

## Weed control Q&A: Aquatic Weeds

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### Introduction:

- Florence – Perspective from the field: Importance of knowing plants/what you're dealing with. ID's are important. Joe DiTomaso's book is a great resource. Also CDFA botany diagnostics lab. Have to know your waterway, downstream/upstream, uses of the waterway, etc.
- Have to know about and use all available tools: don't rule out hand removal, mechanical methods, physical barriers—be open minded about anything that works.
- If you have resistance issues, use different modes of action. Use available resources to find out which things will work. Herbicide/chemical manufacturer reps, e.g. Monsanto, DuPont and Sepro are good sources of information. Manufacturers' aquatics lines are small though.
- Aquatic weed control takes time! 1989 hydrilla project in Chowchilla river as example. 26 miles of river- 18 years to get to 6 consecutive yrs of zero plants.
- Draw-down and fumigant are methods to kill hydrilla tubers in soil. Water drawn down and the treatment is applied with sprinklers. Very effective, even though hydrilla is otherwise very difficult to kill. Special permit needed.

### Agencies Involved:

- Know the rules and regulations; work with agencies to get regulations.
- Florence – A lot of regulations have changed since 1989
- Question: Waterways- water quality board and Fish and Game jurisdiction?
  - It is important to find out: who owns land under the water? Is it navigable?
  - Fish and Wildlife involvement may be invoked if there are ESA issues.
  - Just call everybody.
  - Different activities on same waterway regulated by diff agencies. E.g. bridge/stream alteration would be CA Fish and Game 1600 permit series.
  - Stakeholders can be noisy and disruptive
  - Importance of educating stakeholders
  - If you're calling all agencies, all will WANT to have a say and may not know where limits lie.
- Question: Is there a checklist? County? State?
  - If you do an environmental document, you'll trigger whoever needs to know.
- Make sure MOU's and other agreements are written down and counter-signed, etc. Have things down on paper as opposed to undocumented agreements.
- Regional water quality control board is important.
- There are 9 regional water quality control boards (each unique).
  - Eg, work on Eurasian watermilfoil and Curlyleaf pondweed in Lake Tahoe, Lahanton RWQCB has a lot of power and vetoes many actions

- Lake Tahoe effort is made up of an aquatic inv spp working group (people on the ground), then coordinating group (agency people). Coordinating group talks, find out the issues present then finds funding, ways through regulations.
- There is a need for a listing/description of methods for aquatic plant control-handling boats, herbicide application from boats. A resource to find this information. However, many situations are unique and nearly all will require some customization of methods and equipment.
  - E.g.: *Ludwigia* in Laguna de Santa Rosa in Marin – have to deal with hundreds of tons of vegetation.
- If you can link these problems to things like West Nile, etc. gives you clout with other agencies and stakeholders. For example, Mosquito & Vector Control has machinery and expertise (hovercraft, helicopter, boats, MOU's). Good for cooperative work, a model for work elsewhere. Mosquito control- main target is larva. Control of larvae with mosquito fish- open waterways - will eat stuff up.

#### Methods- General:

- In general for aquatics- no standard recipe book for methods and actions. Look at different methods, and what you have vs. what you need, what options you have available to you. Customized projects are common. Redevelop procedures (site-specific). Although there are standards, and standardized equipment, you sometimes need to take sprayers and agricultural equipment, and adapt it for aquatic use.
- Again, important point is to not discount potential treatment methods til you have tried them
- Question: When can you use backpack sprayers?
  - For floaters/emergent.
- Question: What about submerged species?
  - Several herbicides available and effective in slow-water situations, depending on species. But you need ID's and life history information, and know what you have.
  - Difficult if there is flow- most difficult situation.
  - However, do not assume methods won't work without trying them. Boating and Waterways situation very instructive. They are trying to control *Egeria densa*, a submerged weed, with fluridone, a slow-acting systemic herbicide. Supposedly you need 3 weeks of contact time with fluridone to get effective control. They are trying to control the egeria in Frank's Tract, a tidal area where there is lots of water movement. The first guess would be that the control wouldn't have a chance of working, but B&W is starting to see promising results. How is this happening? May be that it's getting moved off and on again due to the tides.
- Some of these methods are novel and getting this information into the literature is important.
- Control of aquatic plants- This subject has blossomed in the last 15 years. No cookbook yet. We're not ruling anything out yet.
- Always need to take population prioritization into account. Start small.

### Survey and Monitoring:

- Question: What if surveys haven't been done?
  - These need to be done. You at least need to know which species you have.
  - We use a crude grappling hook to reach down and see what we have (15 gauge wire bent through a 6-8 inch section of heavy pipe). Rebar, or a weed rake
  - Pat Handout: As long as we are talking about surveying and mapping; a GPS system to use for doing this. Device- can customize for your needs. Integrated with a GPS recorder, make records of up to 8 spp at one time, and takes only a few seconds for each observation.
  - Question: Can it do elevation under water? Not at present. Manufacturer is very willing to customize system and if you can get a signal out of your sonar system, he can probably get it recorded with the GPS data
- Question: So is one of the treatment methods to make environment non-aquatic?
  - Yes, draw-down is useful to control some species, but it will actually encourage other species. Look those up
- Most of the submerged species are rooted perennials, not annuals.
- Again, know particular species and your waterway.

### Species Information and Identification:

- Question: *Elodea*- where is it native?
  - Pat – The major pest species is *Egeria densa* and is non-native. Comes from South America. It has several common names including egeria, Brazilian elodea, or just elodea. Problem is, there are 2 species of native *Elodea* (*canadensis*, *nutalli*), so I always call it egeria to avoid confusion. They are all somewhat similar in appearance.
  - Florence – Just because a plant is native doesn't mean it's not a problem.
  - Pat – But native *Elodea* don't tend to be a nuisance.
  - Native vs non-native water primrose (*Ludwigia*): They have *Ludwigia hexapetala* – the non-native - at Laguna de Santa Rosa. They did chromosome squashes, figured out what it was. Used morphological characteristics to get ID. Keys from Jepson weren't working
- Question: Who can we ask about this in Sacramento?
  - Send it to an expert, e.g., Lars Anderson, Joe DiTomaso.
- Need healthy, flowering plants to identify *Ludwigia*. If petal is longer than 2cm, you have *hexapetala*. Fortunately, *Ludwigia* flowers almost constantly.
- There is 6 miles of this on **Seal Head creek**.
- *Ludwigia* can be very hard to tell apart when not healthy and flowering. One experience was that often using the Jepson key leads to non-native ID.
- Some of the natives can be aggressive though.
- With native plants and Calif's many climates due to north-south spread, elevational differences, really can have isolation and differentiation between populations, natural dispersal barriers. So some natives can be invasive even within Calif. E.g., yellow bush lupine from So Cal is invasive north of SF Bay.

- Bakersfield- 3000 acres of water hyacinth in water infiltration ponds- comes in from other places.
- Maryland experiment in water infiltration ponds- tried radishes; cows eat off tops, roots rot and battle weeds, improve percolation.
- Need to look at situation and be creative.
- Pat – Water primrose? How many have experienced trying to control it?
  - (4/12 present)
- We've needed to control it, have gotten mixed responses using triclopyr. May be because we're using diquat as well, and the diquat is killing the tops before the triclopyr can move through to the roots and kill them. We'll try to get better control by doing triclopyr treatments a couple of weeks before the diquat treatments.

#### Methods- Timing and Biomass:

- Experience of contract work- usually the situation is way out of control when it gets to the contractor. Usually there's lots of biomass that must be removed at that point. Have used a variety of herbicides after. Renovate (=triclopyr) works the best (on water primrose). Renovate alone is best product out there and best success rate. Need to treat plants on shoreline too! That's the population reserve. Spray bank as well- that's where it starts from. Tough plant to handle.
- Question: So remove biomass first, and then maintain control of resprouts?
  - Yes. Example of a lake 4' deep- put in mechanical equipment to remove it- the aquamog and harvester (clamrake) pulls it.
- Question: What do you do with sheer biomass?
  - Depends on situation. City of San Francisco to it and made compost, and is a good weed suppressant (recommended for areas away from waterways). Lots of biomass though.
- If you maintain your site, you won't end up with this situation. Once past this task, should be less work on maintenance.
- Question: So what do you do with the biomass?
  - Another possibility was used in Laguna de Santa Rosa: arrange with local farmers to dump, they'll disc it in. But with very polluted waterways, can have significant garbage in haul of biomass.

#### Methods- Preventative measures:

- Pat – Mechanical methods make many plant fragments, and many aquatic species spread easily by fragments. Can be a source for new infestations somewhere else. If an infestation is small and is the first one on a water body, mechanical methods can rapidly spread the infestation. So you need to know if you'll only be making the situation worse if you do mechanical control.
- In contract work, sometimes a boom is placed around the area. Helps also with turbidity.
- Question: What is a boom?
  - A physical barrier that allows water through but not sediment. Doesn't restrict flow or movement of water.

- Lake Tahoe- A person on the boat looks for turbidity. Watch for too-high levels, then stop work. Turbidity is really a short-term impact though if you look at larger goal. So haven't used booms etc. More for safety of divers.

#### Methods- Solar Bees:

- Solar Bees in the ponds? Common misconception that they'll get rid of aquatic weeds. They are for algae. Don't do anything for macrophytes. They are expensive.
- Solar Bees are not for rooted plants.
- Again, one must know the plants present before starting all of this.

#### Seasonality and Timing:

- Suggestion: Dig up roots, and treat, etc. Try to get back to a situation where you're just treating occasionally instead of waiting until you can't see the water any more.
- Question: Is there an issue of seasonality of treatments?
  - Plants are pretty dormant in the winter, and often biomass dies way back. Many times you can take advantage of this. Conversely, sometimes treatments later in the season are much less effective, because there's much more to treat than there would have been earlier.
  - If you're managing lake, don't cut aquatic every year: aquatic plants love to be cut and re-grow rapidly. Water primrose- very expensive. For extreme nuisance conditions.
  - 2 techniques- apply herbicide first, remove biomass second? Or vice-versa? Depends on scale. Biomass should come out first.
  - The seasonality issue depends on the plant species.
- Water hyacinth- You are already behind if you start treatment in July. Do treatments in April/May.
- You may be treating biomass that would disappear in winter anyway. Fluctuates by 80% annually. If you spray just before senescence, results may be natural die-off and not herbicide effects.
- Water primrose- Perennial. Treat as soon as you can once growth starts.
- Many perennials- Treat towards end of season- good time to treat with systemic herbicides. Will pull down to root.
- Salmonid areas (waterways with salmon)- Spray is prohibited at certain times. Can't spray until after June 15 unless you get a take permit.
- Question: Is there is a window for control before this season relative to salmonids?
  - Boating and Waterways does the hyacinth control, not CDFA. They have the permits. There may be some local treatments in April that are allowed in certain small cases.
  - Probably can't treat before the salmon season due to biology of plant...ie, they are dormant anyway, so treating is useless.
  - Boating and waterways has spent money on studies- knows why these regulations are in place.

- Fall River Mills? PG&E was harvesting biomass of aquatic weeds to make sure waterways clear, flow moving. They weren't concerned with fragments entirely, but they did use booms to catch fragments. This program was discontinued due to lack of funding. Situation hasn't worsened too much yet, but there have been no big floods since then. May depend on water temperature for aquatic plant population blooms.
- Cut the tops at 4' depth, cut in swaths.

Resources:

- Question: What are some good online resources?
  - Joe Ditomaso's book.
  - CDFA website- not for control, but weed ID.