Instructions for Building a Secure Beehive Enclosure
The Colorado Parks and Wildlife wants your bee hive operation to be successful. This publication is intended to help you construct a secure enclosure. Besides protecting your hives, an enclosure also benefits wildlife – it keeps them away from human-produced sources of food and keeps them in the wild where they belong.

This photo shows that a bear can quickly destroy years of work. Bears are intelligent animals -- do not underestimate them. Electric enclosures have proven to be very effective. A well-constructed, well-maintained system will work if precautions are taken. If a bear gets into a yard because of poor construction or because of a system failure, it is often impossible to keep them out even after repairs are made. Bears can jump over fencing, nose underneath or use brute force to get inside.

The instructions that follow will help you to construct a secure enclosure. If you have questions, please, contact the CPW at: (970)252-6000
What You’ll Need

Construction tools needed:

- 100-foot tape measure (two if possible)
- Work gloves
- Level
- Weed whacker or lawn mower.
- Herbicide
- Channel locks, pliers, needle-nose pliers, wire cutters, fencing tool
- Large adjustable wrench
- Screwdrivers
- Electrical wire-stripping tool
- Metal hammer/mallet
- Surveyor’s tape
- Fence stretcher
- T-post driver
- Corner stakes -- wood or metal
- Battery volt meter
- Electric fence tester
- Spool of twine - 200 feet
- Sturdy, weather-resistant box to hold the 12-volt battery, and charger. An old beehive box works well.

Get some help
Beehive enclosures can be constructed by one person. But the job will be much easier with two or more people. All enclosure materials are provided and delivered by the Colorado Parks and Wildlife.
### Materials provided by the Colorado Parks and Wildlife

#### Materials/parts list for 40' x 40' Bee Yard

<table>
<thead>
<tr>
<th>Quantity / Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>6 ½' steel T-posts (with 2 clips ea.)</td>
</tr>
<tr>
<td>¼ roll</td>
<td>330' high tensile barbed wire</td>
</tr>
<tr>
<td>½ roll</td>
<td>165' 39&quot; light high tensile woven wire</td>
</tr>
<tr>
<td>3</td>
<td>1/2&quot; ground rods and clamps</td>
</tr>
<tr>
<td>12</td>
<td>7/8&quot; x 7' Fiberglass posts</td>
</tr>
<tr>
<td>12</td>
<td>4' sections PVC 1 ½&quot; pipes</td>
</tr>
<tr>
<td>60</td>
<td>8.25&quot; aluminum ties</td>
</tr>
<tr>
<td>6</td>
<td>black insulated gate handles</td>
</tr>
<tr>
<td>50 feet</td>
<td>12.5 gauge insulated lead out cable</td>
</tr>
<tr>
<td>5</td>
<td>lead out wire clamps</td>
</tr>
<tr>
<td>50</td>
<td>fiberglass post U clip</td>
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<tr>
<td>24</td>
<td>T-post clips</td>
</tr>
<tr>
<td>6 lb</td>
<td>smooth brace wire</td>
</tr>
<tr>
<td>1</td>
<td>corner brace kit</td>
</tr>
<tr>
<td>1</td>
<td>deep cycle battery wet cell SRM24</td>
</tr>
<tr>
<td>1</td>
<td>10 watt solar collector panel</td>
</tr>
<tr>
<td>1</td>
<td>12V charger-Parmak MAG 12 UO</td>
</tr>
</tbody>
</table>

#### Materials/parts list for 20 x 20 Bee Yard

<table>
<thead>
<tr>
<th>Quantity / Unit</th>
<th>Item</th>
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<tbody>
<tr>
<td>8</td>
<td>6 ½’ steel T-posts (with 2 clips ea.)</td>
</tr>
<tr>
<td>1/8 roll</td>
<td>165’ high tensile barbed wire</td>
</tr>
<tr>
<td>¼ roll</td>
<td>82.5’ 39” light high tensile woven wire</td>
</tr>
<tr>
<td>3</td>
<td>1/2” ground rods clamps</td>
</tr>
<tr>
<td>8</td>
<td>7/8” x 7’ fiberglass posts</td>
</tr>
<tr>
<td>8</td>
<td>4’section PVC 1 ½” pipes</td>
</tr>
<tr>
<td>40</td>
<td>8.25” aluminum ties</td>
</tr>
<tr>
<td>6</td>
<td>black insulated gate handles</td>
</tr>
<tr>
<td>50 feet</td>
<td>12.5 gauge insulated lead out cable</td>
</tr>
<tr>
<td>5</td>
<td>lead out wire clamps</td>
</tr>
<tr>
<td>10 watt solar collector panel</td>
<td></td>
</tr>
<tr>
<td>deep cycle battery wet cell SRM24</td>
<td></td>
</tr>
<tr>
<td>12V charger Par-Mak MAG 12 UO</td>
<td></td>
</tr>
</tbody>
</table>
Getting Started

• Pick location for beehive enclosure.
• Select a level area that can accommodate the size of your enclosure. The standard sizes are 20’ by 20’ and 40’ by 40’.
• Consider ease of access for vehicles.
• The following instructions are for a 40’ by 40’ enclosure.
Setting the Corners for 40’ x 40’ yard

• Choose a location for first corner and stake it.

• Measure 56' 7" at a 45-degree angle to the opposite corner. Stake second corner.

• To set the third corner: From the two staked corners, measure to 40' at 90-degree angle. Using two tape measures simplifies the measurement. When the tapes meet at 40' that indicates the corners are square. Stake corner.

• Repeat the measurement on opposite side to set a fourth corner. Stake corner.

• For a 20 x 20 yard: Diagonal distance is 28’ 4”.
Setting the Corners

• Use a weed cutter or lawn mower to cut weeds and grass as low as possible. Cut a 2’-wide strip. Grass that touches a grounded wire can short-out the system. If possible, use an herbicide to kill the plant material along the fence lines.

• Pound metal T-posts (4) in each corner. Knobby ridge pointed to outside; flange pointed on 45-degrees to middle. Posts should stand as straight as possible. Use level. Maintain flange pointing at 45-degree angle. Set spade plate below ground level.

**CAUTION:** BE CAREFUL WHEN USING T-POST POUNDER! CONCENTRATE ON THE POST; DON’T MOVE TOO FAST. PEOPLE HAVE HIT THEMSELVES IN THE HEAD, FEET AND LEGS WITH THE POST POUNDER.
Setting the Remaining T-Posts

• To set a guide for measuring, tie twine tight around the corner T-posts low to the ground. This marks the enclosure perimeter.
• Decide which side of the enclosure to locate gate. Consider vehicle access.
• Measure along twine 13' 4" from each corner post in both directions and mark the location with surveyor’s tape.
• Pound in metal T-posts (8) at the marks, knobby ridge pointing out. Slide round PVC pipe covers over all metal posts.
Setting Fiberglass Posts

• Measure 6' 8" from each metal post in both directions and mark spot with surveyor's tape.

• Pound in fiberglass posts (11) at each mark between the metal posts. The 12th fiberglass post is used for a gate stay and is not pounded in.

• Holes drilled in the fiberglass posts must be above ground and be perpendicular to the fence line.
Keep top of all posts at the same height as much as possible.

Setting Ground Rods

• Inside and parallel to the fence opposite the gate opening, pound in three electrical ground rods. Rods must be at least 10' apart and 3' inside the enclosure. Pound in as deep as possible to maximize ground contact. Same distances apply for a 20'x20' enclosure.
• Rods can be buried if pounding them in is impossible.
Attach Woven Wire to Posts

- Use a fencing tool to attach wire to posts.
- Start at one metal T-post at the gate opening and attach woven wire securely.

- Hook, wrap-around and twist straight aluminum ties to attach woven wire to plastic covers.

- Use U-shaped aluminum clips to attach woven wire to fiberglass posts. Woven wire hangs on U-shaped clips.
- Roll out woven wire a little at a time and stretch against posts as much as possible by hand.

- CAUTION: To prevent shorts: On fiberglass posts, when bending the U-clips do not allow the ends to touch a grounded wire.
Assembling the Gate

• Gate opening is approximately 14’. Cut woven wire so that it can be stretched tight.

• In the middle of the gate, secure a fiberglass post to the woven wire. The post will act as a stay to keep the gate standing. Do not pound into ground.

• For the gate opening, attach 6 spring-loaded black handles on one end of fence. Handles are plastic and will not conduct electricity.
Installing Corner Brace Kit

- Corner braces tighten the structure.
- Use corner braces provided. Complete instructions included in package.
- Place each corner brace attachment over corner T-posts.
- Inside the fence corner at a 45-degree angle, attach second T-post to the corner brace.

- Place small board, tile, or rock on the ground. Place support post on top.
- Wrap rusty wire (provided) around bottom of corner post, and attach to bottom of support post – as indicated in Speed Brace kit. Use plenty of wire to allow for tightening.
- By twisting the wrap of wire together, the fence will be pulled tighter.
- Repeat in three other corners.
- Check gate; tighten section if necessary.
• Start at one end of gate opening and attach one strand of barbed wire directly to metal T-post about 6" above the woven wire. Use a T-post clip
• Pull barbed wire as tight as possible and secure to every T-post with T-post clips. Best to use a fencing tool.
• Use U-clip to attach to fiberglass pole. Do not allow the U-clip to touch the woven wire clip below.
• Attach a second strand of barbed wire 6" - 12" above the first.
• Barbed wire must also be placed over the gate.
• A grounded strand of barbed wire can also be placed on the bottom of the fence to provide extra security. Bears and other animals can crawl under fences.
• All barbed wire is grounded.
Lay Out Electrical Components

- Place box that houses battery and charger at least 3 feet inside the fence near the middle ground rod. Box is not included with materials supplied by CPW.
- Cut a hole for the lead out wires. Hole also provides venting for battery gases.
- Two lead-out cables, one for positive connection; one for negative connection.

Additional directions provided in the Parmak charger package.
Making the Connections

• This photograph shows how all components should be connected.
• The battery-pole clamps are included with the charger kit.
• Lead-out cable lengths from the charger must be long enough to reach the closest ground rod and barbed wire from the negative connection, and the woven wire from the positive connection.
• With a volt meter, test the battery – it should read 12-14 volts. Battery is delivered charged.
• Connect positive and negative wires from the solar panel and the charger to the battery terminals.
Attach Ground Wires

One end of lead-out cable is connected to negative/ground terminal of the charger. Cable is then attached to the ground rods and the barbed wire. Strip insulation at ends and at location where the lead-out cable will connect. Use clamps to attach to wire and ground rods.
+ Making the Positive Connections +

- Attach lead-out cable to positive (red) terminal of the charger. Then, using connector clamps, attach lead-out cable at three locations to only the woven fence wire.
Testing the Fence Output

• Before connecting the charger to the woven wire, test output voltage by touching the electric fence tester probes to the charger. Voltage should be 7k to 10k. Charger might not be effective on bears at an output below 7k.

• After testing, turn charger off and make positive and negative connections to the fence and ground rods.

• Carefully secure solar panel to top of the box. If not secure, the panel can be blown off by wind. Do not cover solar cells. Expose to sun as much as possible.

• Turn charger on. Replace top of box.
Testing Output

• Check the output voltage at several locations using electric fence tester. Touch positive probe to the woven wire. Simultaneously touch negative probe at several locations, including barbed wire, ground rod and the soil you’re standing on.
• Voltage should read more than 7k to be effective. If less than 7k, troubleshoot the system and look for any uninsulated item touching the woven wire, for example: vegetation, U-clip ends touching, sagging barbed wire, sagging gate, touching ground, etc.

CAUTION: To leave the enclosure, carefully open the gate by holding insulated handles. The gate is the easiest place to get shocked.

You’re Done!!!!
Tips for Maintaining the Bee Yard

• Check the fence and charger thoroughly before placing the beehives.

• Check battery voltage regularly. It should read between 12 volts and 14 volts.

• Check water level in battery regularly.

• Use electric fence tester to check voltage output on enclosure regularly.

• Check the fence and charger regularly for damage.

• Remove vegetation near fence. A (load) short is caused when vegetation touches the fence.

• Clean off solar panel regularly. Dust interferes with operation.

• Disassemble and store electrical equipment after bears enter hibernation.

• Disconnect solar panel from battery.

• Keep equipment at a moderate temperature and keep battery charged. Use a batter tender to prevent overcharging.

• If location is in an area that receives lots of snow, disassemble fence after bears enter hibernation. Posts can be left in place.

Questions: Contact Colorado Parks and Wildlife at (970)252-6000.