

# Sabino Canyon Pilot Arundo Removal Project

## Coronado National Forest

Progress Report - Dec 2007 to Mar 2008

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with  
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For more than a decade, the Sabino Dam site has hosted a large stand of giant cane grass or Arundo Donax. Floods following the Aspen Fire of 2003, landslides of Aug. 2006 and subsequent high flows have removed a lot of the riparian trees and shrubs and widely distributed new and invasive stands of Arundo. For birders, hikers and visitors, the Giant Cane grass seems to be taking over ever larger sections of the Sabino Canyon riparian corridor. While Arundo is not as big of a regional threat as Buffel Grass, it is slowly working its way into southwestern riparian systems. There are ever growing stands of it along both the Santa Cruz and Rillito Rivers. Both the Forest Service ([www.invasivespecies.gov/profiles/giantreed.shtml](http://www.invasivespecies.gov/profiles/giantreed.shtml)) and USGS ([sbsc.wr.usgs.gov/research/projects/swepic/SWVMA/InvasiveNon-NativePlantsThatThreatenWildlandsInArizona.pdf](http://sbsc.wr.usgs.gov/research/projects/swepic/SWVMA/InvasiveNon-NativePlantsThatThreatenWildlandsInArizona.pdf)) have identified Arundo as an invasive species and the Southwest Biological Science Center ranks Arundo among the 19 most invasive plants in Arizona. The USDA fact sheet explains the ecological threat of Arundo as follows:

“Giant reed forms dense thickets of distinct clumps which chokes riversides and stream channels, crowds out native plants, interferes with flood control, increases fire potential, and reduces habitat for wildlife... The long, fibrous, interconnecting root mats of giant reed form a framework for debris dams behind bridges, culverts, and other structures that lead to damage. It ignites easily and can create intense fires. Giant reed can float miles downstream where root and stem fragments may take root and initiate new infestations. Due to its rapid growth rate and vegetative reproduction, it is able to quickly invade new areas and form pure stands at the expense of other species. Once established, giant reed has the ability to out-compete and completely suppress native vegetation.”

Recognizing this threat Jim Washburne, a hydrologist with the Department of Hydrology and Water resources at UA, initiated a pilot effort to remove Arundo manually in December of 2007. Unfortunately, it was practically the Christmas holidays before he contacted and obtained permission to start this project from Josh Taiz. This was too late to get other volunteers involved over the “break”. Josh asked us to follow these work guidelines:

- This was to be a pilot effort to evaluate methods and burden on existing programs,
- All roots/rhizomes had to be bagged and placed by established trash cans for removal,
- All cane stalks had to be dragged out to a collection location and tied into ~6’ bundles,
- The whole effort should be conducted in such a way as to minimize the burden on Forest Service staff and volunteers – ie. trash/stalk pick-up had to fit on existing loads,
- Any additional volunteers had to be trained and supervised by Jim,
- Care should be taken not to muddy waters, particularly in upper Canyon where some native fish were being re-introduced.

### First Efforts

Jim began this effort by focusing on clipping seed heads off the top of reeds (apparently the seeds start to disperse after the first hard freeze, which was late this year, around 12/22). A strong wind storm on Christmas eve effectively dispersed all but the most sheltered seed heads. So the strategy he pursued next was to look for very small stands of Arundo (1-10 stalks) to remove between the first “bridge” or water crossing and the base of water tank hill and the Rim trail. This effectively arrests the immediate spread of Arundo (and has been completed) even though many of the larger and more obvious stands remain. During this effort, it became clear that fewer than 10% of these small stands were germinated from seed as relic rhizomes that had floated downstream were clearly present at the other 90% of the sites. For most of this early work, bags with roots were carried out daily but stalks were stacked above high water line for later removal. We are using 40-50 gal, 1.0+ mil black plastic trash bags. The roots are cut into small (fist size) pieces with branch cutters and the resulting bags weigh between 25-40 lbs. In general, most of the work has been done during the cool morning hours, between 8–12 or 9-1. Cane stalks were dragged to a suitable staging area and bundled together with hay bale twine in 6-7' lengths. Unfortunately Jim twisted his ankle (off site on a “fun” hike) on 1/3/08 which necessitated a 10 day break but this allowed him time to begin coordinating efforts with his primary collaborator – the Master Watershed Steward Program, which is affiliated with the Arizona Cooperative Extension and coordinated by Candice Rupprecht. Not only are Master Watershed Stewards (MWS) community members who have already taken the time to learn about local water issues, but they make a commitment to engage in 40 hours of watershed-related community service after completing their training. This makes them perfect “volunteers” for this effort, which requires some hard work over a long time period. Our hope is that many of these stewards will help us manage a larger set of student and community volunteers next winter. Once we started working in the area below the dam, numerous people stopped by to commend us on our efforts and even to join us. Subsequently, we trained several major additional collaborators, some of whom are identified in Table 1.

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Stephen Hansen	Sabino Canyon Volunteer Naturalists	

Table 2, below, outlines the major activities that were accomplished. This time period is defined by when Jim started removal efforts to when the temperature warmed into the 80's (nights ~ 50's), which is also when we expected snakes to start coming out and which we wanted to avoid with volunteers working off the beaten pathways. Approximately 214 volunteer hours resulted in 79 bags of Arundo rhizomes being excavated and removed with their stalks between the first “bridge” and the southern property line. It is hard to define an average removal rate but a skilled

team should be able to remove at least ½ bag/hr/person for the small disperse stand we focused on. Larger stands tend to produce much larger volumes of materials.

<b>Sabino Arundo 2007-2008 Effort Report</b>				
Date	Location/notes	Bags	People	~ work-hours
12/24	Around Rattlesnake ck (Loc1)	Seeds only	1	4
12/25	windy overnight – sheltered areas	Seeds only	1	4
12/26	Loc1 – near shore	2	1	4
12/27	Loc1 – far shore	1.5	1	4
12/28	Stop 1 – near shore	2	1	4
12/29	Stop 1 – far shore	1.5	1	4
12/30	Base of hill/rim trail(Loc2) - far	2.5	1	4
2008		0	0	0
1/1	Loc 2 - near	2.5	1	4
1/3	Twisted ankle in Pima Canyon	0	0	0
1/12	Loc2 - near	.5	1	2
1/13	Loc2	1.5	1	4
1/20	Loc2 – near; drag stalks	2.5	4	16
1/21	Loc2 - far	3	1	4
1/26	Loc2 - far	3	2	8
1/27	Below dam by BC rd (Loc3)	3	3	12
2/3	Loc3	4.5	4	16
2/10	Loc3	7	4	16
2/17	Loc3 & Above dam (Loc4)	18	13	52
2/24	Loc3 & 4	8	8	32
3/2	Loc4	7	3	12
3/9	Below tram stop 4 (Loc5)	9	2	8
	Pilot season - Totals	79	54	214

### **Future Strategies**

Consistent with the USFS's *National Strategy and Implementation Plan for Invasive Species Management*, our desire is to work with community partners and volunteers to prevent the spread of Arundo, identify new stands and rapidly remove them and slowly work on managing or removing the larger stands. We believe that Sabino Canyon's Arundo infestation, with the exception of the area immediately above the dam, can be controlled and virtually eradicated with the help of student and volunteer (hand) labor over the course of one or two more winter seasons. Again, the emphasis on this time period has to do with safety – no snakes and stable water levels, and with comfort – air temperatures being much more comfortable for the heavy work that is involved. Master Watershed Stewards and Sabino Canyon Volunteer Naturalists who gained experience removing Arundo this season are well positioned to work with larger groups in the future if the Forest Service can find a way to accommodate a volume of flux of bags and stalks that might be 3-10 times what was produced this year.

It is recommended that volunteers be organized into teams, lead by experienced volunteers. Because Arundo removal is physically demanding, it is critical that each team member trades off tasks so that no team member overexerts him or herself. It is also important that each team is

provided with enough tools to work efficiently. From our experiences, we have found that teams of ~3-6 people are most effective. The structure of each team is:

- 1-2 stalk cutters, bundler, & draggers
- 1-2 root diggers
- 1-2 root cutter & bagger

In determining the quickest removal process, we have found that best method is to first cut the stalks, then drag them away. The people removing stalks may wish to bundle the stalks at this time or save all bundling for the end of the workday. Due to volunteer time constraints, our recommendation is to either cache or bundle stalks as you work, so that there is not too much additional work to do at the end of the day. As stalks are being bundled, one or two people can begin digging out rhizomes and piling them up, to then be cut and bagged by another volunteer. Its probably best not to have more than three teams in the field at once, so as to keep the pick-up at a manageable level. Based on this methodology, tools needed for each team include:

- 1-2 polaski or pick axe for each digger
- 1-2 pair lopper shears for cutter
- 1 pair hand shears for cutter/bundler
- Heavy-duty (> 1.0 mil), 40-50 gal trash bags
- Heavy-duty twine

### **Conclusions and Other Recommendations**

- Our efforts this winter represent the beginning of a much larger effort next winter and had arrested the spread of Arundo in most locations.
- Start contacting potential student and volunteer groups during the early fall about helping. We should focus on groups such as:
  - MWS, Audubon, Sabino-related groups, Scouts, Arizona Rivers schools, Tucson Clean and Beautiful, High school community service advisors.
- MWS has developed a volunteer guide to removing Arundo; a copy is attached.
- Develop a schedule where 2-4 experienced volunteers help train and supervise new groups for at least their first two visits. In any case, have the groups schedule work dates through us or the Forest Service to avoid chaos and optimize the use of equipment. Encourage groups to volunteer for multiple days.
- Define the 2008-2009 work season to run from late October to March 1. Assuming that seeds become ready to fall/fly after the first freeze, which is typically about Dec. 1, extra effort will be required between Nov. 20 and Dec. 20 to clip and isolate seedpods.
- Work closely with Coronado National Forest so as not to negatively impact visitor appreciation or volunteer staff work loads.
- Get a lightweight, balloon tire, wheelbarrow to help remove the root bags. In fact, if a trailer or pickup can be parked adjacent to the real big stands, this would cut down on the need to cut the roots up so small. In fact, it might be possible to build a simple handcart that would facilitate hauling stalks long distances, even over rough terrain. These transporters will be particularly useful when we have high school-age volunteers.
- The half-day (~4 hour schedule) seemed to work out well. The work is so demanding I never heard a complaint when we started to pack up around mid-day.

- GPS mapping of locations where we removed Arundo and locations that still have Arundo present may be useful in monitoring the spread of Arundo in Sabino Canyon. This mapping could be done in the summer, as it is less physically demanding than the actual removal.
- Towards the end, we kept literature on-hand that passer-bys could pick-up and read about and it was clear that the tram drivers had read some of this literature and began incorporating this project into their narrative, particularly when we were working next to the road. Additionally, we should provide PR and project visibility on sign boards around Visitor Center so people are informed about this project and have an opportunity to participate as concerned individuals, not necessarily affiliated with a target group.
- Consider contacting Pima County Parks and Rec. and Pima Flood Control regarding the removal of small Arundo stands up and down the Rillito Wash.
- Consider responding to outside RFP's for some of the equipment necessary to deal with the larger volumes of waste material, such as a tree shredder or air curtain destructor.

### **Next Steps**

Candice has requested proceedings from the Arundo/Phragmites Symposium sponsored by the Western Society of Weed Science, held March 13 and 14, 2008. Arundo has been a serious problem in California, so we look forward to reading these proceedings to help guide us in developing best strategies for expanding our removal efforts, based on current research being done in the field of weed science.

Based on initial outcomes, additional literature reviews and feedback from volunteers, Jim and Candice plan to develop an implementation strategy and schedule for expanding this project to recruit additional volunteers. Based on conversations with individuals who stopped to talk to us while we were working, we will follow-up with various contacts to help us identify interested community groups.

If necessary, we will organize more in-depth training materials and workshops to ensure that our volunteers are adequately trained in best practices for Arundo removal, as well as necessary safety measures.

### **Potential Problems**

Jim Washburne developed a severe skin rash on March 13, four days after his last work trip. The rash appears to be related to the many jabs and scabs he built up over his almost 20 days working in the canyon. Previously, he suffered from seasonal allergies, particularly related to rag weed (which had not yet seeded out) but might have been present in the dust covering thorns, etc.. This suggests that full skin cover (long-sleeves) and gloves should be strongly encouraged.