Faith Van De Putte

Piper’s Orchard and Permaculture
Mission

To enhance Piper’s Orchard historic, horticultural, educational, aesthetic and recreational value for the local community.

Shared by Friends of Piper’s Orchard and Carkeek Park.
Goals

• Improve the health of the orchard
• Improve fruit quality
• Reduce maintenance costs
• Increase volunteerism
• Create education program
Why Permaculture Design

Permaculture offers a methodology and framework for designing the overlapping needs and resources of both the trees and human community using the orchard.

- Site specific observation and design
- Make the least change for the greatest effect
- Each design element performs multiple functions & each function is supported by multiple elements
Piper’s History

• Formed 50,000 years ago
• Logged in the 1800s
• Piper family bought land in late 1800s
• Orchard planted
• Seattle Parks bought land in 1927
• Orchard abandoned
• Orchard rediscovered in 1981
Design Process

- Sectors
- Stacking
- Guilds
- Relative Placement
Sectors

the natural forces that impact the site
Water Access
Slopes and Contours
Summer – Shade Map
Fall & Spring – Shade Map
Winter - Shade
Other Influences

• Overlapping Stewardship
  • Seattle Parks Department
  • Friends of Piper’s Orchard
  • Carkeek Park Advisory Council
• Park Rules and Regulations
• Opportunistic Plant Species
• Pests
• Funding
Jeff Wick

Infrastructure
Labor to care for the orchard is not adequate.

1. Orchard is a remote location and not well-enough known.
2. Communication & education is not fully developed.
3. Orchard does not attract sufficient volunteers.
Tree health & fruit quality needs improving.

1. Soil health is not fully developed.

2. Beneficial plant biodiversity is not fully developed.

3. Supplemental irrigation water is not available.

4. Beneficial animal biodiversity is not fully developed.

5. Pest control efforts have not been sufficient.
# Permaculture Design Features

<table>
<thead>
<tr>
<th>Permaculture Design Features</th>
<th>Increase Volunteerism</th>
<th>Improve Tree Health</th>
<th>Improve Fruit Quality</th>
<th>Reduce Effort</th>
<th>Generate Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bench - Trellis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom - Workshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orchard sign - Gateway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Info kiosk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpretive signs - Species labels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pathway - Picnic sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shorter Trail to ELC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedgerow - Guild plantings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage - Tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage - Harvested Fruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple catcher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bat habitat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bee &amp; wasp habitat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Deferred for further study:** Bird habitat, propagate trees & plants, chicken tractors, compost bins & chipper, cider press, cobb oven, solar panel, suntrap.
Diverse Functional Relationships

- Bench, Trellis
- Classroom, Workshops
- Interpretive Signs, Species Labels
- Pathway, Picnic Sites
- Irrigation System
- Swale System
- Apple Catcher
- Bat Houses
- Invite & Involve
- Increase Volunteerism
- Improve Tree Health
- Improve Pest Control
- Improve Fruit Quality
- Reduce Effort
- Reduce Cost
- Add Revenue
- Orchard Sign, Gateway
- Info kiosk
- Shorter Trail from ELC
- Hedgerow, Guild Plants
- Tool Storage
- Harvested Fruit Storage
- Mason Bee Apiaries
Design Feature Locations
Orchard Sign Gateway & Kiosk
Bat House Design

- Slightly round off post corners
- \(\frac{3}{4}\)" space between center post and outer box established by wood block spacers
- Bats will enter and exit from here
- Untreated post with roughened surface
- Treated post
- Concrete base
Classroom and Storage
Apple Tree Water Requirements

### Weekly Water Requirements

- **MAY**: 28 gallons
- **JUNE**: 60 gallons
- **JULY**: 113 gallons
- **AUGUST**: 110 gallons
- **SEPTEMBER**: 92 gallons
- **OCTOBER**: 20 gallons
Irrigation

- No pump required
- Gravity Flow
- Intake at pond, or just below at stream
- Portable water lines
Straw Filled Swales

- Low profile to mowing
- Straw filled 12” depth
- ~500 linear feet of swale
Overlapping swale installation pattern avoids damaging tree roots.

Tree rows not on-contour

Slope contour line:

Straw-filled swales

Overlapping "fish scale" swale pattern
Ingela Wanerstrand

Plants, Trees, Birds and Bees
Plants and Animals

• Orchard Trees

• Orchard Floor
  • Soil
  • Meadow
  • Under The Fruit Trees

• Hedgerows

• The Orchard Edges
Tree Variety Map

PIPER ORCHARD

Legend:
- Apple
- Cherry
- Chestnut
- Hawthorn
- Quince
- Pear
- Fallen Tree
- Elderberry
- Filbert
- Walnut

Subscript number alongside tree denotes year tree was planted. Trees without number are original to the orchard.

February 18, 1995
Orchard Map Overview
Plants
Birds and Bees
JJ Jacobi

Abundance for the Orchard and Community
Creating Abundance

The quality of fruits and nuts on the site is directly affected by orchard health.

By addressing orchard health, the quality of fruit improves and it can be used in more ways.
Orchard Health

- Tree Nutrition & Maintenance
- Orchard Floor Habitat
- Insects and Birds
- Codling Moth
- Apple Maggot
- Apple Scab
CODLING MOTH

- Arrived in WA during 1880s
- Apples, Pears, Quince and Walnuts
- Emerges based on # of warm days
- Burrows into fruit to mature
- Birds, cardboard collars, and proper disposal
- Infected fruit can be buried, crushed, or heated
Apple Maggot

- First detected in WA – 1980
- Hawthorn, apple, pears, wild rose hips
- Damage to fruit flesh
- Apples and maggots mature together
- Maggots mostly emerge when fruit has fallen
- Infected fruit can be buried, crushed, or heated
Apple Scab

- Fungal Disease
- Affects apple and pear trees
- Disease favors wet, cool weather
- Reduces tree leaf and health
- Increases pest problems
- Survives in previous years infected leaves
- Infected leaves treated through heat
Breaking the Disease Cycle

- High frequency gathering of dropped fruits and nuts
- Careful handling of harvested fruits and nuts
- Gathering fallen leaves
- Composting safely
- Make it easy, and even fun

<table>
<thead>
<tr>
<th></th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>Bud</td>
<td>Leaf</td>
<td>Flower</td>
<td>Fruit</td>
<td>Fruit</td>
<td>Harvest</td>
<td>Harvest</td>
<td>Harvest</td>
</tr>
<tr>
<td>Maggot</td>
<td></td>
<td></td>
<td>Emerge</td>
<td></td>
<td>Peak emerge</td>
<td></td>
<td>Emerge</td>
<td></td>
</tr>
<tr>
<td>Moth</td>
<td></td>
<td></td>
<td></td>
<td>Emerge</td>
<td>Peak emerge</td>
<td></td>
<td>Emerge</td>
<td></td>
</tr>
<tr>
<td>Scab</td>
<td></td>
<td></td>
<td>Spore</td>
<td>Spore</td>
<td>Spore</td>
<td>Spore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Getting It Done, By Good Design

- Use the Slope!
- Log Catches
- Regular Work Parties
Getting Visitors Involved

- The problem could be the solution
- Using the fallen apples for entertainment
- Allow the frequency of visitors to help with orchard hygiene
- Using compostable materials for booties
Composting and Organic Matter

- Cedar Grove composting
- Replace lost organic material with Cedar Grove compost
- When orchard health improves, onsite composting can be explored.

A good permaculture design should strive to catch and store all the energy and materials produced on site. Reinvesting resources can build capacity in the site to capture yet more resources.
Harvesting

• Sort according to good, cider and bad grades.

• Immediately distribute good grade apples.

• Educate receivers of apples

• Press cider apples

• Cedar Grove compost bad apples
Cider Pressing

• Ideal for using diseased fruit
• Controls pests
• Produces many end products
• Reward for volunteers
• Harvest festival entertainment
• Classes
Shala Racicky

Education and Community
Objectives

- Increase awareness
- Increase volunteer base
- Strengthen community
- Meet maintenance needs
- Generate revenue
Education and Outreach Opportunities

- Classes and workshops
- Apple Exchange
- Signage
- Festivals
- Website enhancements
- Field trips
## Orchard Labor Requirements

<table>
<thead>
<tr>
<th>Role</th>
<th>Friends of Piper's Orchard</th>
<th>Park staff</th>
<th>Work Parties &amp; workshops</th>
<th>Interest groups</th>
<th>Casual visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervise all aspects of orchard management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinate with Friends of Piper's Orchard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervise work parties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinate workshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinate with Parks Dept.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervise orchard events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watering trees &amp; guild plantings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mowing long grass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop &amp; maintain hedgerow and guild plantings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree mulching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree pruning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sucker removal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit tree grafting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit collection &amp; distribution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPM - Trunk bands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPM - Fruit socks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPM - Sticky balls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPM - Pheromone traps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trash pickup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# 2009 Maintenance and Event Schedule

<table>
<thead>
<tr>
<th>Month</th>
<th>Maintenance Need</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late, Plant young trees</td>
<td>Learn maintenance techniques for young fruit trees.</td>
</tr>
<tr>
<td>March</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late, Grafting</td>
<td>Class: Grafting</td>
</tr>
<tr>
<td>April</td>
<td>Early</td>
<td>Class: Introduction to Permaculture</td>
</tr>
<tr>
<td></td>
<td>Late, Planting</td>
<td>Class: Guild Planting</td>
</tr>
<tr>
<td>May</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late, Put fruities on and thinning</td>
<td>Class: Pest Management</td>
</tr>
<tr>
<td>June</td>
<td>Early</td>
<td>Patterns in Nature and Design</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>Early, Summer pruning and picnic</td>
<td>Class: Summer Pruning. Prune older trees for growth reduction and restoration.</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>Learn to construct with cobb: build a community beehive in Piper’s Orchard</td>
</tr>
<tr>
<td>August</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late, Mow orchard</td>
<td>Cider Pressing Workshop</td>
</tr>
<tr>
<td>September</td>
<td>Early</td>
<td>Harvest Festival, hay ride</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>Early</td>
<td>Class: Processing large quantities of fruit from home fruit trees</td>
</tr>
<tr>
<td></td>
<td>Late, Planting shrubs for hedgerows</td>
<td>Class: Hedgerow Design and Planting for Wildlife &amp; Pollinators</td>
</tr>
<tr>
<td>November</td>
<td>Early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Late, Clean-up</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>Early, Install blue-orchard bee hives</td>
<td>Kids workshop: Bees &amp; Bld Houses. Kids can build mason bee houses, nesthaltch and brown creeper boxes as part of the winter celebration for wildlife. (Ideas: Tiki can hang pre-made boxes in the Orchard as part of the winter program</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td></td>
</tr>
</tbody>
</table>
Bringing in Volunteers
Increasing Orchard Volunteers

More volunteers = larger, more popular and more diverse classes
More classes = more volunteers
↓
More volunteers = fewer pests
Fewer pests = healthier trees
↓
Healthier trees = healthier apples
Healthier apples = healthier people
Apple Exchange

- Phase 1: Contact Appropriate Demand Groups
- Phase 2: Delivery of Educational Component
Orchard Signage
Design Feature Locations
Harvest Festival
## Education and Community Outreach

<table>
<thead>
<tr>
<th>Objective</th>
<th>Classes</th>
<th>Apple exchange</th>
<th>Signage</th>
<th>Festivals</th>
<th>Website</th>
<th>Field Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase awareness of the orchard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase volunteer base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase sense of community within the orchard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthen community connections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meet maintenance needs of the orchard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generate revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depends on approach</td>
</tr>
</tbody>
</table>

- **High potential for objective to be met**
- **Medium potential for objective to be met**
- **Secondary potential for objective to be met**
Bob Baines

Phasing and Implementation