

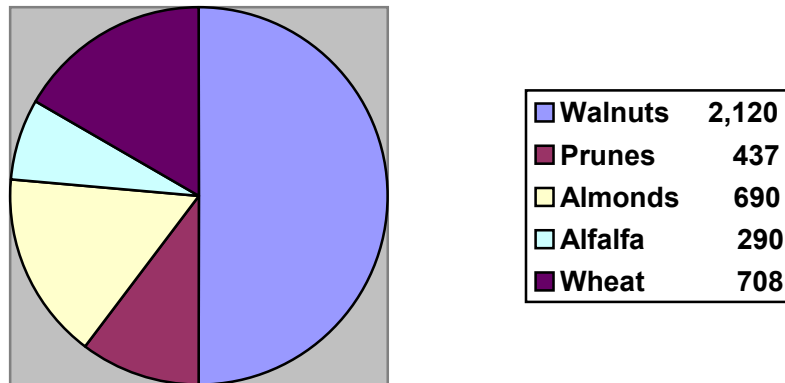
## Investigation of Methods for Advancing Compatible Agriculture in Sacramento River Floodplain Habitats

Fred Thomas  
Cerus Consulting  
766 East Avenue, Suite C  
Chico, CA 95926

Similar to other project goals, research and development, and pilot implementation of compatible agriculture is aligned with SRFAC guidelines. Local stakeholders are unanimous in their support of agricultural practices that are compatible with neighboring conservation lands. As more water quality monitoring is implemented, these farms on the banks of the river may be identified as the largest contributors to the runoff problem. Therefore, many of the project efforts are geared towards reducing these environmental impacts. The following is an outline of TNC and our partner's efforts towards developing compatible agriculture while meeting ecosystem restoration goals, and improving the economic sustainability of farming within the Inner River Zone.

TNC manages 30 properties totaling 4,245 acres with over 3,000 acres of orchard and 1,000 acres of row and field crops on the banks of the Sacramento River between the cities of Red Bluff and Colusa.

TNC Crop Acreage 2002 (4,245 acres)



These properties are in a transitional stage, ultimately to be restored to riparian habitat. During this transitional period TNC leases out the orchards and fields to local farmers to raise income for the future restoration of the properties. The income benefits former owners who often lease back the properties while they expand their agricultural operations outside the flood plain. The gradual removal of orchards and restoration helps local economies and county governments adjust to gradual changes in income.

Most of the orchards that TNC acquires are approaching the end of their economic life cycle. Once acquired, the properties are leased for an average of five years. Healthier orchards may be

leased out for as long as ten years, although these are a small percentage of the total properties managed.

Walnuts, almonds, and prunes comprise the three main orchard commodities raised on the banks of the Sacramento River. Each of these commodities has their own environmental and economic issues. All the orchard commodities are challenged by global competition, water quality regulations, and the outright elimination of specific pesticides. On a site-specific basis the majority of these properties are eroding or are covered at times of the year by floodwaters from the river and tributaries. The near semi-annual flooding, silt and debris removal, and erosion, combined with recent declines in the commodity price of prunes and almonds have all contributed to willing sellers approaching TNC about purchasing their properties.

### *Compatible Farming Program*

#### **Walnuts**

Walnuts comprise half of the farm acreage of TNC's farming program (Figure 1). Currently thirteen of the twenty agricultural properties are in walnut production. With properties in close proximity to the flood zone, walnuts have been regularly acquired along with remnant riparian forest.

Since acquiring walnut orchards in 1993 Point Reyes Bird Observatory has conducted bird surveys that continue to validate that the structure of walnut orchards is similar to structure of forests and is visited by neo-tropical migratory birds. Because walnuts are wildlife compatible, TNC has developed farming programs that continue to provide a sustainable yield with substantially reduced pesticides. Since acquiring these properties along the Sacramento River and tributaries, TNC has eliminated the applications of Guthion®, Lorsban®, Imidan®, Sevin®, Diazinon®, and Asana® in the walnut farm properties.

Since 1998 TNC has helped farm lessees switch from broad-spectrum organophosphates and pyrethroids to the insect growth regulator Confirm®. During the 2002 season TNC started large-scale treatment for the primary pest Codling Moth with a pheromone disruption system on one third of the acres managed by TNC. TNC is a member of the California Walnut Commission's Pest Management Alliance and reported their results of the largest field-testing of this new sustainable method of pest control.

As funding becomes available walnut properties will be restored, but because walnuts are compatible with the river ecosystem, many of the blocks are scheduled to be productive for five or more years. TNC plans to continue to use their properties as model farms for wildlife friendly farming methods and encourage other neighbors to participate in pesticide reduction systems.

#### **Prunes**

The current two TNC prune farms were recently acquired and will become part of large-scale trials of the California Dried Plum Board's (CDPB) Integrated Prune Farming Practices program. As part of the Hamilton City Project the validation of monitoring to only use oil and a fungicide for prune production will be field-tested on prune orchards managed by TNC.

Despite the recent acquisitions of prunes, TNC has acquired and restored more one thousand acres of former prune orchards since the project began in 1988. Unlike the walnut orchards, many of the prune orchards were in poor condition from years of flooding and the prune industry has had depressed returns for a number of years.

TNC was instrumental in starting the Biological Prune Systems (BPS) project in 1995 to bring sustainable farming, pesticide reduction, and bird friendly farming to area farmers. With both a Department of Pesticide Regulation and EPA 319h grant, TNC enlisted ten farmers who eliminated Diazinon®. A series of 20 educational meetings were held, a newsletter created, and the program helped our industry partner, the California Dried Plumb Board (CDPB), to start a statewide program. In addition to the inclusion of the PRBO bird surveys in the CDPB Research Results, TNC has also been instrumental in supplementing research in conjunction with Scientific Methods, Inc. to develop a pheromone disruption program for Plum Aphids, a primary obstacle statewide to pesticide elimination in prune production.

### Almonds

Two of the three almond orchards currently managed by TNC are in poor condition and scheduled for removal and restoration after the 2003 season. Almonds are the least floodplain compatible orchard crop because they bloom early and flood easily on the floodplain. Similar to prunes, TNC has restored more than one thousand acres of almonds since the project began.

In 2002 newly acquired properties north of Hamilton City were monitored as part of the Water Steward Research and Demonstration project in Glenn County. The almond properties managed by TNC will be expanded to include Almond Pest Management Alliance monitoring protocols.

### Wheat

Many properties along the river are former prunes, almonds, or row crops and these properties are farmed to wheat after the orchard removal. The sequence of orchard removal, wheat, cover crop, and restoration is repeated on most of the properties and the wheat farming is very compatible with wildlife and eventual restoration. Many of the former orchards that are removed have thick undesirable weed understories dominated by noxious weeds such as Johnson grass and Bermuda grass which have become deeply established. Deep disking followed by wheat cultivation will clean up and keep the properties clean of noxious weeds.

The ability to use registered broadleaf herbicides on the wheat crop followed by disking to remove perennial grass weeds leads to a much cleaner and successful native grass establishment. Wheat is a very wildlife compatible crop, providing cover until summer and a supply of food for many species. TNC will continue to use the row crop rotation of the restoration process to eliminate noxious weeds and seeds from the restored flood plains and forests.

### Cover Crops

For the past five years TNC has supported the use regionally of cover crops through the Biological Prune Systems. As a partner in the effort with Natural Resources Conservation Service (NRCS) TNC has held many meetings on the farm properties demonstrating the effective use of cover crops. As part of a regional cover crop team with CSU, Chico TNC has

funded demonstration plantings and field days for staff, restoration contractors, and local farmers.

As part of our noxious weed program, cover crops are used on the restoration properties during farming and during the restoration phase to suppress introduced weeds. During the past five years the restored properties include an under story of California Native grasses, such as creeping wildrye, which inhabited the banks and floodplain in historical times. The cover crops are planted for one or two years before establishing the native grass providing extensive wildlife cover and habitat. The understory grasses are then no-till planted into the cover crop mulch to reduce the need for herbicides. As a member of the UC Conservation Tillage Workgroup TNC has hosted a no till plug planting demonstration for the Glenn County Surface Water Stewardship program.

### *Implementation examples*

#### The Phelan Island Sustainable Farming System Project

The Phelan Island Sustainable Farming System Project is part of TNC's Sacramento River Project. In combination with our partners, California State University, Chico (CSUC) and the U.S. Fish and Wildlife Service, TNC has directed and managed the cooperative farming and restoration activities since 1994. The Phelan Island Project had three specific objectives:

- a. Restore 33 acres of native riparian habitat.
- b. Implement best management practices on the walnut and prune orchards to reduce or eliminate pesticides and fertilizers.
- c. Create a local outreach program with the Phelan Island and Biological Prune Systems (BPS) programs to demonstrate techniques and methods designed to reduce the use of pesticides and fertilizers and highlight the benefits of riparian forests to prune farmers.

During the time period of the program, April 1996 to November 2000, the program achieved all of the objectives and created many essential collaborating partnerships that have expanded the project. In addition to restoring the 33 acres at Phelan Island, TNC has been able to remove non-productive walnut and prune orchards within the Sacramento River Conservation Area and restore more than 800 additional acres. The BPS program created an Advisory Team that helped 12 prune farmers eliminates the use of Organophosphate (OP) pesticides. These original farmers formed the core of both the BPS and the California Prune Board's (CPB) Integrated Prune Farming Practices (IPFP) program. During the past two years the IPFP project has expanded to 33 sites state wide including 10 sites that were added in 2000 that were supervised by Pest Control Advisors (PCA).

Two other key local outreach partnerships that have developed as a result of the Phelan Island Project are the Natural Resources Conservation Service (NRCS) and the Glenn County Surface Water Stewardship (GCSWS) program. By using the original sites that were developed through TNC and CPB, numerous meetings have been held regionally to showcase techniques that reduce surface water contamination by OPs, establish cover crops and filter strips, feature new monitoring methods for PCA and farmers, and optimize irrigation water and nitrogen efficiency.

## Biological Prune Systems Project

BPS is a cooperative program for prune growers to refine and adopt farming practices that remain economically viable while striving to protect environmental quality. The BPS project was initiated by TNC for compatibility of farming and riparian areas and to help local prune growers adopt farming systems that would help the health of the Sacramento River watershed. An Advisory Team (AT) of two progressive prune farmers, a Pest Control Advisor (PCA), a cover crop specialist, a filter strip researcher, a prune processing representative, and for the first year the University of California Cooperative Extension Service (UCCE) assisted in the recruitment of the BPS growers.

The first year ten growers joined the program and placed 15 to 25 acre blocks into a reduced chemical program, often pairing the block with an equally managed conventional block. The second year two more growers joined the program for a total of twelve. The growers voluntarily tried the methods suggested by the AT, and they all removed Diazinon and other Organophosphate sprays by the second year. The alternative methods included using *Bacillus thuringiensis* (BT), oil sprays, cover crops, grassed roadways, habitat and shrub plantings, and monitoring to reduce farm inputs and control pests by implementing a systems approach of functional farm biology. The project growers farm or manage over 6,000 acres of mixed orchard crops, and for them this was a testing area that they could expand to other parts of their ranch.

After the first year, the UCCE Farm Advisors left the Advisory Team and started a similar project called, Environmentally Sound Prune Systems (ESPS). The focus of ESPS was on developing monitoring protocols for pest control to validate decision-making by the farmers. Some of the BPS concepts were also incorporated, such as, farming for the benefit of wildlife, cover crops, grassed roadways, improving soil biology with compost, beneficial insect shrub plantings, orchard/urban interfaces, and farming ‘with nature’ through a whole systems approach. The second year the BPS project had monthly industry meetings on many different subjects to help all area orchardists. These meetings included an industry seminar, cover crop planting demonstrations, a brush shredding and air quality field meeting, a nitrogen and irrigation workshop, and a spring bus tour of the project.

To ensure commodity continuity the California Prune Board (CPB) was invited to be Chairperson of the Advisory Team at the end of the second year. By making BPS a CPB program the Prune Board was able to continue as much as possible the goals of TNC and solicited funding through the newly formed Pest Management Alliance (PMA) and with grant funding formed the Integrated Prune Farming Practices (IPFP) Program that acted as an umbrella for ESPS, BPS, and industry collaboration.

TNC is very pleased with the support from the Environmental Protection Agency and the State Water Quality Control Board in the development of the BPS project. These agencies have recognized the importance of offering grants to groups that implement pesticide reduction and stewardship. The BPS project is a combined effort of a private, public, business, research, and community partnerships that built a successful Integrated Pest Management (IPM) Innovator commodity directed program.