

Herbicide Applicator Dauber Wand

Herbicides are often the quickest way to get rid of **invasive plant species** "biological pollution". This document gives instructions for how to make an herbicide applicator (dauber) (wand) from materials easily available in North America. It is easy to carry in the field through the brush: a wand in one hand, and [folding-saw](#) or [pruners](#) in the other. This design works better than commercial models I have seen—compared to the wand in the picture below, this design holds more, drips less, and involves less stooping.

I have used the wand, to good effect ([results available on request](#)), using [application methods](#):

- **Cut-Stump** or **Cut-and-Paint**—cut invasive close to ground, daub remaining surface with herbicide.
- **Basal Bark**—no-cut; coat stem of invasive, 360°, from ground to 18" high (about knee-high).

These are great alternatives to:

- **Glove of Death**—you wear chemical-gloves, with cotton gloves over, dip in herbicide, wipe over invasive.

About 1 m long, it holds enough herbicide for an **hour or two** of daubing, or **three or four hours** of cutting and daubing. Empty, it weighs 1.1 kg (2.4 pounds), full 1.4 kg (3.1 pounds), in-use average 1.2 kg (2.7 pounds). Your first wand costs about **US\$57** to build, with subsequent wands about **\$32**. Add something to that for taxes, extra pipe you can't use, mileage and labor.



1 Document History



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- [Original design by the wand's inventor, Jack McGowan-Stinski, Land Steward, The Nature Conservancy, Michigan Chapter, 1998-10-28](#), retrieved 2012-10-01 by Eric Piehl.
- Adapted by **Barry Meyers-Rice**, of TNC's Wildland Invasive Species Program, 2000-04-05, retrieved 2013-01-07 by Eric Piehl, found to be no longer on Internet on 2013-05-27.
- Reengineered and totally rewritten, based on my experience building these, by [Eric Piehl](#), 2013-05-12 to 2013-10-04.
- A colleague pointed me to [another write-up of a similar design](#), retrieved 2014-01-06 by Eric Piehl.

For date this file last updated, please see page footer. For information on programming or other green subjects, please see a list of [this document's sister docs](#).

TODO: Analyze other write-up above. **TODO:** Refer (and link?) to MSDS Material Safety Data Sheets.

TODO: Improve cleaning instructions. **TODO:** Improve costing. **TODO:** Record time to build.

TODO: Hack layout pic, incl. labels and assembly centerlines. **TODO:** Hack punch pic, showing sharpened end.

TODO: Add link to info on invasive plant species "biological pollution". **TODO:** Change driplplate to flow diagram.

TODO: Add usage info (what herbicide works on what plant, what doesn't, [MNFI BCP sheets](#) (MDNR or [www.michigan.gov/invasivespecies](#) > click "Species Profiles - Plants"), [Nature Conservancy's "Weed Control Methods Handbook: Tools & Techniques for Use in Natural Areas"](#), [MISIN](#) > Species Information, etc.)

TODO: **General-Use** v **Restricted-Use** Herbicides, certified pesticide applicator v volunteers, vest, 5-point signs.

TODO: Try punch [copper tubing 1½" nominal dia.](#), rigid not soft, type K or L, grind OD leaving cut surface on ID.

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2 Important Note!

- In the USA, a **state pesticide license** is required to (1) **mix** herbicide with other agents (including water!), or (2) **put** in something other than the **original** container.
 - **Have someone on your team get such a license.** [Getting a Michigan Commercial Certified Pesticide Applicator License.](#)
TODO: Source this, and tighten up writing.
- Or **ignore this document**, and use a **ready-to-use product** from its **original container, in accordance with its label** (it's the law!), such as 1% glyphosate + 0.1% triclopyr (check the label, not the brand!), 5 liter, with wand, such as Roundup brand "Poison Ivy Plus Tough Brush Killer", about \$26.

3 How to Use the Wand

- Remove **sponge tip E**, and use a **paperclip** or wire to clear the [holes in dripplate D](#).
- If **sponge tip E** gets **worn** or disgusting, replace it with a spare. Put tip back on the wand.
- **Close valve B** (turn handle **perpendicular** to pipe). Mark wand "**Herbicide**" or more specific.
- Prepare your **herbicide-mix** in accordance with the **manufacturer's instructions** and your state's **DEQ**, preferably with enough **dye** to check for leaks, monitor applications, and identify any exposure to operator.
- With **plug A** up, unscrew the fill port. Should have been hand-tight.
- Pour **herbicide-mix** into main reservoir **A**.
- Replace the **plug**, hand-tight, with rubber gasket or *Teflon tape* keeping the connection sealed.
- Go to your first invasive. If **Cut and Paint**, cut down ankle-high with your [incredibly-sharp folding saw](#).
- **Open valve B** (turn handle **parallel** to pipe) to let herbicide enter the **sponge reservoir C** and **D**. Wait about 23 seconds. [The original instructions say you may need to loosen the fill-cap to let air into the main reservoir, but I find not.]
- Once the **sponge tip E** begins to saturate, **Close valve B**. [And if necessary, retighten the fill plug.]



- Touch **sponge tip E** to the (1) **cut-stump**, enough for a nice coating on the (if small) entire surface or (if large) the cambium layer perimeter between the bark and wood; or (2) **basal bark**, 360° around the plant, everything under 18" (on me, below my kneecap). A light touch should be enough.

- When **sponge tip E** no longer has enough herbicide, crack open **valve B** again. If that doesn't work, check for herbicide-mix remaining in the main reservoir (slosh it back and forth). If that doesn't work, remove **sponge tip E**, and use a **paperclip** or wire to clear the [holes in drippate D](#).
- With 20% glyphosate, works down to **-5°C 24°F**. If **cold** makes herbicide-mix more viscous or freeze: (1) clean and drill larger holes, or (2) tape disposable chemical hand-warmer around **drippate** section **D**.
- If **sponge tip E** gets **worn** or disgusting, replace it with a spare.
- When **done** for a while, **Close valve B**, and store with **sponge tip E** pointing **up**. In a 5-gallon bucket, perhaps. But do not allow contents to remain under **extreme temperatures**.
- When **done for the day**, **Close valve B**, pour the extra herbicide back into proper container, discard **sponge tip E**, **Open valve B**, rinse out in accordance with the **herbicide manufacturer's instructions** and your state's **DEQ**, and let dry. Do not allow herbicide-mix remain in very hot or freezing conditions.

4 Capacity

You can **adjust** the capacity of herbicide you carry, by cutting a **longer** or **shorter** long pipe. Decide the capacity of herbicide you need:

Capacity (1" pipe)	Capacity (1" pipe)	Len of Main Reservoir A	Notes
7 oz.	0.21 l	15"	<i>Original design says 12-15". I think that is a little short.</i>
8 oz.	0.24 l	17"	<i>This size stores fully-assembled inside Sterilite vertical wrapping paper box.</i>
10 oz.	0.30 l	21"	
12 oz.	0.35 l	25"	I like this, to extend field time and use standing upright . Wands this size store fully-assembled inside Sterilite 67-qt Wheeled Latch Box .
0.48 oz. / inch	0.014 l / inch	box inside length – 14"	<i>If you have a box or drum in which to keep your wands, fully-assembled.</i>

If you find a **container with lid** maybe 1 m (32-40") high and 30-40 cm (16") in diameter, that will fit inside my hatchback, please [let me know!](#) Especially if I can fit several wands in it, **filled**, **ready-to-go**, with a bottle of herbicide in the bottom. [I hear that around Christmastime, Target has one for [storing wrapping paper](#); I will check. The [Rubbermaid 3K06](#) looks interesting, but is too expensive and unavailable.]

[I have experimented with using pipes of size *other* than **1"**. **1½"** pipe is not worth it—not lighter, not easier to carry, just makes it more complex to build. I doubt **1¼"** pipe is any better. But if you want to try it, [I have specs for this in an old version of this doc](#).]

5 Tools List

In hardware store, **plumbing** PVC polyvinyl chloride area:

Total about **\$25**

□ **1**—kit containing 1 can each of **PVC** (A) purple **primer** and (B) **cement**. (If Oatey, [MSDS1](#) [MSDS2](#).) \$5-7
... and if you are making **multiple units** ...

- **1**—**plastic-pipe cutter**. Must be for pipe diameter $\geq 1"$. If you buy one, don't buy the cheapest. \$15
- **1**—**pipe diameter=1¼"**, wall thickness **Schedule 40**, length=**8"** or so. [Can use metal](#). \$5

In hardware store, **other areas**, acquire additional tools:

- **1**—**drill**, with **bits**: $\frac{3}{4}"$ (spade bit tolerable, helical bits should work better), and **1/16"** [I have seen commercial units drilled **5/64"**, but that runs too much].
- **1**—**vise** or big Channellock **standoff pliers**.
- **PPE** personal protective equipment: **eye protection**, **leather gloves**, etc.
- **1**—Sharpie or other permanent marker that can mark plastic. **Black** OK. **Green** and **red** are nice.
- scrap lumber

... and if you are making **only one unit** ...

- **1**—your old **hacksaw** and [**utility knife** or coarse file] will work to cut and de-burr pipe.
- **1**—ruler and scissors (to cut sponge).

6 Parts List

In hardware store, paint and bathroom areas, acquire additional parts:

Total about **\$32**

- **Optional container:**
 - 1—5-gallon bucket.** Home Depot has buckets everywhere, but lids only in paint area. \$4
 - 1—[Sterilite vertical wrapping paper box](#).** Stores wands (barrel up to 17") fully assembled, protecting car.
 - 1—[Sterilite 67-qt Wheeled Latch Box](#).** Stores wands (up to 1 m) fully assembled, protecting inside of car.
 - 1—[Sterilite 20-gal Latch Tote](#).** Stores wands (barrel up to 23½") fully assembled, protecting inside of car.
- **4—rubber bathroom lavatory drain "Mack washer" gaskets**, inner diameter=1¼". **\$5**
Outer diameter and thickness don't matter. Make sure they **fit** and **seal** on the threaded-male fittings you select below—these are to seal four threaded hand-tightened joints.
If your store has only 2 or 3 gaskets, get a roll of Teflon tape for the joints that aren't opened regularly. [I have seen commercial units with no gaskets, with Teflon tape on all four joints, but I don't like that—works OK for two Open/Close cycles, then leaks.]
- **1—sponge**, heavy duty **cellulose** ("o-cel-o" brand OK) at least 1½" thick (8 X 4 X 1½" makes 8 [tips](#)). \$4

In hardware store, **plumbing** PVC polyvinyl chloride area, acquire per applicator (if any of these are missing, replace with any functionally-equivalent combination of items):

TODO: Try slip joints instead of threaded [suggested by crew chief]

- **1—pipe** diameter=1", wall thickness **Schedule 40**, long enough to cut into: **\$5**
1—piece of length= **25"** or as adjusted above in [Capacity](#), plus
2—pieces of length= **2"** [I have seen commercial units with each **3½"**, but I like **2"**].
- **1—ball valve**, threaded-female/threaded-female, diameter=1". **TODO: Try 2 [sug. by crew chief] \$12 \$6**
Go through all of them, choosing those with the **biggest** and **easiest-turning handles**.
- **1—plug**, threaded-male, diameter=1". **TODO: Try 0 [sug. by crew chief] \$0 \$1.49**
If multiple varieties, choose those with a **big hex** or square you can **grip with your hand**.
- **1—cap**, threaded-female, diameter=1". **\$1.49**
If multiple varieties, choose those with a **big hex** or square you can **grip with your hand**.
- **1—cap, slip**-female, diameter=¾" (yes, this is smaller—you are going to cut it up). **\$0.59**
- **3—couplings**, slip-female/threaded-male, diameter=1". **TODO: Try 4 [sug. by crew chief] \$3.56 \$2.67**
- **1—coupling**, slip-female/threaded-female, diameter=1". **TODO: Try 0 [sug. by crew chief] \$0 \$1**
- **1—coupling**, 45° angle elbow, slip-female/slip-female, diameter=1". **\$1.49**
- **1—if you can't get enough rubber lavatory gaskets** above, get one roll of **Teflon tape**. **\$1**



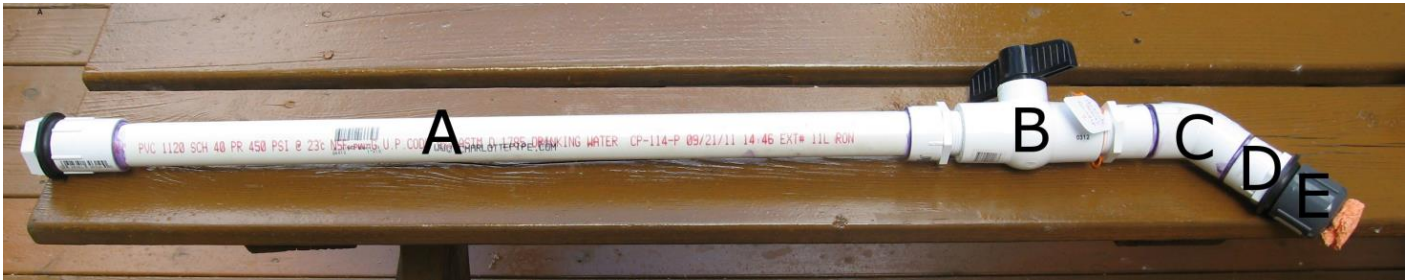
7 Assembly Instructions

Lay out all your parts and tools, as in the photo above.

For glue steps below, follow **glue/primer manufacturer instructions** (if Oatey, [intro](#) [dir1](#) [dir2](#) [MSDS1](#) [MSDS2](#)), including excellent ventilation to outside. I prefer my driveway. Steps are presented from back to front (left to right in these photos). However, if mosquitos are bad, you can do “outside” steps together, then complete inside.

7.1 Cut Pipe (outside or not)

- Cut the PVC pipe:
 - 1—long pipe** dia=1”, length=**a foot or two or three** (decided above in section [Capacity](#)).
 - 2—short pipes** dia=1”, length=2” [I have seen commercial units cut at 3½”, but I like 2”].I like using a **plastic-pipe cutter**. If you don’t have one, cut pipe square with a **hacksaw**, and de-burr with **utility knife** or coarse file, inside and out.



7.2 Main Reservoir A (outside)

- **TODO:** Try making this another valve, with a slip joint [suggested by crew chief]. **Mark**, perhaps with a Sharpie pen, the outside of the valve with position (1) **OPEN** or **FILL**, and (2) **CLOSED** or **TRANSPORT/APPLY**.
- Onto the **long pipe A**, prime and cement the one **slip-female/threaded-female coupling** (the slip-female-side).
- Onto the **other end** of long pipe A, prime and cement one of three **slip-female/threaded-male couplings** (slip-female-side).



7.3 Main Reservoir A to Valve B (can delay until you are indoors)

- Examine **ball valve B**. Notice the external handle turns an internal sphere, with a hole drilled through it. Turn the handle to where the hole just starts to be exposed. **Mark**, perhaps with a Sharpie pen, the outside of the valve position (1) **OPEN** (next time, I intend to try **APPLY**) under the current position of the handle, so later you know where the valve starts to Open, and (2) **CLOSED** (next time, I intend to try **TRANSPORT/FILL**) where fully-Closed.
- **TODO:** Try making this a slip joint [suggested by crew chief]. Onto the **threaded-male** fitting exposed in the previous step, place a **rubber gasket** over the male threads. Shown in photo: If you don’t have enough rubber gaskets, wind some **Teflon tape** (a) start along the outside tip, rolling with the threads around twice or more as needed to cover the threads, (b) pull on the tape until it stretches and breaks, in such a way as to hold it on until you Screw the fitting into one side of the **ball valve B**, hand-tight.
- Onto the **threaded-male plug**, place a **rubber gasket** over the male threads [I have seen commercial units that use **Teflon tape** instead—works OK for a



*couple Open/Close cycles, then leaks], and place into the **threaded-female** fitting exposed four steps above.*

When hand-tightened, the rubber gasket *or Teflon tape* should keep the connection sealed.

7.4 Dripplate D (outside or not)

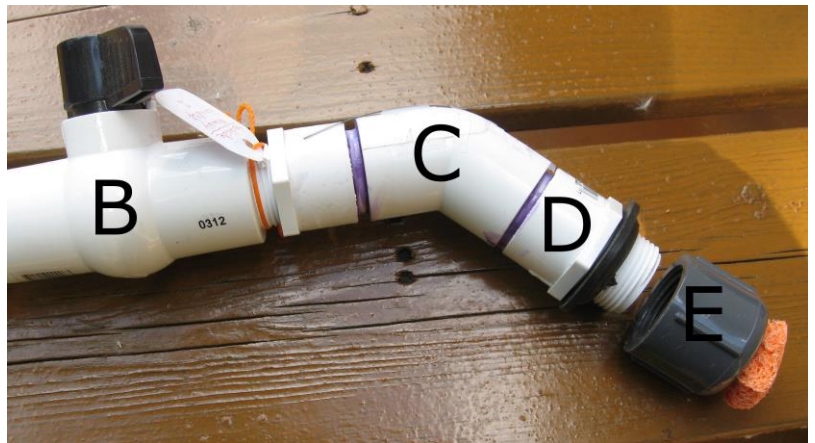
Depending upon the details of the way your PVC fittings were molded, you may have to innovate this part of construction.

- In the $\frac{3}{4}$ " **slip-female cap**, with a $\frac{1}{16}$ " drill bit [I have seen commercial units drilled $\frac{5}{64}$ ", but that runs two much], **drill two holes** through its face, somewhere in the middle half.
- **Cut** away the barrel-part of the coupling, leaving it looking like a **large shirt-button**.
- Insert it into the second of three **slip-female/threaded-male couplings** (the slip-female-side). It should slide snugly inside. If not, cut or file your button until it does.



7.5 Sponge Reservoir C-D (outside)

- Prime and cement [dripplate D](#) in place, as far inside the coupling as you can.
- Right behind your **button**, prime and cement one of your **short pipes**.
- On the other end of this **short pipe**, prime and cement the **45° angle elbow coupling C**.
- On the other end of this **45° angle elbow coupling C**, prime and cement the second **short pipe**.



7.6 Sponge Reservoir C-D to Valve B (can delay until you are indoors)

- Onto the third of three **slip-female/threaded-male couplings** (the **threaded-male** side), place a **rubber gasket** over the male threads.
*Shown in photo: If you don't have enough **rubber gaskets**, wind some **Teflon tape**.*
- Screw the fitting into the other side of the **ball valve B**, hand-tight.

7.7 Sponge Reservoir C-D (outside)

- Into this **slip-female/threaded-male coupling** (the slip-female-side), prime and cement the other end of the **short pipe** from two steps above, ending with the bend **C** pointing **away** from the valve control.

7.8 Sponge Tip E (part one) (outside or not)

- On the **threaded-female cap**, in the center of the face, **drill** a $\frac{3}{4}$ " diameter hole. Hold cap in a vise; or with leather gloves and big Channellock standoff pliers, backed up by scrap lumber.
- Make a **sponge tip E**, by cutting from the heavy-duty sponge a square or columnar chunk, about **1½"** in diameter. If the sponge is dry, you might find that the **plastic-pipe cutter** works well.

sponge size (square) (in)	sponge size (cylinder diameter) (in)	cross-section (sq in)	Notes
0.89	1.00	0.79	[Original instructions, but I find it leaks too much.]
1	1.13	1.00	
1.25	1.41	1.56	
1.33	1.50	1.77	I find this best : does not leak, but lets fluid out when you press sponge. Is a little tough to install.
1.5	1.69	2.25	

It should fit snugly in the hole in the previous step's **threaded-female cap**. It should **some moderate effort** to insert the sponge (to make it easier, get sponge wet, and start with an edge). If this were easy, it would leak in use.

At bottom (after leak-checking and so on), are [instructions for cutting lots of sponge tips](#).

- Onto the **wand's** only-remaining exposed **threaded-male** fitting, place a **rubber gasket** over the male threads [*I have seen commercial units that use **Teflon tape** instead—works OK for a couple Open/Close cycles, then leaks*]. Screw the fitting into the **threaded-female sponge-tip E** made in the previous step.

When hand-tightened, the rubber gasket or *Teflon tape* should keep the connection sealed.



7.9 Complete, test and practice

- To let the cement harden and vapors disperse, Open valve **B**, remove cap **E** and plug **A**, and set aside for a few hours.



- Make sure you can fit a **paperclip** or wire through the [holes in dripplate D](#)—if not, [drill them out](#) again.
- Leak-check** and **practice** using the unit:
 - Close **Valve B**, Open **Cap A**, fill with water, Close **Cap A**. Dry any water on the wand. Take outside, and shake vigorously. Leaking threads with a **rubber gasket** probably need tightening or the gasket moved downward. *Leaking threads with Teflon tape probably need tightening or rewinding.*
 - When good, Open **Valve B**, hold tip-down. The **sponge tip** should become wet in 15-45 seconds. Practice treating something with the sponge tip—it should be easy to paint it completely wet, but not too wet. **Shake** front end moderately, and handle any leaks.
 - When good, remove **Cap A**, remove **sponge tip E**, Open **Valve B**, and set out all to **dry**.

- [Make a label](#), and cover written side in clear packing tape, holding to the barrel, or cover in tape and punch a hole and tie it on, or write on the barrel "**Herbicide**" with what you will probably be using.
- Tape or attach a **paperclip** or wire, to be used later (if needed) to clear [holes in driplate D](#).
- **Use as at top. Happy hunting!**

7.10 Sponge Tip E (part two) (outside or not)

- Now that you have one **sponge tip** that works, [cut out a few more](#)—you will need them.

However, if you are making **more than five sponge tips**:

- Make a **punch**. Since [testing above](#) found a **1½"** cylinder of sponge to be optimal, I wanted to make a punch of that size. Consulting [charts](#), I found that **1½"** would be **right in the middle** of **1¼"** plastic pipe. I thus acquired a length of **8"** or so of **1¼"** plastic pipe, and sharpened **one** end **half-to-the-outside** (using a grinding wheel in a drill), and **half-to-the-outside** (using a hand file).

[The original instructions said to make from **metal**; I suspect that is faster to **use**, but slower to **make**.

TODO: Try [copper tubing 1½"](#) [nominal dia.](#), *rigid not soft, type K or L, and grind OD leaving cutting surface on ID.*]

- To **use** punch, sandwich from the top down:
 - **hammer** or hand-sledge,
 - **scrap lumber**,
 - **punch** (sharp end down),
 - **sponge** (*fresh-out-of-the-wrapper or wet-and-wrung-out* worked for me, not *dry*),
 - **scrap lumber**,
 - **driveway**.

- With my plastic punch, I can punch out sponge tips with a half-dozen hammer-blows each. No need to remove each sponge tip—you can wait until you have cut holes in the whole sponge before poking out the whole stack with a stick.



-End.- [send comments to the author](#)

8 Labels

TODO: Rewrite this section--needs a massive update.

As part of section [Complete, test and practice](#), for each wand, print a label, write the owner, and:

- cover written side in clear packing tape, holding it to the barrel, wrapping a rubber band to indicate its contents, **or**
- cover both sides in clear packing tape, punch a hole, and tie onto the barrel somewhere.

Herbicide Applicator Dauber Wand

contains one of (mark with rubber band)
(cleanout wire under tape):

empty and clean

other

22% glyphosate + 3% triclopyr

27% triclopyr ester Garlon 4 "CWC Michigan Blend"

27% glyphosate "RoundUp"

Herbicide Applicator Dauber Wand

contains one of (mark with rubber band)
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