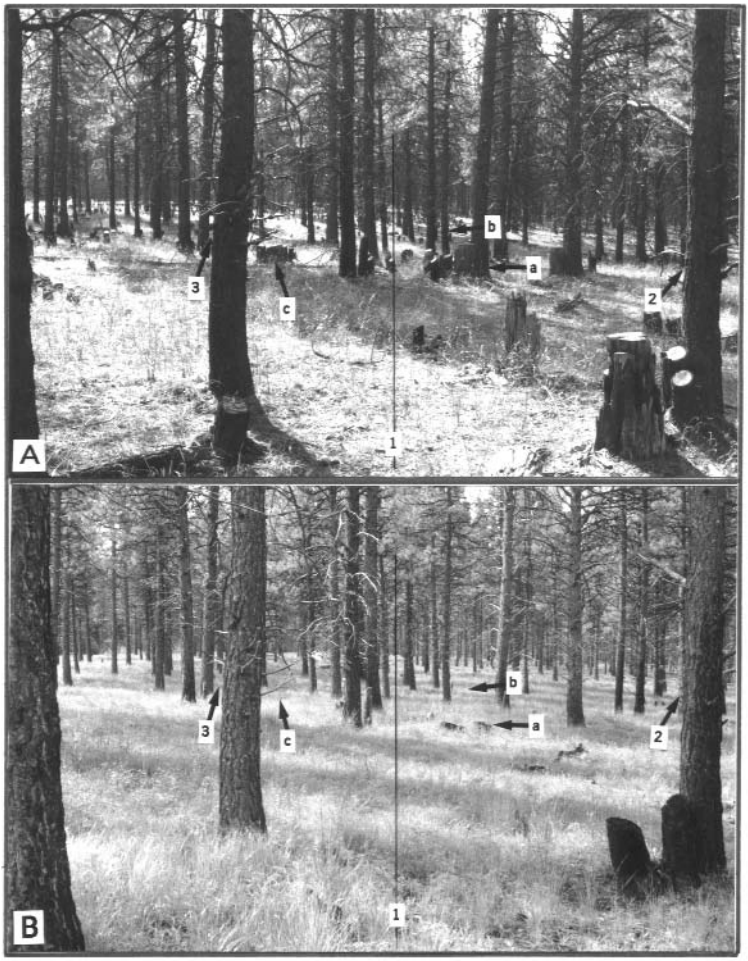


Figure 8—Photograph reorientation uses a black-and-white photo on which a triangulation system is diagramed. A center line (1) is established on the original photograph (**A**) for direction. The center line is identified by position of trees in the background and framing the picture with trees in the foreground. Then positions of items 2 and 3 at the sides of the picture are used to triangulate the camera location. Looking to the right, note the position of trees at arrow 2 while also looking left for tree positions at arrow 3. For (**B**), the photographer moves forward and backward along the center line until items at arrow 2 and arrow 3 are aligned. Try to include some unusual object in the photograph, such as the pair of stumps in the lower right corner. Photograph (**A**) is preunderburn condition and (**B**) is postburn and salvage of killed trees. In (**B**), note the missing trees at arrows “a” and “b,” and a burned-out stump at arrow “c.”

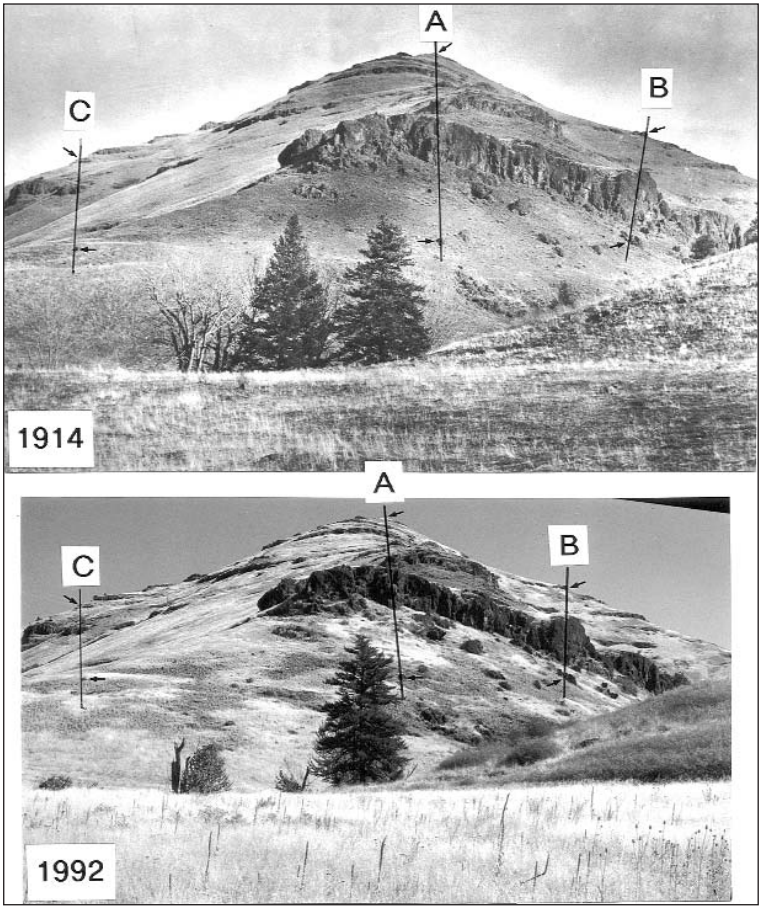


Figure 9—Relocation of a historical photograph taken in 1914 of Branson Creek, Wallowa County, Oregon. Skovlin and Thomas (1995, p. 22-23) took the bottom view in 1992. On a copy of the original (1914) photo, mark orientation lines. “A” identifies the centerline orientation. Then choose objects on the edges of the picture, such as “B” and “C,” to triangulate location of the original camera. Once centered on the original photograph, move forward or backward until the angles of B and C are similar to the original photograph. Slight differences in orientation lines between 1914 and 1992 suggest that in 1992, the camera was a few yards left of the original location. The usefulness of black-and-white photographs is illustrated here by being able to draw triangulation lines directly on a copy of the 1914 picture.

the camera location, find items on the sides of the picture, shown by arrows 2 and 3, to triangulate the location. The items are distances between trees. Move forward or backward along line 1 (fig. 8B) to repeat the distances shown at 2 and 3. This is the camera location and photo point direction. Mark the camera location with a fencepost and add a meter board (photo point) location 25 to 35 feet (8 to 10 m) distant.

Figure 9 applies this triangulation concept to relocation of landscape photographs.

If major vegetation manipulation has occurred as shown in figure 1, relocation may be very difficult.

When to Photograph

When to photograph is usually determined by the activity being monitored. Pole Camp, for example, is part of a study evaluating effects of cattle grazing on a riparian area. Figure 3 illustrates one topic of concern, streambank stability. Photographs have been taken three times per year to correspond with livestock activity: June 15 just before grazing, August 1 as cattle change pastures, and October 1 after animals leave the allotment (fig. 4). This three-season monitoring is repeated every year.

Figure 1 illustrates a very different monitoring schedule. Photographs were planned for the first week in August as an index to appraise vegetation development. They were taken just before logging and in each of the two seasons after cutting to document rapid changes in ground vegetation. Then a 5-year rephotography cycle was established to follow slower changes in both stand structure and ground vegetation. The routine was repeated with the second logging and the precommercial thinning.

If vegetation is a primary topic, consider establishing a fixed date or dates for rephotography. Established dates have several advantages: (1) they set a consistent reference point to evaluate seasonal differences in plant phenological development, (2) they provide a consistent reference for comparing change over several years, and (3) they establish a consistent time interval over which change is documented.

Text continues on page 18.

DATE_____

AREA_____

UNIT_____

CAMERA: 1 2 3 4 5

PHOTO: A B C D

E F G H I J

Figure 10—An example of a photograph identification card to be placed in the camera view (fig. 2). This has been reduced to 60 percent of its original size. Part B, appendix A has blank forms that can be reproduced onto dark blue paper. The best paper colors are Hammermill Brite Hue Blue or Georgia Pacific Papers Hots Blue. Light colored paper, common in the office environment, bleaches out under direct sun and should not be used.

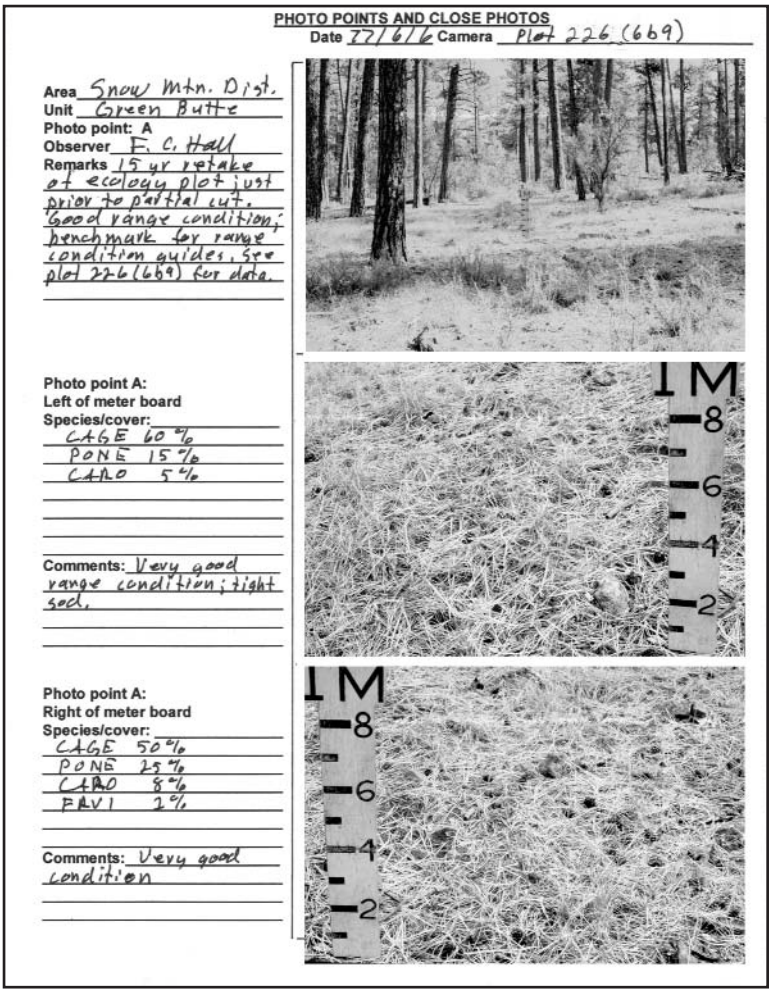


PHOTO POINTS AND CLOSE PHOTOS
Date 77/6/6 Camera Plot 226 (669)

Area Snow Mtn. Dist.
Unit Green Butte
Photo point: A
Observer F. C. Hall
Remarks 15 yr retake of ecology plot just prior to partial cut. Good range condition; benchmark for range condition guides. See plot 226 (669) for data.

Photo point A:
Left of meter board
Species/cover:
CAGE 60 %
PONE 15 %
CARO 5 %

Comments: Very good range condition; tight sod.

Photo point A:
Right of meter board
Species/cover:
CAGE 50 %
PONE 25 %
CARO 8 %
FRVI 2 %

Comments: Very good condition

Figure 11—Filing system form “Photo Points and Close Photos” documenting a ponderosa pine/elk sedge community. This area had not been previously logged and had only sporadic sheep use because water was 1.5 miles (2.4 km) distant. The general view is followed by pictures to the left and right of the meter board. The concept is to show both a general view and a pair of closeups to document change. Figure 18 illustrates what happened in this view after logging and 18 years later. Species noted are: CAGE (*Carex geyeri* Boot.), PONE (*Poa nervosa* (Hook.) Vasey), CARO (*Carex rossii* Boot.), and FRVI (*Fragaria virginiana* Duchesne).

Photograph Identification

Each photograph should be identified by site name, photograph number, and date. Figure 10 is an example for use with general or topic photographs (fig. 2). A critical factor is identifying **negatives** for color or black-and-white pictures or digital images. The borders of slides can be written on, but there is no similar place to identify negatives or digital memory card images. Placing a photo identification card in each picture assures a permanent record on the negative or image. This—negative identification—has been one of my biggest problems. Part B, appendix A, contains blank photo identification forms ("Camera-Photo" and "Shrub Photo Sampling"), which can be copied onto medium blue colored paper.

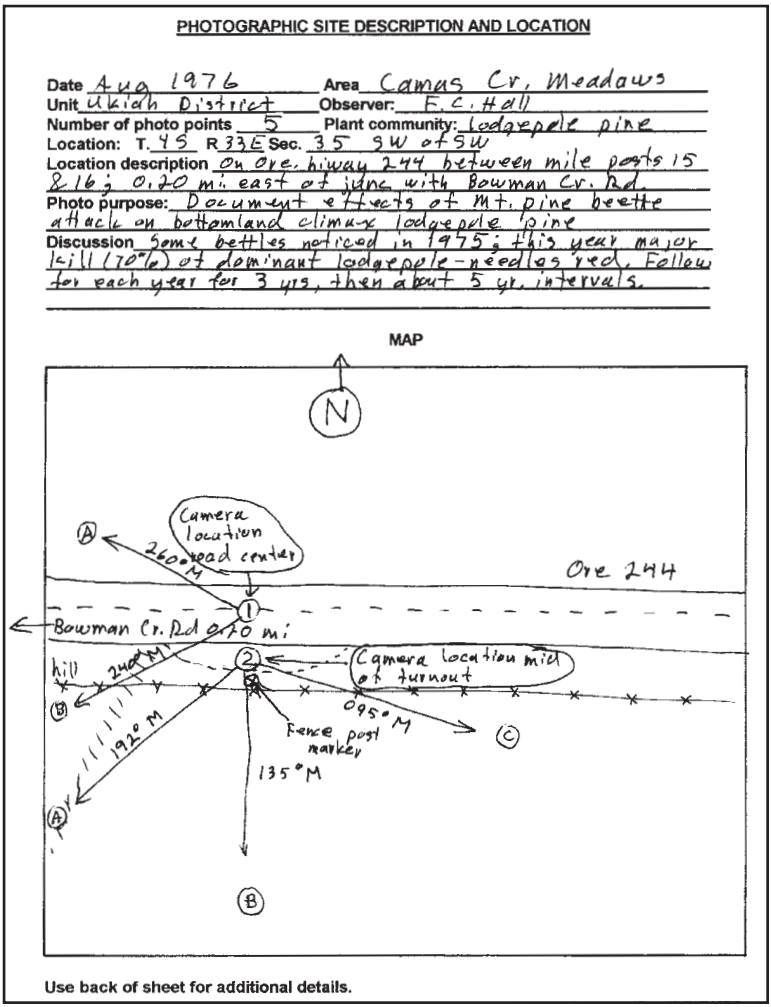
Paper color is the next consideration. Plain white or light colors, common in the office environment, are not suitable because they are too light in color and will bleach out when photographed. The recommended paper color is either Hammermill Brite Hue Blue or Georgia Pacific Papers Hots Blue (part B, app. A). Tests have shown these darker blue hues to be superior to other intense colors such as green and yellow.

Describing the Topic

Describe what is in the photographed scene. Include plant species, ground conditions, disturbances, or any other pertinent item. Part B, appendix A, contains forms having provision for recording these notes. For example, the filing system form "Camera Location and Photo Points" is shown in figure 2 with two views of Pole Camp and brief comments about each photo. And figure 11 is the "Photo Points and Close Photos" form for a general view and two closeup photographs of a ponderosa pine/elk sedge (*Carex geyeri* Boot.) plant community in undisturbed condition. Canopy cover estimates of dominant species are recorded in each closeup photo. Other topic description forms are discussed below in "Shrub Profile Photo Monitoring" and "Tree Cover Sampling." The forms are available in part B, appendix A.

General Photography

General photographs document a scene rather than a specific topic marked by a meter board. They are similar to landscape pictures in that they may not contain a size control board (meter



PHOTOGRAPHIC SITE DESCRIPTION AND LOCATION

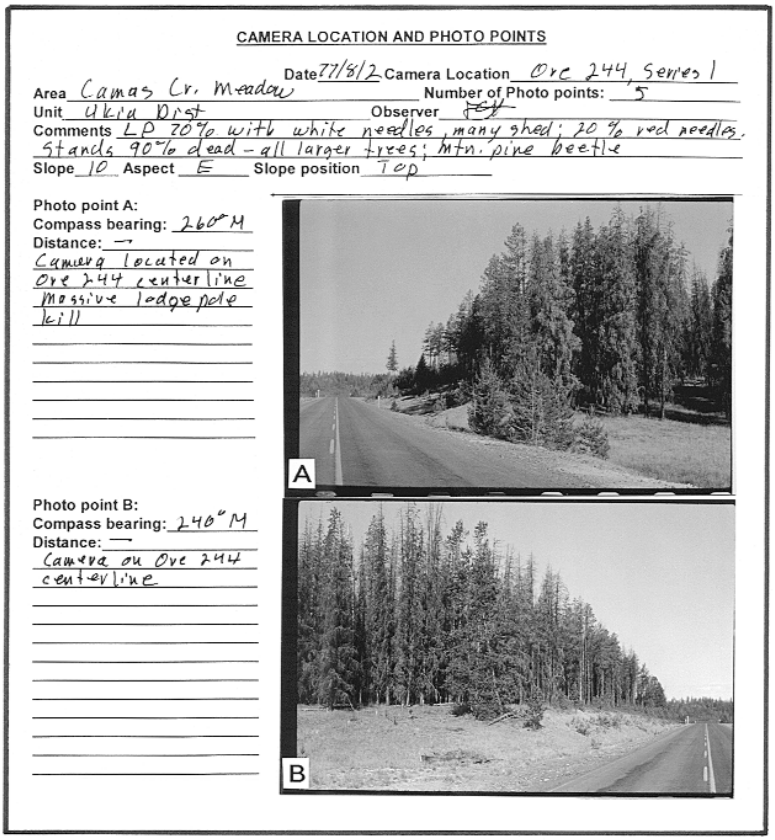
Date Aug 1976 Area Camas Cr. Meadows
Unit Ukiah District Observer: F.C. Hall
Number of photo points 5 Plant community: lodgepole pine
Location: T. 4S R. 33E Sec. 35 SW of SW
Location description On Ore. hiway 244 between mile posts 15 & 16; 0.20 mi. east of jnc. with Bowman Cr. Rd.
Photo purpose: Document effects of Mt. pine beetle attack on bottomland climax lodgepole pine
Discussion Some beetles noticed in 1975; this year major kill (70%) of dominant lodgepole-needles red. Follow for each year for 3 yrs, then about 5 yr. intervals.

MAP

Use back of sheet for additional details.

Figure 12—Filing system form “Photographic Site Description and Location” with a map to locate camera locations and photo points to document the affects of mountain pine beetle on lodgepole pine. Two camera locations are shown. Figures 13 to 15 are from camera location 1 and show photo points 1A and 1B.

board) on which to focus the camera and orient subsequent photographs. A photo usually covers an area of 2 to 20 acres (0.8 to 8 ha) and distances of 50 to 200 yards (40 to 180 m) (figs. 12 to 15).



CAMERA LOCATION AND PHOTO POINTS

Date 77/8/2 Camera Location Ore 244, Series 1

Area Camas Cr. Meadow Number of Photo points: 5

Unit Ukiah Dist Observer [illegible]

Comments LP 70% with white needles, many shed; 20% red needles. Stands 90% dead – all larger trees; Mtn. pine beetle

Slope 10 Aspect E Slope position Top

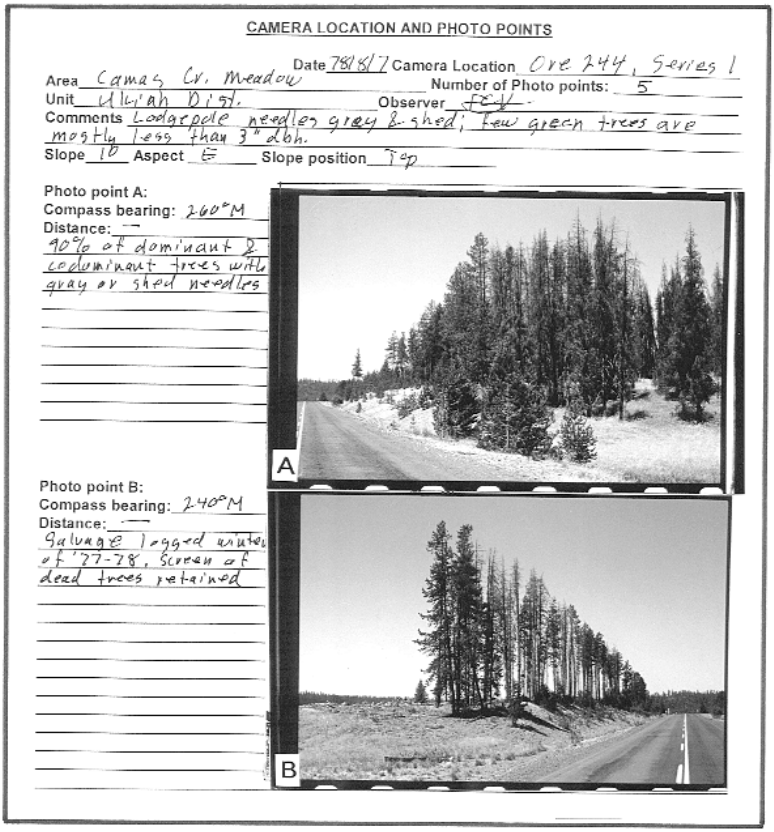
Photo point A:
Compass bearing: 260° M
Distance: —
Camera located on Ore 244 centerline
Massive lodgepole kill

Photo point B:
Compass bearing: 240° M
Distance: —
Camera on Ore 244 centerline

Figure 13—Filing system form “Camera Location and Photo Points” documenting stand conditions in 1977, one year after mountain pine beetle attack on lodgepole pine. The needle color on trees killed in the first year changed from green to dark red (not visible here). Compare to figures 14 and 15. Photo orientation used the road center line.

Concept

In many cases, general photographs document a scene in which a meter board cannot be placed to orient and focus the camera. One use of general photographs is shown in figure 2. Filing system form “Camera Location and Photo Points” is used in two pictures of Pole Camp where fenceposts marking camera locations and photo points may be identified. Another use is illustrated in figures 13 to 15, which document effects of mountain pine beetle attacks on lodgepole pine.



CAMERA LOCATION AND PHOTO POINTS

Date 7/8/7 Camera Location Ore 244, Series 1

Area Camas Cr. Meadow Number of Photo points: 5

Unit Ukiah Dist. Observer FCL

Comments Lodgepole needles gray & shed; few green trees are mostly less than 3" dbh.

Slope 10 Aspect E Slope position Top

Photo point A:
Compass bearing: 260°M
Distance: --
90% of dominant & codominant trees with gray or shed needles

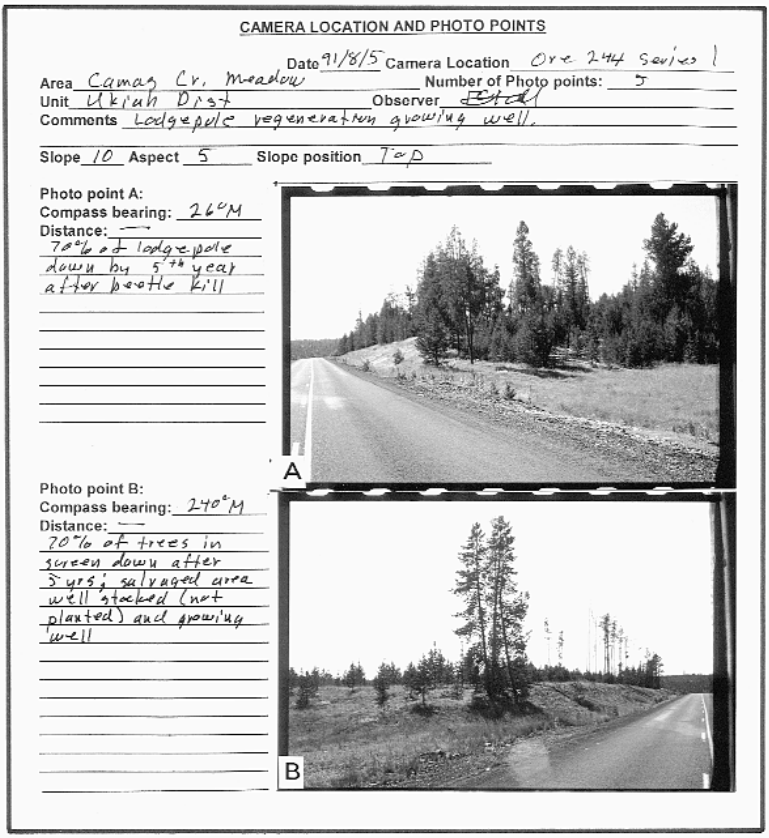
Photo point B:
Compass bearing: 240°M
Distance: --
Salvage logged winter of '77-78, Screen of dead trees retained

Figure 14—Stand conditions in 1978, 2 years after beetle attack in 1976. Photo point “A” has 90 percent kill and massive standing dead fuel. Photo point “B” was salvaged the winter of 1977-78.

Equipment

The following equipment is needed:

1. Camera or cameras for different film, or digital camera.
2. Photograph identification form “Camera-Photo” from part B, appendix A (fig. 10).
3. Clipboard and its support for holding the photo identification sheets (part B, app. B).
4. Compass and 100-foot (30-m) measuring tape.
5. Previous photographs for orientation of the camera.



CAMERA LOCATION AND PHOTO POINTS

Date 91/8/5 Camera Location Ore 244 Series 1

Area Camas Cr. Meadow Number of Photo points: 5

Unit Ukiah Dist Observer [illegible]

Comments Lodgepole regeneration growing well.

Slope 10 Aspect S Slope position Top

Photo point A:

Compass bearing: 26°M

Distance: —

70% of lodgepole down by 5th year after beetle kill

Photo point B:

Compass bearing: 240°M

Distance: —

70% of trees in screen down after 5 yrs; salvaged area well stocked (not planted) and growing well

Figure 15—Stand conditions in 1991, 14 years after beetle attack and 13 growing seasons since figure 13. Photo point “A” shows most dominant trees are down, which creates severe burn conditions at ground level. Photo point “B” illustrates natural regeneration height growth. Orientation of repeat general photography without a meter board requires skill and a set of orientation pictures similar to those in figure 7.

6. Filing system forms “Photographic Site Description and Location” (figs. 6 and 12) and “Camera Location and Photo Points” (figs. 2 and 13-15) from part B, appendix A.
7. Fenceposts and steel stakes sufficient for the number of camera locations desired. Include a pounder.
8. A tripod to use for camera reorientation.

Technique
Select a scene that will meet your monitoring objectives. Describe it, including plant species, ground cover items, disturbance, or whatever the topic of the photograph is by using the filing system form “Camera Location and Photo Points.” Photograph the scene.

Make maps of the location and layout of the scene on the filing system form “Photographic Site Description and Location” (figs. 6 and 12). In figure 6, the two photos from figure 2 are labeled “Pan Left” and “Pan Right.”

Reorientation—Reorientation of subsequent pictures is a major concern due to lack of a meter board. Identification of key items in each view will be needed. In figure 6, for example, the tall tree in the right background of picture (A) is the same tree as in the left background of picture (B). Panoramic views, such as figure 6, always should include about 10 percent overlap between photographs.

Systems used for landscape photo reorientation (discussion at fig. 8) are of major help. On a black-and-white copy of the scene, mark reorientation items as shown in figures 8 and 9. With the camera mounted on a tripod, compare the picture in hand with the scene through the camera. Orient the camera accordingly.

Figure 7 illustrates a site locator fieldbook for rephotographing general views. It has 3- by 5-inch (7.5- by 12.5-cm) photographs mounted on 5- by 5-inch (12.5- by 12.5-cm) cardboard. Instructions are given under each picture for its location and orientation. These fit into a vest pocket for use in the field. Figure 3 is a recent picture of figure 7B.

Example—Figures 13 to 15 illustrate general photography documenting effects of mountain pine beetle on lodgepole pine along highway 244 in the Blue Mountains of eastern Oregon. Figure 12 is filing system form “Photographic Site Description and Location” mapping two camera locations. Camera location 1 has two photo points (figs. 13 to 15) and camera location 2 has three photo points. Monitoring started in 1976 when beetles first attacked the stands.

Figures 13 to 15 show the use of filing system form “Camera Location and Photo Points” to document beetle effects over a 14-year period. Figure 13 depicts second-year effects of beetle attack where trees killed the first year have started to drop their needles. Figure 14 is the third year after attack and shows massive standing fuel (14A) and salvage (14B). Figure 15, 14 years after initial attack and 13 growing seasons after figure 13, illustrates tree fall (15A) and growth of natural regeneration (15B).

Topic Photography

Topic photography narrows the subject from a general view to a specific item of interest. It adds a meter board, or other size control object, to identify the photographic topic (figs. 1, 3, 4, and 11).

Concept

We will assume monitoring objectives have been established as discussed in “Basics.” A meter board, or other size control board, is placed at the selected topic for several reasons: to (1) identify the item being monitored for change; (2) establish a camera orientation reference point for subsequent photography; (3) set up a constant size-reference by which change can be documented, for example by grid analysis; and (4) provide a point on which to focus the camera for optimum depth of field.

Figure 3 illustrates identification of a very specific topic, streambank stability. Figure 1 deals with a general view limited to area around the meter board; the topic is effect of logging and precommercial thinning on stand structure and ground vegetation. Purpose of topic monitoring is the primary factor in selecting a monitoring layout.

The effect of distance from the camera to the meter board to emphasize a topic is shown in figure 16. The topic in 16A is a transect for nested frequency, in 16B it is density of grass and big sagebrush (*Artemisia tridentata* Nutt.), and in 16C it is species density and use (none in this case). Select a camera-to-photo-point distance that best depicts what you want to emphasize. Remember that once the distance is established, it **must** remain fixed.

continued

Exhibit 28

2012 Agricultural Order- Individual Monitoring Costs Estimates

	Laboratory Costs						
	BC	**Creek**	**Pacific EcoRisk**	**CalTest**	**Value Used**	**Minimum conditions****	**Maximum conditions*****
Field Visit* (including flow or volume, duration of flow, water temperature)					400		
pH*					10		
Conductivity*					10		
Turbidity*					12		
Total Nitrogen*	60	60			60		
Nitrate*	25	30			30		
Total Ammonia*	35	30			35		
Total Cost without pesticides/toxicity:					557	3342	20052
OP Suite- Chlorpyrifos and Diazinon*	175			190	190		
Ceriodaphnia Toxicity*	733		735		750		
Hyallela Toxicity in water	1000		785		1000		
Total Cost of pesticides/toxicity:					1940	7760	46560
Total Cost per year						**11102**	**66612**
Total Cost per half-year						**5551**	**33306**
Notes	*Value from Attachment 1, Appendix F, Staff report for Board Meeting Item 14, March 2011, Central Coast Water Board					**Assumes one tailwater discharge point, one stormwater discharge point, 3 sampling events: 1 without pesticides/toxicity, 2 with pesticides/toxicity	***Assumes 3 tailwater discharge points, three stormwater discharge points, 6 events: 2 without pesticides/toxicity, 4 with pesticides/toxicity

Exhibit 29

CENTRAL COAST WATER BOARD - AGRICULTURAL ORDER
5-Year Compliance Calendar

TIER 1	TIER 2	TIER 3	Agricultural Order R3-2012-0011 Requirement	Reference	Due Date	*Check box when completed* 2012	2013	2014	2015	2016
✓	✓	✓	1. Enroll - Submit electronic-Notice of Intent (if grower has not already done so).	Order, p24 #55	15-May					
✓	✓	✓	2. Develop/Update Farm Plan.	Order, p21 #44	1-Oct					
✓	✓	✓	3. Install Backflow Prevention devices,if you fertigate or chemigate.	Order, p19 #31	1-Oct					
✓	✓	✓	4. Implement management practices to treat or control discharges and protect water quality.	Order, p4 #10 Order, p15 #12 Order, p20 #36	Ongoing					
✓	✓	✓	5. Minimize bare dirt and prevent erosion to protect water quality.	Order, p20 #37	Ongoing					
✓	✓	✓	6. Protect existing aquatic habitat next to your farm to protect water quality.	Order, p20 #39	Ongoing					
✓	✓	✓	7. Conduct surface receiving water monitoring - Monitor the creeks and estuaries that may receive farm runoff .[1]	Order, p23 #52 MRP, p2 Part 1A	15-Sep					
✓	✓	✓	8. Conduct groundwater monitoring - Monitor primary irrigation well and any drinking water well located on farm.[1]	Order, p23 #51 MRP, p8 Part 2A	Sept-Dec Mar-June			Tier 3 Only	Tier 3 Only	Tier 3 Only
✓	✓	✓	9. Update electronic-Notice of Intent (if necessary)	Order, p8 #27 Order, p24 #55	1-Oct					
✓	✓	✓	10. Report surface receiving water monitoring (Growers can comply individually or by participating in the Cooperative Monitoring Program).[1]	Order, p23 #52 MRP, p2 Part 1B	Various					
✓	✓	✓	11. Report groundwater monitoring.[1]	Order, p23 #51 MRP, p10 Part 2B	1-Oct			Tier 3	Tier 3	Tier 3
	✓	✓	12. Submit Annual Compliance Form.	Order, p27 #67 MRP, p12 Part 3A	1-Oct					
	✓	✓	13. Calculate risk of loading nitrate to groundwater.	Order, p28 #68 MRP, p10 Part 2C	1-Oct					
	✓	✓	14. Conduct photo-monitoring to document the existing condition of adjacent surface water, *if impaired by sediment, turbidity or temperature.*	Order, p28 #69 MRP, p14 Part 4A	1-Oct					
	✓	✓	15. Record and report total nitrogen applied, *if the farm/ranch has a high nitrate loading risk.* [2]	Order, p28 #70 MRP, p11 #5	1-Oct					
		✓	16. Conduct individual discharge monitoring.	Order, p29 #72 MRP, p14 Part 5A	1-Oct					
		✓	17. Report indvidual discharge monitoring.	Order, p29 #73 MRP, p15 Part 5B	15-Mar					
		✓	18. Report elements of certified Irrigation and Nutrient Management Plan, *if farm/ranch has a high nitrate loading risk.* [2]	Order, p29 #77 MRP, p19 Part 6B	1-Oct					
		✓	19. Submit Water Quality Buffer Plan, *if farm is adjacent to surface water impaired by sediment, temperature, or turbidity.* [2]	Order, p30 #80 MRP, p20 Part 7A	1-Oct					

Compliance calendar represents summary requirements for each tier. Growers should review complete Order and Monitoring and Reporting Program R3-2012-0011 for details. Right-hand columns indicate the year in which items are due for specific tier. Growers can check the box when completed. Blacked-out boxes indicate no item is due that year. 1-Growers can comply with specific requirements individually or cooperatively (by particpating in the Cooperative Monitoring Program). 2-Alternative method to comply with specific requirement available.

AGRICULTURAL REGULATORY PROGRAM
CONTACT INFORMATION

Updated August 22, 2012

PROGRAM INFORMATION

Angela Schroeter (Program Manager/Supervisor)
(805) 542-4644
aschroeter@waterboards.ca.gov

Lisa McCann (Section Manager)
(805) 549-3132
lmcann@waterboards.ca.gov

Elaine Sahl (electronic Notice of Intent)
(805) 542-4645
esahl@waterboards.ca.gov

WATERSHED LEAD STAFF

Monica Barricarte
(Pajaro River Watershed)
(805) 549-3881
mbarricarte@waterboads.ca.gov

Hector Hernandez
(Groundwater Monitoring /Salinas Watershed)
(805) 542-4641
hhernandez@waterboards.ca.gov

Corinne Huckaby
(San Luis Obispo/Santa Barbara Watersheds)
(805) 549-3504
chuckaby@waterboards.ca.gov

Jill North
(Enforcement)
(805) 542-4762
jnorth@waterboards.ca.gov

RELATED PROGRAMS

Total Maximum Daily Load Program (TMDL)
Chris Rose, (Program Manager)
(805) 542-4770
cjrose@waterboards.ca.gov

Central Coast Ambient Monitoring Program (CCAMP)
Karen Worcester (Program Manager)
(805) 549-3333
Kworcester@waterboards.ca.gov

S:\Agricultural Regulatory Program\Program Management\Resources4growers_Order2012\Compliance Calendar and Contacts\AgContacts.docx

Exhibit 30

2011
MONTEREY COUNTY
Crop Report

Table of Contents

3 **Agricultural Commissioner's Letter**

4 **Monterey County's Ten Million Dollar Crops**

5 **Gross Production Value**

6 **Monterey County's Trends of Major Crops**

7 **Vegetable Crops**

10 **Lettuce Production - Detail**

11 **Fruit & Nut Crops**

12 **Grape Production**

13 **Monterey County's Value of Wine Grapes**

14 **Field Crops**

15 **Seed & Apiary Production**

16 **Agriculture & Our Community**

18 **Cut Flowers & Foliage**

19 **Nursery Products**

19 **Livestock & Poultry**

20 **Produce Exports by Commodity**

21 **Agricultural Exports Trade Partners**

22 **Nursery Exports**

23 **Summary Of Sustainable Agricultural Activities**

Agricultural Commissioner
Eric Lauritzen

Assistant Agricultural Commissioner
Robert Roach

Chief Deputy Agricultural Commissioner
Richard Ordonez
Karen Stahlman

Deputy Agricultural Commissioner
Kenneth Allen, Teodulo Gonzalez, Heather Healy, Casey McSwiggin

Staff Biologist
Brad Oliver

Administration
Emmett Ashurst, Melanie Beretti, Virginia Jameson, Dawn Mathes, Rosanne Rubino, Sheila Salazar

Administration Services Staff
Juanita Adame, Veronica Arroyo, Irene Espinoza, Ericka Esquivel, Marc Gomes, Dolores Mariscal, Ginger Ramirez, Kathleen Nielsen, Daniel Sanchez, Karla Tinajero, Elizabeth Tunstall

Agricultural Inspectors/Biologists
Brianna Allen, Natalia Bahena, Kimberly Becker, Guillermo Bravo, Cara Brents, Ronnie Capili, Noralyn Carlton, Leslie Crowl, Nathan Desjarlais, Diana Devlin, Priscilla Du, Brandon Gates, Jimmy Hueck, Yvette Hilber, Graham Hunting, Paul Josselyn, Tim Lewis, Shayla Neufeld, Francisco Paredes, Daniel Prakash, Jesus Ramirez, Helena Roberts, Isabel Rodriguez, David Sanford, Tim Taylor, Olivia Villalvazo, Hannah Wallis, Becky White

Weights & Measures Inspectors
Daniel Marien, Glenn Sakasegawa, Larry Simon, Joseph Woodbury

Produce Inspectors
Toni Cadena-Rice, Celia Cervantes, Danny Garcia, Linda Castro, Danny Mallobox, Jr., Danny Mallobox III, Jose Torres

Agricultural Aides
Pamela Cope, Ingrid David-Horgan, Peter Gachot, Manuel Mendoza, Gustavo Reyes, Sylvia Rodriguez, Justin Turpin

Monterey County Agricultural Commissioner

ERIC LAURITZEN
AGRICULTURAL COMMISSIONER

Karen Ross, Secretary

California Department of Food & Agriculture and
The Honorable Board of Supervisors of Monterey County

Dave Potter	5th District, Chair
Fernando Armenta	1st District
Louis Calcagno	2nd District
Simón Salinas	3rd District
Jane Parker	4th District

It is a pleasure to present the 2011 Monterey County Crop Report that is prepared pursuant to the provisions of Section 2279 of the California Food & Agriculture Code. This report reflects a production value of $3.85 billion for Monterey County, a slight decline from 2010 ($153 million, or 3.8%).

Crop values vary from year to year based on production, market and weather conditions. Some noteworthy changes in 2011 include: head lettuce value was down 11% while leaf lettuce was up 7%, continuing the market trend of recent years; strawberry value decreased by 5% and wine grape value was down 18%; and spinach, spring mix and salad products all showed declines based on recent refinements of the data for these crops.

As a complement to the annual crop report, our office recently released *Economic Contributions of Monterey County Agriculture*, a study that quantifies how each dollar generated through agricultural production moves through our local economy. Starting with the production values reported in our annual crop report, that study looked beyond the direct benefits of farm production to include the ripple effects from ag-related business throughout the local economy. The study showed that agriculture contributed $8.2 billion and more than 73,000 jobs to the Monterey County economy in 2010.

It is always important to note that the figures provided here are gross values and do not represent or reflect net profit or loss experienced by individual growers, or by the industry as a whole. Growers do not have control over most input costs, such as fuel, fertilizers and packaging, nor can they significantly affect market prices. The fact that the gross value of agriculture is holding steady reflects positively on the diversity and importance of our agriculture industry.

This report is our yearly opportunity to recognize the growers, shippers, ranchers, and other businesses ancillary to and supportive of agriculture, which is the largest driver of Monterey County's economy. As such, we would like to extend our thanks to the industry for their continued effort to provide vital information that enables the compilation of the Monterey County Crop Report. While we continually strive to improve upon this information, without their assistance, this report would not be possible.

Special recognition for the production of this report goes to Richard Ordonez, Helena Roberts, Shayla Neufeld, Melanie Beretti, and all of the staff who assisted in compiling this information and improving the quality of the report.

Respectfully submitted,

Eric Lauritzen
Agricultural Commissioner

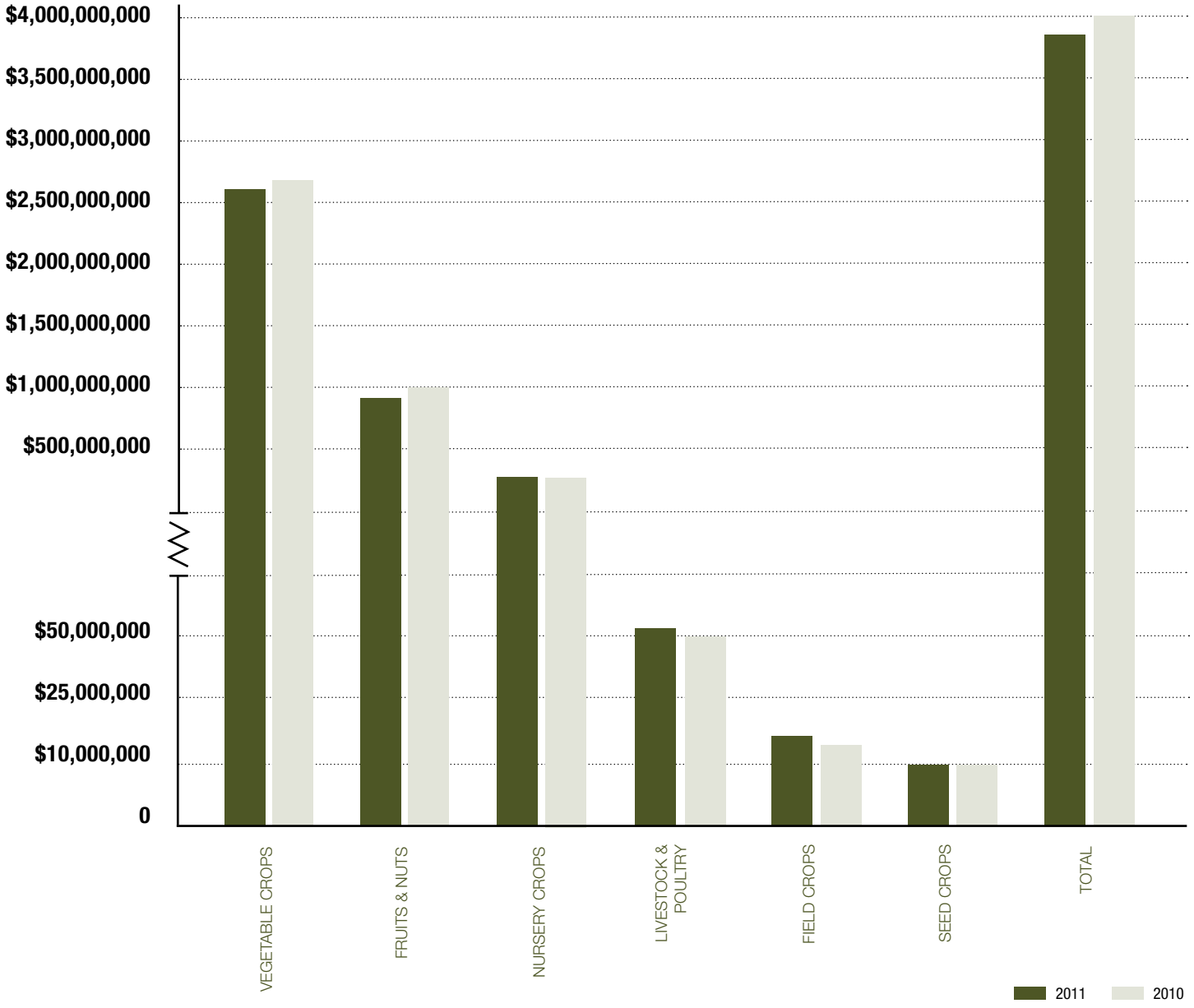
County of Monterey Agricultural Commissioner
1428 Abbott St., Salinas, CA 93901 • *tel* (831)759-7325 • *fax* (831) 759-2268 • ag.co.monterey.ca.us

Monterey County's Ten Million Dollar Crops

CROPS	2011 CROP VALUE	2011 CROP RANKING	2010 CROP RANKING
Leaf Lettuce	$777,418,000	1	2
Strawberry	$713,854,000	2	1
Head Lettuce	$454,238,000	3	3
Broccoli	$297,299,000	4	4
Nursery	$260,703,000	5	5
Celery	$182,308,000	6	6
Grapes	$140,976,000	7	7
Misc. Vegetables	$125,512,000	8	9
Cauliflower	$104,970,000	9	11
Spring Mix	$100,776,000	10	8
Spinach	$88,926,000	11	10
Salad Products	$81,599,000	12	12
Mushrooms	$78,966,000	13	13
Artichokes	$49,331,000	14	14
Raspberries	$45,525,000	15	15
Beef Cattle	$44,500,000	16	16
Cabbage	$35,711,000	17	17
Peas	$29,801,000	18	18
Onions, Green	$26,327,000	19	19
Rappini	$23,423,000	20	20
Carrots	$22,030,000	21	21
Radicchio	$19,300,000	22	22
Kale	$17,932,000	23	24
Asparagus	$13,632,000	24	25
Rangeland	$13,065,000	25	26
Citrus	$11,220,000	26	23

Gross Production Value

CATEGORIES	2011 TOTAL VALUE	2010 TOTAL VALUE
Vegetable Crops	$2,596,683,000	$2,677,072,000
Fruit & Nuts	$914,685,000	$987,693,000
Nursery Crops	$260,703,000	$266,121,000
Livestock & Poultry	$54,468,000	$49,893,000
Field Crops	$16,824,000	$15,230,000
Seed Crops	$9,404,000	$9,984,000
Apiary	$228,000	$242,000
TOTAL	**$3,852,995,000**	**$4,006,235,000**



Monterey County's Trends of Major Crops

CROP		1991	2001	2011
Artichokes	Acre	7,545	5,943	4,992
	Value	$29,136,000	$38,473,000	$49,331,000
	CPI Adjusted*	$48,159,000	$48,886,000	$49,331,000
Broccoli	Acre	50,160	54,899	52,694
	Value	$139,343,000	$258,962,000	$297,299,000
	CPI Adjusted	$230,319,000	$329,050,000	$297,299,000
Cauliflower	Acre	23,790	17,390	17,399
	Value	$89,661,000	$102,567,000	$104,970,000
	CPI Adjusted	$148,200,000	$130,327,000	$104,970,000
Celery	Acre	6,929	10,030	11,902
	Value	$40,103,000	$97,988,000	$182,308,000
	CPI Adjusted	$66,286,000	$124,508,000	$182,308,000
Grapes	Acre	33,412	38,098	43,034
	Value	$73,800,000	$207,945,000	$140,976,000
	CPI Adjusted	$121,983,000	$264,225,000	$140,976,000
Head Lettuce	Acre	63,000	57,594	34,800
	Value	$293,295,000	$360,562,000	$454,238,000
	CPI Adjusted	$484,785,000	$458,147,000	$454,238,000
Leaf Lettuce	Acre	26,201	53,745	97,979
	Value	$99,743,000	$298,352,000	$777,418,000
	CPI Adjusted	$164,864,000	$379,100,000	$777,418,000
Mushrooms	Pounds	38,466,000	48,146,000	41,128,000
	Value	$36,927,000	$65,479,000	$78,966,000
	CPI Adjusted	$61,036,000	$83,201,000	$78,966,000
Nursery Products	Acre	1,773	2,088	1,831
	Value	$125,254,000	$178,564,000	$260,703,000
	CPI Adjusted	$207,031,000	$226,892,000	$260,703,000
Spinach	Acre	7,410	13,204	13,900
	Value	$16,555,000	$77,009,000	$88,926,000
	CPI Adjusted	$27,364,000	$97,851,000	$88,926,000
Strawberries	Acre	6,320	6,941	10,992
	Value	$158,149,000	$276,912,000	$713,854,000
	CPI Adjusted	$261,403,000	$351,858,000	$713,854,000
TOTAL OF MAJOR CROPS ABOVE	**Acre**	**226,540**	**259,932**	**289,523**
	Value	**$1,101,966,000**	**$1,962,814,000**	**$3,148,989,000**
	CPI Adjusted	**$1,821,430,000**	**$2,494,045,000**	**$3,148,989,000**

*Consumer Price Index Conversion Factors from http://oregonstate.edu/cla/polisci/sites/default/files/faculty-research/sahr/inflation-conversion/pdf/cv2011.pdf

Vegetable Crops

CROP[1]	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL[2]
Anise	2011	610	19.53	11,900	ton	$787.80	$9,375,000
	2010	602	20.00	12,000	ton	$664.73	$7,977,000
Artichokes	2011	4,992	7.19	35,900	ton	$1,374.13	$49,331,000
	2010	4,959	7.03	34,900	ton	$1,370.44	$47,828,000
Asparagus	2011	1,850	4.18	7,740	ton	$1,761.18	$13,632,000
	2010	2,297	4.20	9,650	ton	$1,600.87	$15,448,000
Bok Choy	2011	491	22.09	10,900	ton	$257.46	$2,806,000
	2010	393	23.81	9,360	ton	$223.73	$2,094,000
Broccoli, Bulk[3]	2011	N/A	N/A	121,000	ton	$534.98	$64,733,000
	2010	N/A	N/A	122,000	ton	$549.08	$66,988,000
Fresh	2011	50,506	7.31	369,000	ton	$630.26	$232,566,000
	2010	49,926	7.21	360,000	ton	$639.27	$230,137,000
Broccoli, Total	2011	52,694	N/A	N/A	N/A	N/A	$297,299,000
	2010	60,926	N/A	N/A	N/A	N/A	$297,125,000
Cabbage, Bulk	2011	N/A	N/A	38,200	ton	$307.47	$11,745,000
	2010	N/A	N/A	37,400	ton	$308.72	$11,546,000
Fresh	2011	3,420	20.48	70,100	ton	$341.88	$23,966,000
	2010	3,251	19.89	64,700	ton	$342.49	$22,159,000
Cabbage, Total	2011	4,925	N/A	N/A	N/A	N/A	$35,711,000
	2010	5,131	N/A	N/A	N/A	N/A	$33,705,000

SPOTLIGHT ON

Vacuum/Hydro-Vacuum Packing

- Vacuum cooling technology for fresh produce was developed with agricultural industry financing, in a location off of Highway 183 between Salinas and Castroville. The first commercial use of vacuum cooling was in Salinas in 1948 for iceberg lettuce.
- Vacuum cooling technologies, also known as precooling product prior to cold storage, are used throughout the world for fresh fruits and vegetables, maintaining product quality by completing an effective "cold chain." Vacuum cooling entails placing product in a cooling chamber typically on pallets, and then removing the air from the chamber using a vacuum pump. As the product reaches its flashpoint a sudden surface water vaporization results, producing a localized cooling effect due to the energy required to make the transition from liquid to vapor H_2O.
- Hydrovacuum cooling, where water is sprayed on the product just before the flashpoint of the vacuum cycle, is used to prevent low moisture content product such a leaf lettuce and celery from drying out.
- Vacuum cooling technology is one of the most energy efficient cooling methods available and cools 2-3 times faster than forced air cooling.

[1] Organic figures included in totals
[2] Totals may not calculate due to rounding
[3] "Bulk" may include one or more of the following:
"Food Service" commodities are destined to be sold to restaurants and food service companies for the preparation of meals eaten away from home, and are sold in larger packages; "Processing" commodities are destined to be processed in a way that substantially alters the raw nature of the product such as freezing, drying, or cooking, and does not necessarily include processes such as washing, slicing, or chopping; and "Value Added" commodities are destined to be sold to consumers to prepare meals at home, and are sold in smaller packages with consumer labeling. Figures do not include additional cost of packaging or washing, slicing, chopping, mixing, etc.

Vegetable Crops (cont'd)

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
Carrots, Bulk	2011	N/A	N/A	31,200	ton	$346.42	$10,808,000
	2010	N/A	N/A	28,700	ton	$336.54	$9,659,000
Fresh	2011	1,456	21.22	30,900	ton	$363.17	$11,222,000
	2010	1,431	21.07	30,200	ton	$354.92	$10,719,000
Carrots, Total	2011	3,023	N/A	N/A	N/A	N/A	$22,030,000
	2010	1,863	N/A	N/A	N/A	N/A	$20,378,000
Cauliflower, Bulk	2011	N/A	N/A	22,900	ton	$576.65	$13,205,000
	2010	N/A	N/A	22,100	ton	$569.75	$12,591,000
Fresh	2011	16,260	8.75	142,000	ton	$646.23	$91,765,000
	2010	16,958	8.89	151,000	ton	$648.76	$97,963,000
Cauliflower, Total	2011	17,399	N/A	N/A	N/A	N/A	$104,970,000
	2010	19,444	N/A	N/A	N/A	N/A	$110,554,000
Celery, Bulk	2011	N/A	N/A	37,300	ton	$259.12	$9,665,000
	2010	N/A	N/A	38,100	ton	$263.52	$10,040,000
Fresh	2011	11,816	38.18	451,000	ton	$382.80	$172,643,000
	2010	11,307	38.17	432,000	ton	$383.23	$165,555,000
Celery, Total	2011	11,902	N/A	N/A	N/A	N/A	$182,308,000
	2010	12,305	N/A	N/A	N/A	N/A	$175,595,000
Chard	2011	691	9.11	6,300	ton	$945.27	$5,955,000
	2010	742	9.26	6,870	ton	$906.57	$6,228,000
Cilantro	2011	1,309	4.06	5,310	ton	$806.53	$4,283,000
	2010	634	8.88	5,630	ton	$703.18	$3,959,000
Herbs[4]	2011	105	7.38	775	ton	$2,600.93	$2,016,000
	2010	107	7.27	780	ton	$2,480.43	$1,935,000
Kale	2011	1,944	12.24	23,800	ton	$753.45	$17,932,000
	2010	1,938	12.10	23,400	ton	$745.50	$17,445,000
Leeks	2011	278	12.03	3,340	ton	$1,180.94	$3,944,000
	2010	214	12.46	2,670	ton	$1,130.19	$3,018,000
Lettuce, Total[5]	2011	133,000	N/A	N/A	N/A	N/A	$1,231,656,000
	2010	140,000	N/A	N/A	N/A	N/A	$1,236,523,000
Misc. Vegetables, Bulk	2011	N/A	N/A	157,000	ton	$548.83	$86,166,000
	2010	N/A	N/A	160,000	ton	$572.17	$91,547,000
Fresh[6]	2011	3,802	8.84	33,600	ton	$1,171.02	$39,346,000
	2010	4,130	7.79	32,200	ton	$1,118.68	$36,021,000
Misc. Vegetables Total	2011	21,562	N/A	N/A	N/A	N/A	$125,512,000
	2010	24,669	N/A	N/A	N/A	N/A	$127,568,000

[4] Includes: Oregano, Parsley, Rosemary, Sage, and Thyme
[5] See Lettuce Production for detail information, Page 10
[6] Includes: Arugula, Beets, Broccolini, Brussel Sprouts, Cactus Pears, Cardone, Chicory, Corn, Cucumbers, Fava Beans, Frisee, Garlic, Mache, Potato, and Pumpkins

Vegetable Crops (cont'd)

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
Mushrooms	2011	130	N/A	41,128,000	lbs	$1.92	$78,966,000
	2010	157	N/A	37,204,000	lbs	$1.86	$69,199,000
Napa	2011	580	28.17	16,300	ton	$308.45	$5,028,000
	2010	488	28.12	13,700	ton	$326.91	$4,479,000
Onions, Dry	2011	2,137	23.34	49,900	ton	$178.42	$8,903,000
	2010	2,187	23.15	50,600	ton	$181.34	$9,176,000
Onions, Green	2011	1,350	14.36	19,400	ton	$1,357.06	$26,327,000
	2010	1,376	15.04	20,700	ton	$1,291.11	$26,726,000
Parsley	2011	525	16.58	8,700	ton	$805.33	$7,006,000
	2010	497	16.71	8,300	ton	$746.60	$6,197,000
Peas[7]	2011	1,783	N/A	N/A	N/A	N/A	$29,801,000
	2010	1,789	N/A	N/A	N/A	N/A	$30,797,000
Peppers[8]	2011	1,359	17.75	24,100	ton	$317.85	$7,660,000
	2010	1,327	17.44	23,100	ton	$335.52	$7,751,000
Radicchio	2011	2,403	4.67	11,200	ton	$1,723.25	$19,300,000
	2010	2,473	4.41	10,900	ton	$1,791.80	$19,531,000
Radish	2011	145	14.64	2,130	ton	$528.23	$1,125,000
	2010	149	14.13	2,110	ton	$500.43	$1,056,000
Rappini	2011	4,504	3.00	13,500	ton	$1,735.00	$23,423,000
	2010	4,635	3.20	14,800	ton	$1,737.00	$25,708,000
Salad Products	2011	N/A	N/A	196,000	ton	$416.32	$81,599,000
	2010	N/A	N/A	210,000	ton	$420.26	$88,255,000
Spinach, Bulk	2011	N/A	N/A	86,700	ton	$819.72	$71,070,000
	2010	N/A	N/A	52,600	ton	$814.84	$42,861,000
Fresh	2011	2,162	10.43	19,500	ton	$915.67	$17,856,000
	2010	8,934	10.32	92,200	ton	$918.21	$84,659,000
Spinach Total	2011	13,900	N/A	N/A	N/A	N/A	$88,926,000
	2010	9,329	N/A	N/A	N/A	N/A	$127,520,000
Spring Mix	2011	10,746	9.12	74,100	ton	$1,360.00	$100,776,000
	2010	11,078	9.04	100,000	ton	$1,439.75	$143,975,000
Squash	2011	302	10.63	3,210	ton	$558.24	$1,792,000
	2010	300	10.24	3,070	ton	$582.73	$1,789,000
Tomatoes	2011	679	18.48	12,500	ton	$583.27	$7,291,000
	2010	682	19.38	13,200	ton	$570.69	$7,533,000
VEGETABLE CROPS TOTAL	**2011**	**297,318**					**$2,596,683,000**
	2010	312,691					$2,677,072,000

[7] Includes: Bulk
[8] Includes: Chili and Bell Peppers

Lettuce Production - Detail

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
HEAD LETTUCE							
Spring	2011	11,261	----	----	----	----	----
	2010	16,378					
Summer	2011	10,934	----	----	----	----	----
	2010	14,170					
Fall	2011	12,605	----	----	----	----	----
	2010	14,026					
Naked Pack	2011	N/A	N/A	5,572,000	ctn	$9.51	$52,990,000
	2010	N/A	N/A	6,433,000	ctn	$11.83	$76,102,000
Wrapped Pack	2011	N/A	N/A	23,634,000	ctn	$10.58	$250,048,000
	2010	N/A	N/A	22,723,000	ctn	$12.88	$292,672,000
Head Lettuce, Bulk	2011	N/A	N/A	378,000	ton	$400.00	$151,200,000
	2010	N/A	N/A	367,000	ton	$390.00	$143,130,000
Head Lettuce, Total	2011	34,800	1,356	47,206,000	ctn	$9.62	$454,238,000
	2010	44,574	983	43,836,000	ctn	$11.68	$511,904,000
LEAF LETTUCE							
Butter Leaf Lettuce	2011	1,500	1,217	1,825,000	ctn	$8.81	$16,078,000
	2010	1,489	1,220	1,816,000	ctn	$9.22	$16,744,000
Endive	2011	406	1,063	432,000	ctn	$8.13	$3,512,000
	2010	408	1,051	429,000	ctn	$8.88	$3,810,000
Escarole	2011	370	1,049	388,000	ctn	$8.96	$3,476,000
	2010	339	1,040	353,000	ctn	$8.88	$3,135,000
Green Leaf Lettuce	2011	7,579	1,040	7,883,000	ctn	$9.21	$72,602,000
	2010	8,294	1,033	8,568,000	ctn	$9.36	$80,196,000
Red Leaf Lettuce	2011	2,210	1,044	2,307,000	ctn	$8.58	$19,794,000
	2010	2,313	1,036	2,396,000	ctn	$8.62	$20,654,000
Romaine Lettuce	2011	37,442	1,037	38,828,000	ctn	$10.15	$394,104,000
	2010	36,294	1,054	38,254,000	ctn	$9.45	$361,500,000
Leaf Lettuce, Bulk	2011	N/A	N/A	606,000	ton	$442.00	$267,852,000
	2010	N/A	N/A	604,000	ton	$395.00	$238,580,000
Leaf Lettuce, Total	2011	97,979	N/A	87,310,000	ctn	$8.90	$777,418,000
	2010	95,436	N/A	87,345,000	ctn	$8.30	$724,619,000
LETTUCE CROPS TOTAL	**2011**	**133,000**		**134,516,000**	**ctn**		**$1,231,656,000**
	2010	140,000		131,181,000	ctn		$1,236,523,000

Fruit & Nut Crops

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
Avocados	2011	226	2.07	468	ton	$2,404.30	$1,125,000
	2010	227	3.50	795	ton	$1,540.77	$1,225,000
Citrus	2011	1,239	20.54	25,500	ton	$440.00	$11,220,000
	2010	1,248	30.00	37,400	ton	$486.89	$18,210,000
Grapes[9]	2011	43,034	2.89	124,000	ton	$1,136.90	$140,976,000
	2010	43,321	4.09	177,000	ton	$976.93	$172,916,000
Raspberries	2011	740	15.00	11,100	ton	$4,101.33	$45,525,000
	2010	688	14.99	10,300	ton	$4,122.67	$42,464,000
Strawberries	2011	10,992	34.40	378,000	ton	$1,826.67	$690,481,000
	2010	10,664	37.60	401,000	ton	$1,845.00	$739,845,000
Processing	2011	N/A	N/A	40,500	ton	$577.11	$23,373,000
	2010	N/A	N/A	23,600	ton	$477.52	$11,269,000
Strawberries Total	2011	10,992	N/A	419,000	ton	N/A	$713,854,000
	2010	10,664	N/A	425,000	ton	N/A	$751,114,000
Misc. Fruit[10]	2011	205	6.99	1,430	ton	$1,387.87	$1,985,000
	2010	620	2.53	1,570	ton	$1,123.88	$1,764,000
FRUIT & NUT CROPS TOTAL	**2011**	**56,436**					**$914,685,000**
	2010	56,768					$987,693,000

SPOTLIGHT ON

CSUMB/Community Education

The agricultural community has been a strong supporter of California State University, Monterey Bay since its founding in 1994.

- The Tanimura & Antle Family Memorial Library was built in part thanks to a lead gift of $4 million, the largest gift to date from the agricultural industry. From the moment it opened in 2008, the library has been the center of student and campus life at CSU Monterey Bay, drawing more than 600,000 visitors over the last year.
- The agriculture community provides support for student scholarships. Sponsorships for CSUMB's annual Have a Heart auction from the agricultural community totaled approximately $14,500 this year.
- Businesses involved in agriculture support CSUMB's higher education goals through internships for students in the School of Business, working with students on their senior capstone projects, and hiring CSUMB graduates.
- Industry experts serve as speakers and panelists at the University's Greater Vision forums (a series of public presentations on topics relevant to local agriculture) and often serve as guest lecturers in classes.

[9] Represents Bearing Acres only; See Grape Production for detail information, Page 12-13
[10] Includes: Apples, Blackberries, Blueberries, Kiwi, Loganberries, Olallaberries, Olives and Walnuts

Grape Production

WHITE GRAPE VARIETIES	HARVESTED ACRES	AVERAGE PRICE PER TON	TOTAL TONS	TOTAL VALUE
Chardonnay	16,491	$1,087	42,388	$46,076,000
Riesling	2,116	$937	8,550	$8,011,000
Gewurztraminer	636	$901	4,542	$4,092,000
Pinot Gris	1,499	$986	4,008	$3,952,000
Sauvignon Blanc	1,002	$1,053	3,138	$3,304,000
Other Whites[11]	161	$1,114	594	$662,000
Chenin Blanc	153	$572	999	$571,000
Pinot Blanc	96	$1,723	317	$546,000
Malvasia Bianca	81	$1,158	396	$459,000
Gruner Veltliner	36	$1,020	259	$264,000
Muscat Canelli	55	$898	223	$200,000
Vioginier	149	$1,776	97	$172,000
Roussanne	67	$3,765	42	$158,000
Albarino	34	$1,045	147	$154,000

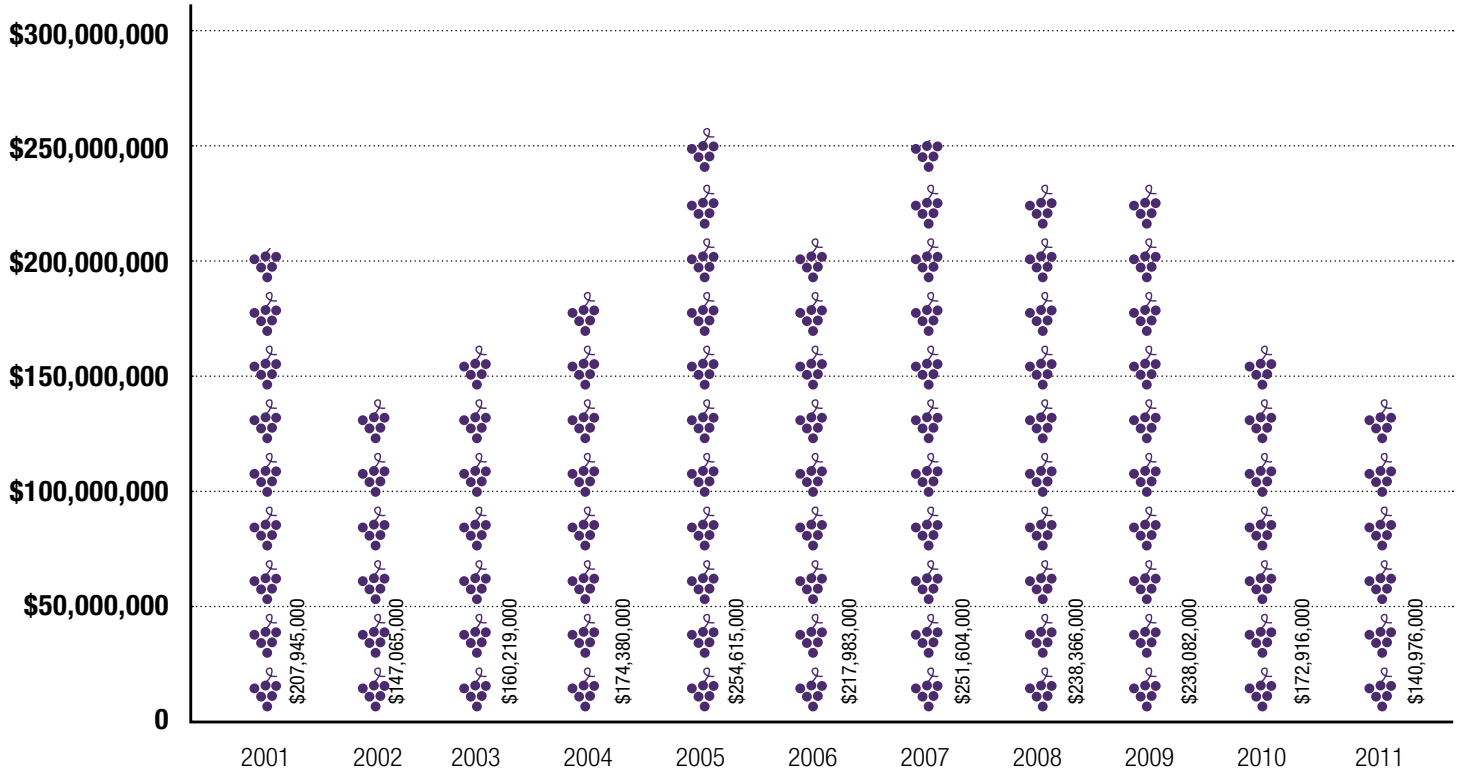
RED GRAPE VARIETIES	HARVESTED ACRES	AVERAGE PRICE PER TON	TOTAL TONS	TOTAL VALUE
Pinot Noir	7,773	$1,775	18,035	$32,012,000
Merlot	5,544	$955	20,104	$19,199,000
Cabernet Sauvignon	4,370	$943	12,232	$11,535,000
Syrah/Shiraz	1,704	$1,114	4,130	$4,601,000
Petite Sirah	265	$1,099	1,272	$1,398,000
Grenache	105	$1,568	411	$644,000
Petit Verdot	138	$1,811	347	$628,000
Malbec	198	$1,114	535	$596,000
Cabernet Franc	116	$1,070	393	$421,000
Other Reds[12]	65	$1,326	311	$412,000
Zinfandel	61	$1,336	241	$322,000
Valdiguie	30	$1,000	239	$239,000
Sangiovese	54	$1,058	197	$208,000
Tannat	35	$1,238	113	$140,000

[11] Arneis, Grenache Blanc, Marsanne, Muscat Orange, Semillon, Sauvignon Musque, Tocai Friulano, and Vermentio
[12] Aleatico, Alicante, Barbera, Carignane, Cinsaut, Dolcetto, Dornfelder, Mataro, Mouvedre, Muscat Hamburg, Negrette, Pfeffer Cabernet, Primitivo, Ruby Cabernet, Souzao, Tempranillo,Teroldego, Tinta Cao, Tourga Nacinal, Touriga Francesca, and Trousseau

Grape Production (cont'd)

YEAR	NONBEARING ACRES	BEARING ACRES	TOTAL TONS	VALUE
2001	7,888	38,098	184,082	$207,945,000
2002	5,682	37,325	143,947	$147,065,000
2003	2,829	34,287	151,344	$160,219,000
2004	1,036	36,614	172,082	$174,380,000
2005	2,378	38,179	269,000	$254,615,000
2006	3,144	38,165	210,000	$217,983,000
2007	3,068	39,636	224,000	$251,604,000
2008	4,006	40,144	201,000	$238,366,000
2009	3,975	40,792	204,000	$238,082,000
2010	2,572	43,321	177,000	$172,916,000
2011	2,006	43,034	124,000	$140,976,000

Monterey County's Value of Wine Grapes



Field Crops

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
Barley, Grain	**2011** 2010	**7,271** 10,130	**1.34** 1.41	**9,720** 14,300	**ton** ton	**$103.80** $92.88	**$1,009,000** $1,328,000
Beans [13]	**2011** 2010	**721** 883	**1.23** 1.27	**885** 1,120	**ton** ton	**$1,680.43** $1,659.61	**$1,487,000** $1,859,000
Hay, Alfalfa	**2011** 2010	**217** 250	**5.39** 5.63	**1,170** 1,410	**ton** ton	**$175.00** $169.88	**$205,000** $240,000
Misc. Field Crops [14]	**2011** 2010	**1,170** 1,550	**1.74** 1.94	**2,030** 3,010	**ton** ton	**$137.00** $119.60	**$278,000** $360,000
Oats [15]	**2011** 2010	**2,035** 2,716	**1.17** 1.87	**2,380** 5, 080	**ton** ton	**$210.00** $119.12	**$500,000** $605,000
Wheat, Grain	**2011** 2010	**1,221** 1,125	**1.26** 1.25	**1,540** 1,410	**ton** ton	**$182.04** $122.60	**$280,000** $173,000
Rangeland	**2011** 2010	**1,066,494** 1,066,494	**N/A** N/A	**N/A** N/A	**acre** acre	**$12.25** $10.00	**$13,065,000** $10,665,000
FIELD CROPS TOTAL	**2011**	**1,079,129**					**$16,824,000**
	2010	1,083,148					$15,230,000

[13] Includes: Peruano, Pintos, Pink, Pinquito, and Lima Beans
[14] Includes: Safflower, Pasture, and Barley
[15] Includes: Hay Oats and Misc. Oats

Seed Production

CROP	YEAR	ACREAGE	PRODUCTION PER ACRE	TOTAL	UNIT	VALUE PER UNIT	TOTAL
Bean Seed, All	2011	2,320	0.89	2,070	ton	$2,096.28	$4,339,000
	2010	2,626	1.04	2,730	ton	$1,807.60	$4,935,000
Misc. Seed[16]	2011	1,739	1.72	3,000	ton	$1,688.42	$5,065,000
	2010	1,630	1.85	3,020	ton	$1,671.78	$5,049,000
SEED PRODUCTION TOTAL	**2011**	**4,059**					**$9,404,000**
	2010	4,256					$9,984,000

Apiary Production

CROP	YEAR	COLONIES	PRODUCTION	UNIT	VALUE PER UNIT	TOTAL
Honey	2011	N/A	24,100	lbs	$1.50	$36,000
	2010	N/A	37,147	lbs	$1.40	$52,000
Pollination[17]	2011	4,200	N/A	colony	$45.00	$189,000
	2010	4,166	N/A	colony	$45.00	$187,000
Wax	2011	N/A	1,125	lbs	$2.35	$2,640
	2010	N/A	1,500	lbs	$2.25	$3,380
APIARY PRODUCTION TOTAL	**2011**					**$228,000**
	2010					$242,000

SPOTLIGHT ON

Locally Developed Packaging Technologies

- Many local produce and package supplier companies are working to improve food safety and develop more sustainable packaging alternatives that are safe, reusable and/or recyclable.
- One Monterey County-based company has developed a waxless alternative carton for shipping hydro-cooled or iced vegetable products that is recyclable and is sourced with Sustainable Forestry Initiative (SFI) certified fiber.
- Pallets literally provide the foundation for moving produce from field to table. One locally-based company reuses and recycles nearly 100% of the material in their new and reconditioned wooden pallets.

[16] Includes: Barley, Broccoli, Carrots, Cauliflower, Celery, Corn, Cucumber, Flowers, Kohlrabi, Onions, Peas, Peppers, Radish, Soybean, and Squash.
[17] Seed Crops Pollinated: Broccoli, Carrot, Cauliflower, Cucumber, Flower, Onion, Pepper, Radish, and Squash.

Agriculture & Our Community

LIVING AND WORKING IN STEINBECK COUNTRY

By Melanie Beretti

Our community is as rich as the soil, diverse as the crops that grow here.

Agriculture touches nearly every facet of life in Monterey County. From lettuce in the Salinas Valley, artichokes in Marina, berries in north Monterey County, or vineyards in Carmel Valley, agriculture shapes our lives. Our community is as rich as the soil, diverse as the crops that grow here.

When one drives along Highway 1 between Salinas and the Pajaro River, it is common to see the iconic image of field workers making their way through a fog-blanketed field. By number, the majority of people working directly in agriculture are field workers. But if you take a more careful look at this scene, you will see that the men and women working in the fields bring a valuable, highly refined skill set. Unlike the majority of agriculture across the United States that is machine harvested, the crops grown in Monterey County are dependent upon this highly skilled labor force to produce the fresh fruits and vegetables that feed the nation and keep us healthy.

The vast majority of agricultural companies based in Monterey County are family-owned and operated. The strength of these companies lies with their employees, and creating opportunities for employee advancement and retention is vital. It is this foundation in family and community that makes it possible, for example, for a hard-working person with basic education to work his or her way up within a company.

Such is the story of Jose Luis, told to me on a typical sunny Salinas Valley day. When Jose Luis completed the sixth grade in his hometown in Chavinda, Michoacán, Mexico, his family didn't have the money to pay for any further education for him. They told him they would be able afford the continuance of his studies in a couple of years, once his older brothers completed university. Out of necessity Jose Luis decided to travel to the United States with his neighbors to earn money for his education and family during this time.

As we drive from ranch to ranch down the valley, our conversation is interrupted at least a dozen times with phone calls or field visits to address the day's business. At one point we meet a colleague alongside the road in Gonzalez to inspect a box

of romaine lettuce hearts in new-to-market packaging. For all I know, my cousins in Michigan will be eating that lettuce tomorrow. With each interruption, Jose Luis politely excuses himself from our conversation and it strikes me how calm and respectful he is in all his interactions, despite the rapid pace of the produce business. Once business is done, he promptly and smoothly picks up his story where he left off, not missing beat.

His father had owned a farm in Mexico and worked hard to insure his children completed their education. He had worked in the United States as part of the Bracero Program, and knew how difficult life could be for field workers in the U.S. It was with some reluctance that he decided Jose Luis could travel to the US for the summer. Jose Luis began by harvesting raisin grapes in California's Central Valley. The summer came and went, and he continued working the fields moving to Watsonville for the celery harvest – "es un trabajo bien duro." Within a couple of years he was working the lettuce harvest in the Salinas Valley. By age 21, his attention to quality and willingness to tell the honest truth, not just what the boss wanted to hear, got him promoted to Harvest Foreman. More than 30 years later, he oversees all mixed vegetable operations for one of the largest produce companies in the world.

If you ask Jose Luis what he does, he'll modestly tell you that he "talks all day." This hardly describes the role he plays to facilitate the movement of millions of pounds of produce each day, Monday through Saturday, from Salinas Valley fields on their journey to tables throughout the nation and beyond. Working from dawn to dusk, Jose Luis choreographs the workers and equipment moving throughout the fields in response to rapidly changing market and field conditions. In one moment he's evaluating lettuce in the field to determine when it will be ready for harvest. The next he's calculating harvest needs and juggling crew schedules to meet orders for the following week.

This position has allowed Jose Luis to support his family and put his children through college, but not without great sacrifice. From April through November, production is on the Central Coast. In order to provide fresh produce year-round, operations shift to Yuma, Arizona in December where Jose Luis works until mid-March. From Yuma production shifts to Huron for about a month, then finally back home to the Central Coast. When his children were young, Jose Luis was able to move his family with him so they could be together throughout the year. However, as his children grew older it became difficult for them to change schools to move south with him. Like his father, Jose Luis is a firm believer in education and wanted his children to have the education that he was not able to obtain. So once his oldest was in high school his family began residing year-round in Salinas while Jose Luis working on the company's operations down south from December until April.

Reflecting upon our time together, I am humbled by Jose Luis's story. Yet I am reminded that his story begins the same as so many of the hard working people in the fields up and down the valley. What has helped make Jose Luis exceptional are his simple "keys to success": no matter what you do, strive to be the best; pay attention to details of your trade; put yourself in the customer's/other person's shoes; never make a decision in haste; take time routinely to look up from what you are doing and see the bigger picture; be kind and respectful to others.

Cut Flowers & Cut Foliage

CROP	YEAR	ACREAGE	PRODUCTION QUANTITY SOLD	UNIT	VALUE PER UNIT	TOTAL
Alstroemeria	2011	3.43	61,500	per bunch	$1.64	$101,000
	2010	3.90	66,100	per bunch	$1.63	$108,000
Asiatic Lily	2011	1.66	101,000	per bunch	$4.21	$425,000
	2010	2.38	111,000	per bunch	$4.22	$468,000
Carnations	2011	7.89	3,209,000	per bloom	$0.16	$513,000
	2010	10.76	4,585,000	per bloom	$0.19	$871,000
Chrysanthemums	2011	30.35	2,494,000	per bloom	$0.41	$1,023,000
	2010	26.99	2,218,000	per bloom	$0.43	$954,000
Eucalyptus	2011	77.07	327,000	per bunch	$1.64	$536,000
	2010	75.94	594,000	per bunch	$1.70	$1,010,000
Gerbera	2011	11.54	6,067,000	per bloom	$0.45	$2,730,000
	2010	13.38	8,146,000	per bloom	$0.30	$2,444,000
Iris	2011	11.34	271,000	per bunch	$2.88	$780,000
	2010	11.19	224,000	per bunch	$3.06	$685,000
Miniature Carnations	2011	4.49	117,000	per bunch	$1.39	$163,000
	2010	4.00	117,000	per bunch	$1.42	$166,000
Misc. Cut Flowers & Cut Foliage[18]	2011	243.56	20,158,000	various	$1.81	$36,486,000
	2010	281.75	23,873,000	various	$1.66	$39,629,000
Oriental Lilies	2011	4.64	205,000	per bunch	$9.26	$1,898,000
	2010	4.37	127,000	per bunch	$9.40	$1,194,000
Roses	2011	13.59	5,301,000	per bloom	$0.51	$2,704,000
	2010	14.15	7,884,000	per bloom	$0.34	$2,681,000
Snapdragon	2011	13.97	520,000	per bunch	$3.72	$1,934,000
	2010	19.87	645,000	per bunch	$3.57	$2,303,000
Tulips	2011	2.12	38,700	per bunch	$3.80	$147,000
	2010	2.10	40,000	per bunch	$4.43	$177,000
CUT FLOWERS & CUT FOLIAGE TOTAL	**2011**	**426**				**$49,440,000**
	2010	471				$52,690,000

[18] Includes: Acidanthera, Amarnthus, Anemones, Anthurium, Asters, Azalea, Banksia, Belladona, Bulperum, Calendula, Calla Lily, Coleus, Curly Willow, Cyclamen, Daffodils, Dahlias, Delphinium, Ferns, Freesia, Gardenia, Gladiolus, Godetia, Grasses, Heather, Hydrangea, Impatiens, Kale, Kangaroo Paw, Larkspur, Lavender, Leather Leaf, Leptospermum, Leucodendron, Leucospermum, Limonium, Lisianthus, Marigold, Oxalis, Portulaca, Protea, Ranunculus, Safflower, Scabiosa, Solidacious, Statice, Stock, Sunflower, Sweet Peas, Tuberose, Viburnum,Yarrow, and Zantedeschia

Nursery Products

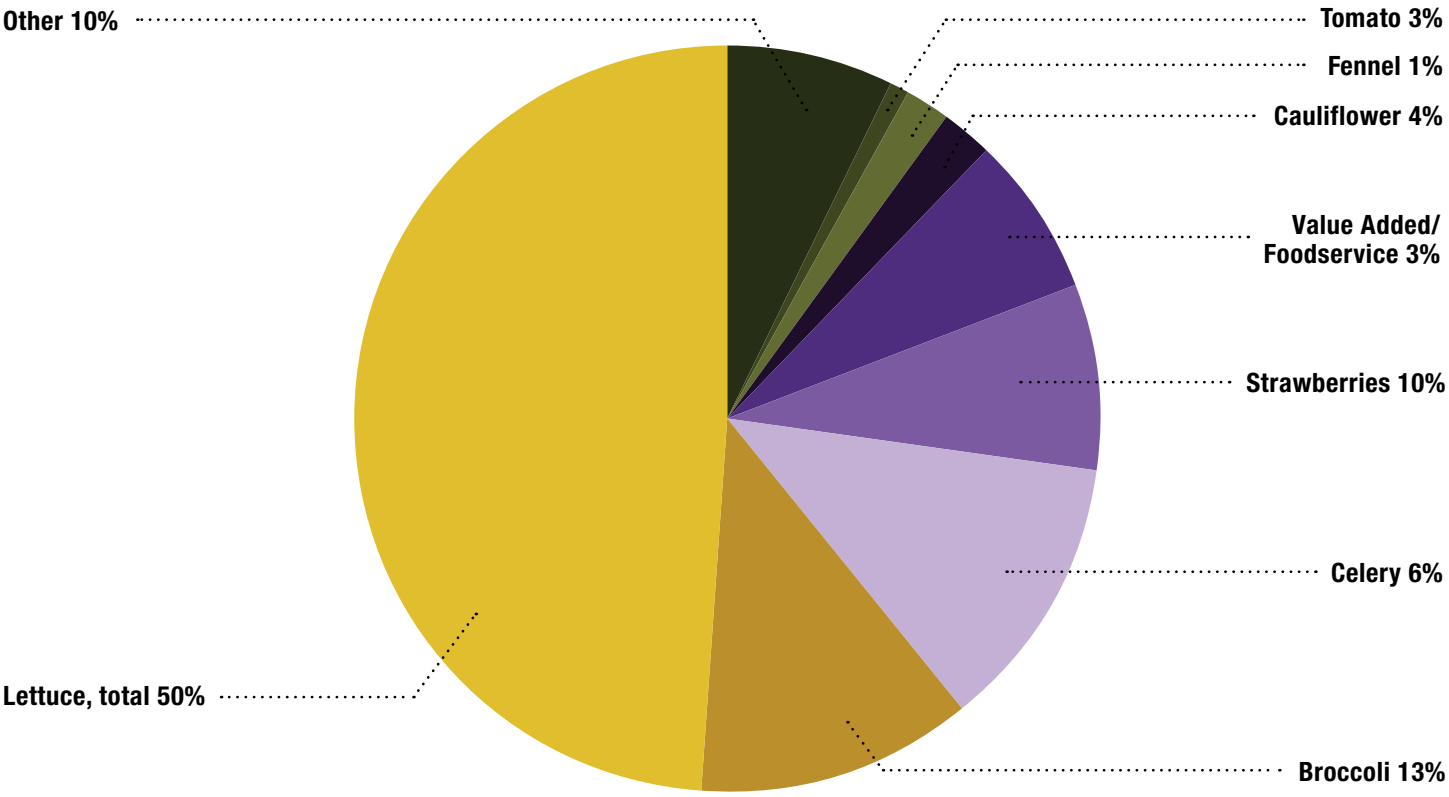
CROP	YEAR	ACREAGE	PRODUCTION QUANTITY SOLD	UNIT	VALUE PER UNIT	TOTAL
Bedding Plants	2011	157.12	32,786,000	per plant	$0.49	$16,065,000
	2010	169.00	35,415,000	per plant	$0.46	$16,291,000
Misc. Nursery Products[19]	2011	658.38	17,527,000	various	$1.04	$18,228,000
	2010	835.55	33,352,000	various	$0.81	$27,015,000
Orchids	2011	108.40	9,119,000	per plant	$6.69	$61,006,000
	2010	91.01	7,690,000	per plant	$7.34	$56,445,000
Poinsettia	2011	81.23	1,933,000	per plant	$5.35	$10,342,000
	2010	88.40	2,031,000	per plant	$5.68	$11,536,000
Potted Plants	2011	252.77	16,239,000	per plant	$2.97	$48,230,000
	2010	253.91	17,485,000	per plant	$2.72	$47,559,000
Propagative Materials	2011	9.94	2,736,000	per plant	$0.36	$985,000
	2010	12.57	3,234,000	per plant	$0.38	$1,229,000
Vegetable Transplants	2011	80.13	1,585,761,000	per plant	$0.03	$47,573,000
	2010	111.09	2,198,455,000	per plant	$0.02	$43,969,000
Woody Ornamentals	2011	56.73	1,781,000	per plant	$4.96	$8,834,000
	2010	73.63	1,993,000	per plant	$4.71	$9,387,000
Nursery Products Total Acres	2011	1,405	----	----	----	$211,263,000
	2010	1,635				$213,431,000
OVERALL NURSERY[20] TOTAL	**2011**	**1,831**				**$260,703,000**
	2010	2,106				$266,121,000

Livestock & Poultry

CROP	YEAR	HEAD	PRODUCTION	UNIT	VALUE PER UNIT	TOTAL
Cattle & Calves	2011	43,250	314,000	cwt	$124.75	$39,172,000
	2010	43,000	280,000	cwt	$112.00	$31,360,000
Stocker	2011	46,000	144,000	cwt	$37.00	$5,328,000
	2010	45,400	136,000	cwt	$64.00	$8,704,000
Sheeps & Lambs	2011	2,200	3,750	cwt	$92.00	$345,000
	2010	2,200	3,750	cwt	$90.00	$338,000
Hogs	2011	1,450	319,000	lbs	$0.65	$207,000
	2010	1,450	290,000	lbs	$0.55	$160,000
Wool	2011	N/A	15,500	lbs	$0.40	$6,200
	2010	N/A	16,000	lbs	$0.40	$6,400
Misc. Livestock[21] & Poultry[22] Products	2011	----	----	----	----	$9,410,000
	2010					$9,325,000
LIVESTOCK & POULTRY TOTAL	**2011**					**$54,468,000**
	2010					$49,893,000

[19] Includes: Begonia, Bromeliads, Bulbs, Christmas Trees, Clivia, Corms, Cypress, Euonymus, Ficus, Fruit & Nut Trees, Jasmine, Milkweed, Myrtle, Native Plants, Rhizomes, Tubers, Turf, and Water Pond Plants
[20] Totals from Cut Flower & Cut Foliage and Nursery Products
[21] Includes: Bulls, Cull Cows, Dairy Cows, Milk Manufacturing, and Market Milk
[22] Includes: Eggs, Fertilizer, Hatcheries, and Poultry

Monterey County's Produce Exports by Commodity



2011 Exported Commodities

Lettuce
378,847,370 lbs

Broccoli
95,016,422 lbs

Strawberries
79,568,870 lbs

Celery
46,037,040 lbs

Cauliflower
30,511,074 lbs

Food Service
25,529,839 lbs

Tomatoes
21,536,050 lbs

Seeds
3,592,032 lbs

Brussels Sprouts
1,369,500 lbs

Asparagus
1,118,421 lbs

Artichokes
528,803 lbs

Other
71,686,930 lbs

Total 759,637,787 lbs

2010 Exported Commodities

Lettuce
279,885,294 lbs

Broccoli
68,476,024 lbs

Celery
64,775,591 lbs

Strawberries
43,562,501 lbs

Food Service
41,740,578 lbs

Cauliflower
10,223,026 lbs

Nursery Stock*
9,942,092 lbs

Anise/Fennel
6,607,745 lbs

Tomatoes
5,638,325 lbs

Asparagus
4,425,024 lbs

Artichokes
3,806,369 lbs

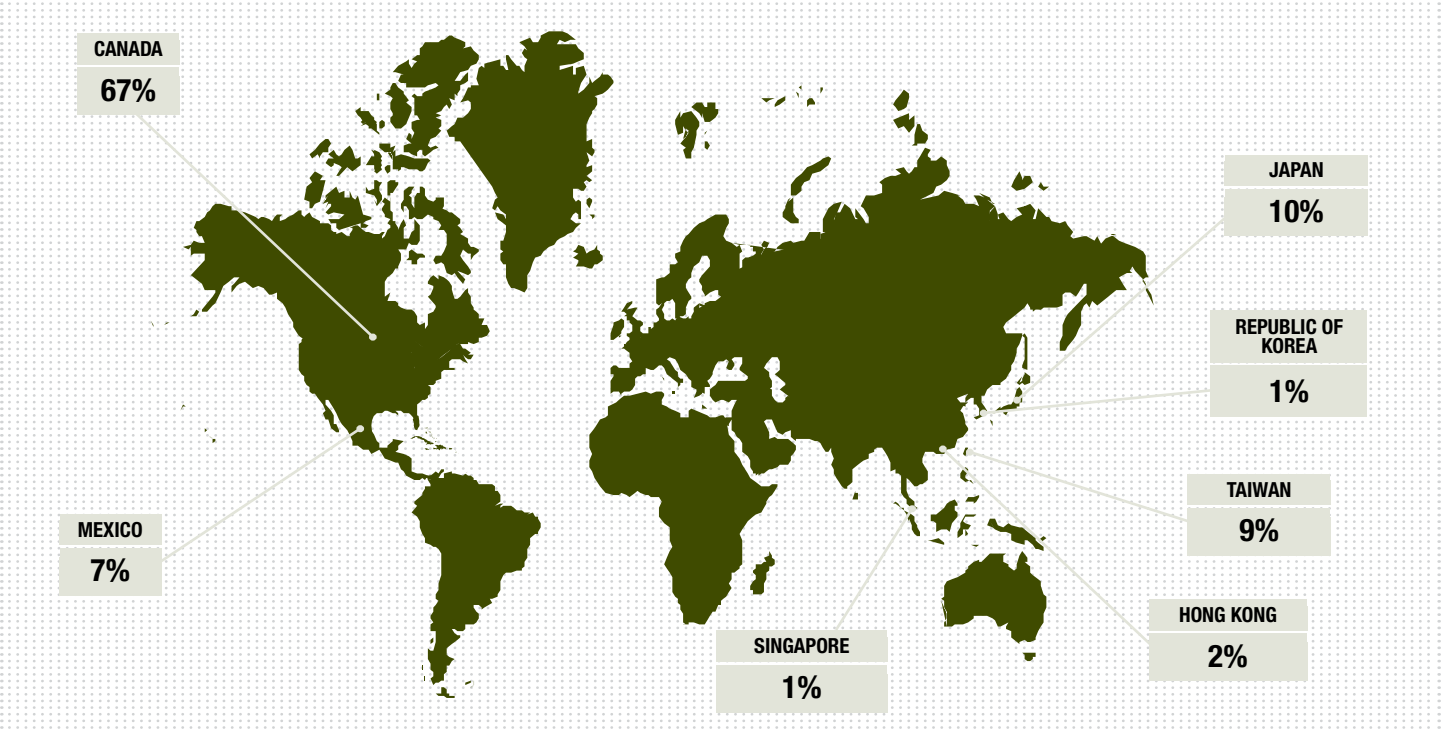
Brussels Sprouts
2,768,150 lbs

Other
21,002,303 lbs

Total 562,853,022 lbs

* Nursery crop exports are now reported separately on page 22

Monterey County's Agricultural Exports Trade Partners



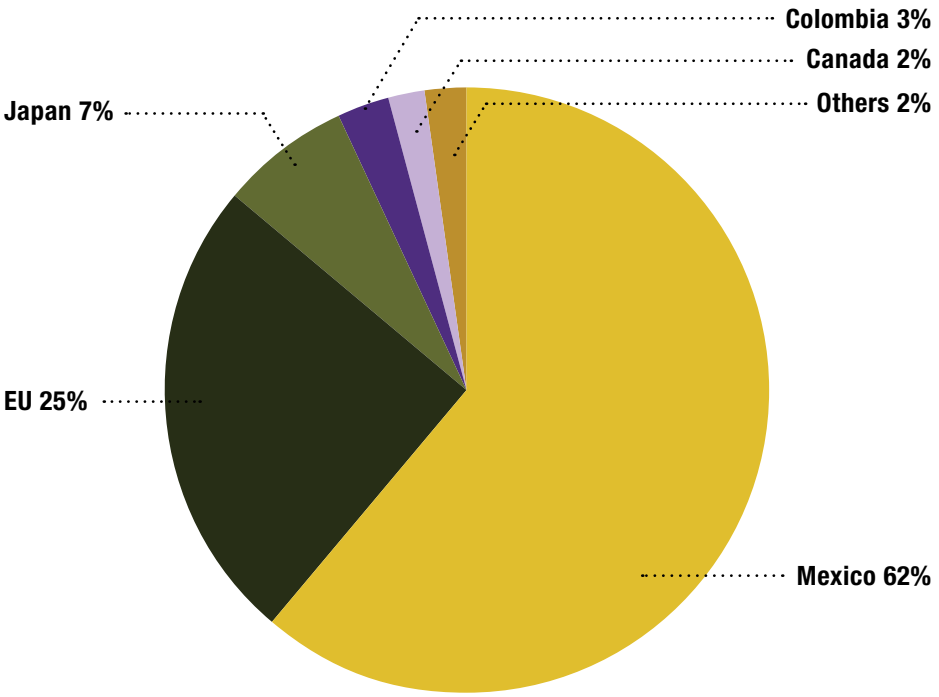
2011 Total Lbs

Canada	**529,832,678**
Japan	**83,067,575**
Taiwan	**68,836,954**
Mexico	**53,248,151**
Hong Kong	**16,873,873**
EUN	**15,487,080**
Republic of Korea	**7,779,993**
Singapore	**9,514,353**
Puerto Rico	**2,896,582**
United Arab Emirates	**1,903,596**
Panama	**1,544,783**
New Zealand	**797,608**
Kuwait	**503,611**
Saudi Arabia	**321,732**
Australia	**311,262**
Baharian	**143,904**
Brazil	**132,390**
Qatar	**108,408**
French Polynesia	**77,004**
Phillipines	**68,088**
Guatemala	**36,119**
Indonesia	**29,550**
South Africa	**24,336**
Chile	**5,134**
Colombia	**1,154**
Costa Rica	**20**

2010 Total Lbs

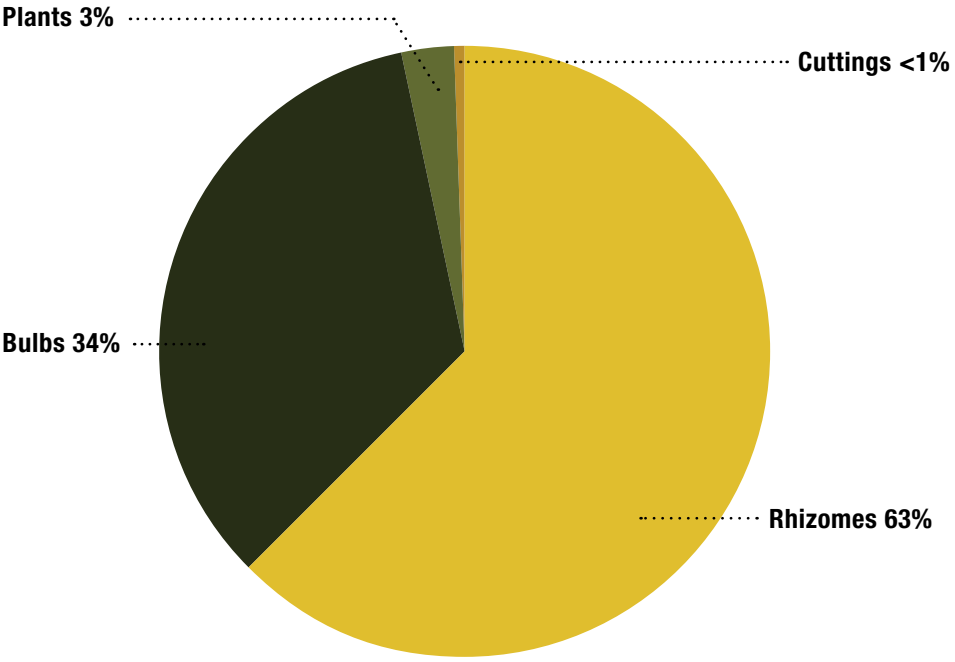
Canada	**309,014,346**
Taiwan	**61,600,448**
Mexico	**38,268,100**
Japan	**29,951,757**
Hong Kong	**19,538,949**
Republic of Korea	**6,578,162**
Singapore	**6,216,406**
Puerto Rico	**4,855,19**
EUN	**3,601,004**
Kuwait	**2,169,321**
United Arab Emirates	**1,421,302**
Panama	**889,018**
Malaysia	**787,020**
Switzerland	**589,440**
Saudi Arabia	**546,000**
New Zealand	**487,855**
Australia	**471,346**
Colombia	**328,581**
Qatar	**104,964**
Guatemala	**94,775**
Brazil	**56,742**
French Polynesia	**48,342**
Indonesia	**29,016**
Republic of China	**25,837**
Bahrain	**18,942**
Costa Rica	**13,962**

Monterey County's Nursery Exports by Units



COUNTRY	UNITS
Mexico	17,965,401
EU*	7,141,584
Japan	1,926,111
Colombia	728,806
Canada	698,980
Republic of Korea	217,950
China	87,660
Guatemala	61,500
South Africa	59,660
Taiwan	48,600
Chile	43,898
Jordan	40,800
Ecuador	30,170
Costa Rica	20,695
Tanzania	17,600
Kenya	15,030
New Zealand	9,510
Norway	8,250
Jamaica	4,450
Dominican Republic	3,000
Sri Lanka	2,880
Vietnam	2,410
Australia	1,331
Brazil	1,040
Fiji	490
Barbados	325
TOTAL	**29,138,131**

Monterey County's Nursery Exports by Category



UNITS	NUMBER
Rhizomes	18,281,595
Bulbs	9,886,129
Plants	824,504
Cuttings	144,488
Flowers	496
In vitro plantlets	488
Plantlets	431
TOTAL	**29,138,131**

* EU includes Denmark, France, Germany, Netherlands, UK, Portugal, Italy, Spain

COUNTY BIOLOGICAL CONTROL

	AGENT / MECHANISM	SCOPE OF PROGRAM
Yellow Starthistle*, Centaurea solstitialis	Seedhead Weevils/Fly,	47 Sites
Italian Thistle, Carduus spp.	Bangasternus orientalis, Eustenopus villosus	General Distribution
Russian Thistle, Salsola australis	Urophora sirunaseva, Larinus curtus,	7 sites
Puncture Vine, Tribulus terrestris	Seedhead weevil, Rhinocyllus conicus	General and Local Distribution
Aphid species	Leaf & stem mining moths, Coleophora spp.	1 site
Ash Whitefly, Siphoninus phillyreae	Stem & Seed weevils, and Microlarinus spp.	General Distribution
	Seven-spotted lady beetle, Coccinella septempunctata	
	Parasitic wasp, Encarsia inaron	

* The hairy seedhead weevil, Eustenopus villosus, is available for release to individual properties with yellow starthistle infestations. Call for arrangements.

PEST ERADICATION

Scotch Thistle, Onopordum acanthium	Mechanical/Chemical	One Infestation
Skeletonweed, Chrondrilla junceae	Mechanical/Chemical	Two Infestations
Puna Grass, Achnatherum brachychaetum	Mechanical/Chemica	Nine Infestations

Hydrilla (Hydrilla verticillata), and biddy-biddy (Acaena novae-zelandiae) have been eradicated.

PEST MANAGEMENT

Roadside (virus host) Weeds	Chemical	County right-of-ways, spot treatment
Roadside, Targeted Noxious Weeds	Chemical	County right-of-ways, boom and spot treatment
Lettuce Mosaic Virus	Virus-Free Seed	Indexing of all county-planted seed
Lettuce Mosaic Virus	Host-Free Period	No lettuce above ground 12/7-12/21
Celery Mosaic Virus	Host-Free Period	No celery above ground in January
Lettuce Root Aphid	Quarantine, State Misc. Ruling 3597	Lombardy poplar prohibition

PEST DETECTION / EXCLUSION

Pest detection is the systematic search for pests outside of a known infested area, or for pests not known to occur in California. The general goal is to detect pests before they become established over an area so large that eradication is no longer biologically or economically feasible. Pest exclusion refers to the process of denying entry of pests into an area by routine inspection of incoming plant shipments and rejection of infested material. Detection trapping is performed primarily by the County Agricultural Commissioner's offices.

TARGET PESTS	INSECT HOSTS	NO. OF TRAPPED SERVICINGS
Medfly	Fruit Trees	3,430
Melon Fruit Fly	Vegetable Gardens	1,072
Mexican Fruit Fly	Fruit Trees	2,792
Oriental Fruit Fly	Fruit Trees	1,484
Misc. Fruit Flies	Fruits and Vegetables	1,076
European Corn Borer	Grains and Vegetables	34
Gypsy Moth	Shade Trees	1,244
Japanese Beetle	Turf, Roses	1,187
Trogoderma Beetle	High Hazard Commodities	16
Glassy Winged Sharpshooter	Nurseries/Vineyards/Urban Areas	15,417
Light Brown Apple Moth	Ornamental/Commercial Crops	5,474
Pepper Moth	Ornamental/Commercial Crops	2
European Grapevine Moth	Grapes	44,355
Asian Citrus Psyllid	Citrus	3,061
Nantucket Pine Tip Moth	Conifers	35

Pest detection trapping activities accounted for 10,761.5 hours, with a total of 80,679 trap services being made. Two hours were applied to inspecting 5 commercial crop sites of 1.5 net/ 75 gross acres. Two calls to residences were made for investigation of suspect reports and 65.5 hours were utilized on inspection/identification of public-reported pests. Twenty-seven high hazard locations were inspected and 241 miles of entryways surveyed, accounting for 52.5 and 34.5 hours respectively. Special surveys were made for exotic invasive weeds, Africanized honeybee, Karnal bunt, mint beetle, citrus greening disease, sudden oak death disease, Asian citrus psyllid, and glassy-winged sharpshooter.

ORGANIC FARMING

One hundred thirteen farms, totaling approximately 19,863 acres of crop land and 9,929 rangeland, were registered in Monterey County in 2011. Utilizing organic principles defined in the California Organic Food Act of 2003, these farms produce a wide array of commodities, such as: strawberries, spinach, broccoli, salad mix, celery, lettuces, cauliflower, raspberries and miscellaneous vegetables. The total estimated value of organic production in Monterey County during 2011 was $170,352,183. This compares with 2010 where we had 19,495 production acres and 9,000 acres of rangeland with an estimated value of $168,956,060.

Monterey County
Agricultural Commissioner's Office
1428 Abbott Street, Salinas, CA 93901

831.759.7325 • http://ag.co.monterey.ca.us

Exhibit 31

Michael Thomas
629 Santa Lucia Ave
Los Osos, CA 93402
(805) 748-6762

August 2012

Education

College:	College of Environmental Science and Engineering, University of Florida
Major:	Environmental Science and Engineering
Graduated:	May of 1987 (Bachelor Degree).

Career Experience:

Assistant Executive Officer, Central Coast Water Board, San Luis Obispo, CA.
2005 to Present:

Oversee approximately 70 employees for the Central Coast Water Board, which regulates many types of land use activities and discharges to land, surface waters, and groundwater, over approximately 11,000 square miles of the Central California Coast. This includes thousands of individual cases in several areas, including:

Municipal development, land uses, and storm water
450,000 acres of Irrigated agriculture
2.3 million acres of cattle grazing
Municipal and hazardous waste landfills
Timber harvesting
Groundwater and surface water cleanup projects
Dredging in harbors
Power plants

Oversee tens of millions of dollars in grants for all types of water resource projects, including habitat conservation and restoration.

Leading the Water Board's effort to be a performance-based organization focused on tangible results in the physical world. This cultural change effort is based on collaboration and teamwork throughout and across the organizational structure. The goal is to grow a culture that rewards actions to achieve tangible progress on the most important and controversial water issues on the Central Coast. This includes implementing the following:

Using a grass-roots process to establish a vision, goals, and objectives for the organization
Establishing values for the organization
Revising our recruiting, interviewing, hiring, and "graceful exit" processes
Establishing higher order, written expectations for all employees
Providing ongoing leadership education for all employees
Measuring important factors to demonstrate progress (and define the culture)
Defining success and failure
Encouraging and rewarding risk taking to achieve greater tangible results

We implemented unprecedented actions to address the major water quality issues on the Central Coast, such as:

> *Defined prioritization criteria based on water quality and threat to human health, and applied it to all our work across the organization to make sure we are focused on the most important issues.*
>
> *Defined job expectations for all Water Board staff based on our goals and priorities.*
>
> *Created and funded the Central Coast Low Impact Development Initiative (http://centralcoastlidi.org/Central_Coast_LIDI/Home.html, which provides expert design and planning services on all aspects of sustainable development to municipalities and consultants.*
>
> *Developed new regulations for irrigated agriculture to address the most severe and challenging water quality problems on the Central Coast, which are also among the most severe problems in the United States.*
>
> *Ongoing development of advanced requirements for municipal storm water management, such as hydromodification control criteria and low impact development design standards.*
>
> *Created a performance based structure and tracking system for our grant management program to achieve accountability for tangible results on our priority issues.*
>
> *Implemented "Vision Teams," which are led by line staff and are designed to work across the organizational structure to define and implement actions that help achieve our vision, goals, and objectives.*

Executive Leadership Teaching

I currently teach several classes in the UC Davis Executive Program, including:

Mental Models
Leading Change
Leadership Communication
Navigating Complexity
Leadership Styles and Efficacy
Ethics
Case Studies

The UC Davis Executive Program is described here:
http://extension.ucdavis.edu/unit/business_and_management/executive_program/

As part of the UC Davis Executive Program, I teach classes am assisting other Regional Water Boards in their efforts to become more performance based organizations (References: David Gibson, Executive Officer, San Diego Regional Water Board; Catherine Coleman, Executive Officer, Santa Rosa Regional Water Board).

June 1987 to January 2005: State of CA, Regional Water Quality Control Board, San Luis Obispo, CA, Program Manager and Project Manager.

1995 to 2005:

I was the project manager overseeing engineering evaluations, ecological impact studies, mitigation analyses, and socio-economic studies related to three major power plants in the Central Coast Region. These projects included some of the most complex and comprehensive work ever undertaken by the Water Board. I directed a technical workgroup that designed and implemented ecological studies at the Diablo Canyon Nuclear Power Plant; studies that defined the standard that is now followed by other similar work. I initiated the use of third party, independent scientific oversight, hired and managed ten independent PhD level scientists and three consulting firms, and managed multi-disciplinary technical workgroups to oversee all aspects of the engineering, ecological, and economics work.

The biological studies at Diablo Canyon are among the most comprehensive marine impact studies of their type in the world (Reference: Pete Raimondi, UC Santa Cruz). During a deadlock among scientists on the technical workgroup regarding interpretation of ecological impacts, I initiated the concept of interpreting impacts as "effective habitat loss," which is now being used throughout the United States on power plant projects and is referenced in new Clean Water Act regulations. I initiated unique solutions to environmental impacts, including habitat restoration and conservation in coordination with achieving the Water Board's ultimate goal of water quality protection on a watershed and regional level scale. A proposed settlement of the Diablo Canyon Power Plant impacts currently includes permanent ecological preservation of 4 miles of coastline habitat and 2000 acres of coastal watershed, and approximately $6 million dollars for marine projects. I initiated discussions with the non-profit Resources Legacy Fund Foundation and negotiated an additional $2.5 million matching grant for this project.

I initiated, negotiated, and defended a $7 million mitigation package to resolve impacts caused by the Moss Landing Power Plant, and directed the funds toward restoration and conservation. The project has so far produced the permanent preservation of over 2000 acres of habitat around the Elkhorn and Moro Cojo Sloughs, and restoration of hundreds of acres of wetlands—one of the most successful conservation projects of its kind in California (Reference. Mark Silberstein, Elkhorn Slough Foundation).

1994-1995:

I was the acting Supervisor of the Regional Board's Planning Unit. I managed several full time employees and student interns. My responsibilities included oversight of large scale monitoring programs, training workshops, grant programs, budgeting, Basin Plan amendments, and presentations and recommendations before the Regional Board.

1990–1994

I worked primarily on non-point source issues, managing several programs:

- Timber Harvest Program
- Toxic Substances Monitoring Program
- Mussel Watch Program
- Bay Protection and Toxic Cleanup Program
- 205j Grant Program
- 319h Grant program
- Clean Lakes Grant Program

- Contract management and oversight of grant project implementation

Major projects during this time were:

Buena Vista Mine:

Project manager investigating mercury pollution in the Lake Nacimiento watershed. I managed a watershed scale mercury loading study that changed the agency's approach to regulating this facility and resulted in the site being accepted into the federal Super Fund Program.

Monterey Harbor Lead Investigation/Cleanup:

Project manager investigating lead pollution in Monterey Harbor. This case presented major political obstacles and had been stagnant for nine years. After taking over as project manager, I addressed each obstacle in turn and within eight months Southern Pacific Railroad was on-site completing a major hazardous waste cleanup operation at a cost of over $5 million.

1987-1990

I worked primarily on groundwater pollution cases. These projects included geological and engineering reviews. Some of my major projects during this time were:

Unocal, Guadalupe:

Project manager overseeing investigation of a massive subsurface oil spill in the Guadalupe dunes. This is one of the largest oil field cleanup projects in the United States, costing hundreds of millions of dollars.

Unocal, Avila Beach:

Initial project manager overseeing investigations into extensive subsurface oil spills beneath a large portion of Avila Beach. Much of the town was excavated, costing in the hundred million dollar range.

Development Courses

Professional Development Education

UC Davis Executive Program (UC Davis 2006/7)
Strategic Management (Harvard Kennedy School of Government, 2006)
Coaching Skills for Managers and Supervisors
Leading Change
The Art and Science of Leadership
The Work of Leadership
Harnessing Complexity
How to Supervise People
Leadperson Workshop
Managing Multiple Priorities
Powerful Business Writing Skills
Evelyn Wood Reading Dynamics
Proofreading and Grammar Skills
How to Handle Conflict, Anger, and Emotion
Interpersonal Communication Skills
How to Solve Communication Problems
Presentations with Confidence and Power
Franklin Quest Time Management
First Things First (Stephen Covey)
Facilitating and Mediating Effective Environmental Agreements (Concur)
Negotiating Effective Environmental Agreements (Concur)

Technical Development Training:

River and Stream Morphology
Comprehensive Watershed Evaluations
GIS Training Seminar
State of the Estuary— Morro Bay (Presenter)
Contract Management
Estuarine Research Seminar
Marine Bioassay Workshop
Bioremediation- Soil and Ground Water
Data Base Management
Conservation Planning on the Central Coast (Resources Legacy Fund Foundation)
Ecosystem Based Management (COMPASS, Packard Foundation)

Angela Schroeter

EXPERIENCE

Senior Engineering Geologist/Program Manager **August 2006 to Present**
Central Coast Regional Water Quality Control Board
Agricultural Regulatory Program

Supervise technical staff and manage the implementation of the Agricultural Regulatory Program Unit. Develop, maintain, and implement permit (Conditional Waiver of Waste Discharge Requirements) for irrigated agriculture. The Agricultural Regulatory Program implementation includes managing enrollment of individual farms, prioritizing individual farms based on relative risk to water quality, degree of waste discharge, and proximal water quality impairment; evaluating compliance based on management practice implementation and monitoring and reporting; and conducting enforcement. The program also coordinates with an external cooperative monitoring program for surface receiving water implemented by dischargers. Agricultural Regulatory Program data and information is managed in the Water Board's GeoTracker system. Current duties also include managing individual staff from the Waste Discharge Requirement (WDR) Program. From August 2006 to approximately August 2008, duties also included managing the Grants Program, Total Maximum Daily Load Program (TMDL), and Basin Planning.

Senior Engineering Geologist/Program Manager **April 2001 to August 2006**
State Water Resources Control Board
Groundwater Ambient Monitoring and Assessment Program (GAMA) Unit

Supervised the GAMA Unit and managed the implementation of the GAMA Program, a comprehensive statewide groundwater quality monitoring program. GAMA Program components include Statewide Basin Assessments (focuses on public supply wells), the Voluntary Domestic Well Assessment Project (focuses on private domestic wells), and Groundwater Special Studies. The GAMA Program utilizes innovative, state-of-the-art sampling and analytical techniques to test for a broad suite of chemical constituents at very low detection limits. Samples are analyzed for major ions, trace elements, nutrients, volatile organic compounds (VOCs), pesticides, pharmaceuticals, and emergent contaminants (e.g. perchlorate). Naturally occurring isotopes (tritium, carbon-14, and helium-4) are also measured to identify the source and age of the sampled groundwater. Data is used to assess the current status of groundwater quality, to detect changes or trends in groundwater quality, and to assess the natural and human factors that affect groundwater quality. GAMA Program implementation includes coordination of Water Board technical staff and researchers from the U.S. Geological Survey, Lawrence Livermore National Laboratory, and University of California using nearly $50 million in contracts. Additional coordination includes developing partnerships with local water agencies, State and Regional Board programs, and other stakeholders through extensive public meetings to promote inter-agency coordination and data sharing.

Associate Engineering Geologist **September 2000 to March 2001**
State Water Resources Control Board - Groundwater Special Studies Unit
Coordinated an inter-agency task force and public advisory program to design the GAMA Program, in response to the Groundwater Quality Monitoring Act of 2001. Served as GAMA Program lead technical staff person and help plan, organize, direct, and review the work of unit staff to accomplish GAMA Program goals. Reviewed and evaluated hydrogeologic reports and data related to ambient groundwater quality and contamination. Reviewed proposed legislation

affecting water quality issues and prepared bill analyses and legislative concept papers. Served as the Division's GIS and GPS contact. Assisted in the management of the Land Disposal Section's student assistants.

Associate Engineering Geologist **September 1998 to August 2000**
State Water Resources Control Board - Land Disposal Unit
Acted as the SWRCB Land Disposal Program liaison for Regions 1 (North Coast), 3 (Central Coast), and 4 (Los Angeles). Provided technical and procedural guidance related to the state Title 27 and federal RCRA programs. Assisted Regional Board staff and other agencies in the implementation and interpretation of statewide policy and regulations. Reviewed and evaluated Report of Waste Discharge, Waste Discharge Requirements, and Self-Monitoring Reports. Evaluated petitions of Regional Board actions and reported analysis, findings and recommendations in technical reports to management. Reviewed and tracked hazardous waste sites under Resolution No. 92-49.

Technical Team Leader – Geologist **August 1997 to August 1998**
U.S. Army Corps of Engineers, Sacramento District - Environmental Engineering Section
Served as the Technical Team Leader for the Basewide Petroleum Program at the Presidio San Francisco. Coordinated state and federal regulators, Corps of Engineers technical staff, and military officials regarding petroleum site investigation and remediation. Negotiated site cleanup with land use authority and directed contractors to conduct investigation and remediation activities. Reviewed remedial and corrective action plans and reports for technical validity and consistency with state and federal policies and regulations. Participated in public meetings, including the Presidio Restoration Advisory Board.

Geologist **June 1994 to July 1997**
U.S. Army Corps of Engineers, Sacramento District - Environmental Engineering Section
Independently organized and conducted hydrogeologic studies in the Honey Lake Basin, including Sierra Army Depot, to investigate regional groundwater movement, occurrence, quality, and supply, including the collection, analysis, interpretation, and management of hydrogeologic data. Coordinated field teams. Prepared reports.

LICENSES **California Professional Geologist**

EDUCATION **M.S. Hydrogeology and Hydrology** ♦ August 1997
B.S. Geology ♦ March 1994
B.S. Environmental Policy Analysis and Planning ♦ March 1994

Silvia Monica Barricarte

Education

- B. S. in Agronomy. University of Buenos Aires. Argentina. 1995. Undergraduate thesis title: "Study of the Salinity on Soils in the West of the Province of Buenos Aires, Evaluating the Influence of the Water Table".
- Master of Science in General Agriculture with emphasis in Irrigation. Graduated from Cal Poly State University, San Luis Obispo, California. 1999. Graduate Thesis Title: "Comparing Actual with Design Distribution Uniformities on Drip and Microirrigation Systems".
  Major Professor: Dr. Burt. Director of the Irrigation Training and Research Center, Cal Poly.

Experience

Present.
- Water Resources Control Engineer for the Central Coast Water Quality Control Board since March 2008. Development of the regional "Irrigation and Nutrient Management Program" to reduce surface water irrigation runoff and the off-site movement of nutrient fertilizers from irrigated lands.
  Currently working under the Agricultural regulatory Program to regulate discharges from Irrigated Agricultural Lands of the Central Coast, CA.
- Vineyard Irrigation instructor at Allan Hancock College, Santa Maria community college, since Fall 2007. The irrigation class includes the following topics: irrigation system efficiency (Distribution Uniformity), irrigation scheduling and systems maintenance.

Government.
- Water Resources Specialist for the Cachuma Resource Conservation District, non-profit special district of the Santa Barbara County, California, from June 2001 to February 2008. Water Conservation plans and reports were performed for land users of the California Central Coast, including GIS mapping and database management, AutoCad drafting, and GPS land positioning equipment.
  "Irrigation Mobile Lab" engineer, main duties included: field inspections and evaluations of urban and agricultural irrigation systems, assessment of water management and conservation plans, field measurements, hardware inspection, and calculation of water application amounts and irrigation system efficiencies.
- Instructor and curricula developer of the "Green Gardener" educational program, Central Coast of California.

Private.
- Land and crop capabilities assessment of over 800 hectares at Ranch La Taba, Buenos Aires, from March to May 1996, Argentina. Mapping and planning of land capabilities, soil problems, and conservation practices.
- Irrigation systems designer, technical assistant and engineer duties performed for Irrigation Concepts, private company located in McFarland, Central Valley, California, USA, from June 1999 to June 2001. More than 50 drip and micro-irrigation systems designs made using AutoCad, the engineering drafting computer program. Also, in-field irrigation systems evaluations and hands-on recommendations were given to the ranchers.

Summer Internships.

Irrigation System Evaluations in the San Joaquin Valley (6/97–8/97), and Sacramento Valley (6/98–8/98) in California. The U.S. Bureau of Reclamation sponsored the internships. The evaluations involved drip, microsprays, furrows and sprinklers irrigation systems. The internships were coordinated and organized the ITRC (Irrigation Training and Research center, Cal Poly. San Luis Obispo).

Previous University Related.

Teaching assistant for the Soils Department, University of Buenos Aires, Argentina, from September 1993 to March 1996. Duties: teaching lectures on soil related subjects, laboratory training on soil and water analysis measurement, and on-farm soils structure assessment and land capability evaluations.

Outreach.

- Spanish and English workshops for farmers and irrigators given in partnership with the Central Coast Vineyard Team, non-profit organization located in the Central Coast Region of California; the UC. Cooperative Extension from Santa Barbara and San Luis Obispo counties; the Southern San Luis Obispo and Santa Barbara counties watershed coalition; and the California Strawberry Commission.
- Classes and workshops for the State Water Agency located in the Santa Barbara County, California.
- Special presentations performed for private organizations like the Wine and Grape California Association.
- Workshops and training classes for landowners with landscape and agricultural water use systems through farm advisors of Santa Barbara and Ventura Counties, California.

Special Knowledge and Certifications

- Bilingual in English and Spanish.
- Computer skills: Word, Excel (spreadsheets), Autocad, AutoCivil, GPS equipment and ArcView GIS 3.2 and ArcMap GIS.
- IA Certified Irrigation Designer for Drip and Micro-Irrigation systems and Certified Irrigation Specialist. Certifications achieved through the United States Irrigation Association in 1999.
- California and International Certified Crop Adviser achieved through the American Society of Agronomy and the Soil Science Society of America in April 2009.
- Committee member of the SIP, Sustainability in Practice, Certification Program, since 2008.

Exhibit 32

Operation and Ranch Information

AW	Operation Name	Current Ranches	Total Acreage	Status
1761	Boutonnet/Laguna Mist Farms	21	3,377.7	Enrolled
1877	Sea Mist Farms	24	4,547.1	Enrolled
1804	RC Farms, LLC	12	3,761.85	Enrolled
1350	Uesugi Farms	19	449.6	Enrolled
1204	Bob Campbell Ranches	27	2,416	Enrolled
1807	Anthony Costa & Sons	7	2,280.3	Enrolled
4609	Costa Farms	12	1,466.46	Enrolled
4610	Costa Family Farms	19	1,763.8	Enrolled
1823	Christensen and Giannini	19	3,751.6	Enrolled
1793	Rio Farms	11	3,608.3	Enrolled
1183	B&D Farms	6	399.6	Enrolled
1818	Jensen Family			No response to NOV issued 9/2011

Note: Enrollment data (from Notice of Intent) is available for these farms. It is not included in the exhibits because information related to specific address and location may not be disclosed due to potential conflict with California privacy laws. In addition, information related to specific irrigation type may not be disclosed because such information may be trade secret and therefore may not be made available for inspection by the public (Wat. Code, § 13267, subds. (b)(2).) Information related to specific crop type may not disclosed because the PRA provides an exception for the disclosure of records that contain "plant production data and similar information relating to utility systems development, or market or crop reports, that are obtained in confidence from any person." (Gov. Code, § 6254, subd. (e).)